



ISSN:2455-7838 (Online)

DOI : 10.36713/epra2016

SJIF Impact Factor(2021) : 8.013

ISI I.F Value : 1.241

**EPRA International Journal of**  
**RESEARCH & DEVELOPMENT**  
**(IJRD)**

*Monthly, Peer Reviewed (Refereed) & Indexed International Journal*

*Volume - 6 Issue - 6 June 2021*



### Chief Editor

Dr. A. Singaraj, M.A., M.Phil., Ph.D.

### Managing Editor

Mrs.M.Josephin Immaculate Ruba

### EDITORIAL ADVISORS

1. Prof. Dr.Said I.Shalaby, MD,Ph.D.  
Professor & Vice President  
Tropical Medicine,  
Hepatology & Gastroenterology, NRC,  
Academy of Scientific Research and Technology,  
Cairo, Egypt.
2. Dr. Mussie T. Tessema,  
Associate Professor,  
Department of Business Administration,  
Winona State University, MN,  
United States of America,
3. Dr. Mengsteab Tesfayohannes,  
Associate Professor,  
Department of Management,  
Sigmund Weis School of Business,  
Susquehanna University,  
Selinsgrove, PENN,  
United States of America,
4. Dr. Ahmed Sebihi  
Associate Professor  
Islamic Culture and Social Sciences (ICSS),  
Department of General Education (DGE),  
Gulf Medical University (GMU),  
UAE.
5. Dr. Anne Maduka,  
Assistant Professor,  
Department of Economics,  
Anambra State University,  
Igbariam Campus,  
Nigeria.
6. Dr. D.K. Awasthi, M.Sc., Ph.D.  
Associate Professor  
Department of Chemistry,  
Sri J.N.P.G. College,  
Charbagh, Lucknow,  
Uttar Pradesh. India
7. Dr. Tirtharaj Bhoi, M.A, Ph.D,  
Assistant Professor,  
School of Social Science,  
University of Jammu,  
Jammu, Jammu & Kashmir, India.
8. Dr. Pradeep Kumar Choudhury,  
Assistant Professor,  
Institute for Studies in Industrial Development,  
An ICSSR Research Institute,  
New Delhi- 110070, India.
9. Dr. Gyanendra Awasthi, M.Sc., Ph.D., NET  
Associate Professor & HOD  
Department of Biochemistry,  
Dolphin (PG) Institute of Biomedical & Natural  
Sciences,  
Dehradun, Uttarakhand, India.
10. Dr. C. Satapathy,  
Director,  
Amity Humanity Foundation,  
Amity Business School, Bhubaneswar,  
Orissa, India.



ISSN (Online): 2455-7838

SJIF Impact Factor (2021):8.013

ISI I.F. Value : 1.241

DOI : 10.36713/epra2016

## EPRA International Journal of Research & Development (IJRD)

Monthly Peer Reviewed & Indexed  
International Online Journal

Volume: 6, Issue:6, June 2021

Indexed By:



Published By  
EPRA Publishing

CC License





## CONTENTS

S.NO	TITLE	AUTHOR/S	PAGES
1	STRUCTURE, RISK FACTORS AND CLINICAL PECULIARITIES OF ORAL MUCOSA DISEASE	Raxmonova Feruza Mutalibovna, Oxunjonova Xayotxon Xosiljonovna	1-3
2	HOMOGENEOUS SUBSET STANCE OF RHIZOME LENGTH AND OPERATIONAL MACHINE SPEED ON PLANTING PARAMETERS OF TRACTOR DRAWN TURMERIC PLANTER	Muogbo P. C1, Obasa P. A	4-10
3	ROLE-PLAYING GAMES IN THE DEVELOPMENT OF DIALOGUE SPEECH IN THE PROCESS OF TEACHING A FOREIGN LANGUAGE	Shahnoza Ilxambekovna Matyakubova, Sitora Baxodirovna Djabbarova, Charos G'anisherovna Uralova	11-14
4	VODCASTING: A TOOL TO AID MODULAR LEARNING IN ENGLISH	Rica Mae B. Javier	15-26
5	THE IMPLEMENTATION OF FLEXIBLE LEARNING IN ENGLISH: INPUT FOR PRACTICE SUSTAINABILITY	Ms. Cristina G. Trinidad	27-39
6	ENHANCING ENGLISH VOCABULARY THROUGH DIGITAL LEARNING APPLICATIONS	Ammi Grace L. Ramos	40-45
7	SEMANTIC AND FUNCTIONAL FEATURES OF THE VERB WITH THE MEANING "TO WORK" IN JAPANESE AND RUSSIAN LANGUAGE (Comparative study) <a href="https://doi.org/10.36713/epra7234">https://doi.org/10.36713/epra7234</a>	Fatkulina Luiza	46-53
8	QUALITY BY DESIGN APPROACH FOR ANALYTICAL METHOD DEVELOPMENT	Kema Vijay Kumar	54-60
9	DEVELOPMENT OF TRANSPORT SYSTEM IN THE KHOREZM OASIS IN THE LATE XIX AND EARLY XX CENTURIES	Jumaniyozov Fazliddin Bobojonovich	61-66
10	BIDYO KOMPREHENSİYANG APLIKASYON: BISA NG PAGGAMIT SA PAGKATUTO NG MGA MAG-AARAL SA ASIGNATURANG FILIPINO TUNGO SA AKADEMIKONG PAGGANAP	Jeny Ann G. Taracatac	67-75
11	IOT BASED APPROACH FOR REMOTELY MONITORING AND ALARMING A DROWSY DRIVER <a href="https://doi.org/10.36713/epra7217">https://doi.org/10.36713/epra7217</a>	Mr. Aniket Ashok Bhamani, Mr. Sanyam Sanjay Mehta	76-83
12	CULTURAL MISFIT OF INDIAN HIGHER EDUCATION: A REVIEW	Rakesh Pathak, Smita	84-89
13	SYNTHESIS, CHARACTERIZATION AND ENZYME INHIBITORY STUDIES OF 4-THIAZOLIDONE DERIVATIVES	M.Lalitha, M.Srikanth Goud, Y.Ashwini,	90-98

		S.Vijaya, P.Naresh	
14	STUDENT FRIENDLY CHATBOT-ANDREA	Sparsh Wadhwa, Tanya Yadav, Mr. Antim Dev Mishra	99-101
15	A STUDY THE CUSTOMER SATISFACTION TOWARDS MRF TYRES IN KARUMATHAMPATTI CITY	Mr. P. Vimal Kumar, Mr. R. Yuvan prasath	102-107
16	A STUDY ON CUSTOMER SATISFACTION OF FURNITURE AND FITTINGS PRODUCTS SPECIAL REFERENCE WITH COIMBATORE DISTRICT	Niswar ushen. S , Mr. K. Ponnumani	108-112
17	VILLAGE DEVELOPMENT – A CASE STUDY ON NGO IN UKHRUL DISTRICT, MANIPUR, INDIA	Ungshungkhui Rephung, A. Balakrishnan	113-117
18	THE CONTENT AND STRUCTURE OF THE EDUCATIONAL AND COGNITIVE COMPETENCE OF UNIVERSITY STUDENTS	Avezmuratova D.A.	118-120
19	YOUTH - OBJECT OF MASS CULTURE IDEOLOGY	Tashmatov Ibragimjan	121-123
20	A REVIEW OF DUAL-MOTOR SYSTEM AND METHODS FOR CHARGING BATTERIES OF AN E-VEHICLE <a href="https://doi.org/10.36713/epra7181">https://doi.org/10.36713/epra7181</a>	Lokesh M. Giripunje, Vipul Kumar Singh, Govind Suryakant Kendre	124-126
21	INFLUENCE OF UNIVERSITY ADMINISTRATION ON HUMAN RESOURCE UTILIZATION AND QUALITY EDUCATION DELIVERY IN STATE UNIVERSITIES IN NORTH EASTERN NIGERIA	Prof. (Mrs.) C. E. Edemenang, DR. Muhammad Adam, Dr. S. S. Sara, Salisu, Salome Audu	127-134
22	THE IMPACT OF CONFLICT RESOLUTION ON PEACE BUILDING IN MOGADISHU SOMALIA	Abdi Kamil Iman Jim'ale, Abdullahi Mohamed Sheik Ali	135-140
23	STRUCTURE OF MORBIDITY OF THE ORAL MUCOSA	Tojiboeva Yokutxon Rejabovna	141-146
24	POSSIBILITIES OF GETTING ELECTRICITY WITH THE HELP OF A SMALL SOLAR FURNACE	Kuchkarov Akmaljon Axmadaliyevich, Muminov Shermuhammad Abdushukur ugli, Egamberiyev Xomidjon Abdullayevich	147-151
25	DESIGN AND CHARACTERIZATION OF PRAMIPEXOLE DIHYDROCHLORIDE NANOPARTICLES	K.Vandana*, G.Samyuktha, L.Swathi, K.Priyanka, A.Srinu	152-159
26	A REVIEW ON CHEMISTRY OF PEPTIDES	Satyam Tiwari, Nitin Rajan, Udit Sagar Dwivedi	160-167
27	THE ROLE OF DEMOCRACY ON CONFLICT RESOLUTION IN MOGADISHU, SOMALIA	Mowlid Mohamud Gabow	168-174
28	WE SAFE WOMEN SAFETY APPLICATION	Abhishek Choudhary, Anurag Upadhyay, Chayan Barua	175-179
29	BARRIERS OF DISTANCE LEARNING ON LEARNERS' LIFE SKILLS	Hannah Mae Z. Gutierrez	180-190

30	COPING WITH THE CHALLENGES IN TEACHING MAPEH SUBJECTS AMONG NON-SPECIALIZED TEACHERS OF DISTRICT 4 IN LAGUNA <a href="https://doi.org/10.36713/epra7323">https://doi.org/10.36713/epra7323</a>	Reem D. Montesor	191-201
31	CORRELATION OF SOCIAL DEPRIVATION ON THE MENTAL HEALTH AMONG THE CLUSTER 7 TEACHERS IN CALAMBA CITY, LAGUNA, SCHOOL YEAR 2020-2021 <a href="https://doi.org/10.36713/epra7290">https://doi.org/10.36713/epra7290</a>	Mart Albert A. De Guzman	202-211
32	ONLINE TEACHING LEARNING: ITS RELATIONSHIP ON PERSEVERANCE AMONG PRIVATE HIGH SCHOOL TEACHERS IN LUCBAN, QUEZON <a href="https://doi.org/10.36713/epra7284">https://doi.org/10.36713/epra7284</a>	Melchie Palmado Veluz	212-217
33	DEVELOPMENT AND VALIDATION OF SUPPLEMENTAL MATERIAL ON OPERATION ON INTEGERS	Serlie G. Cruz	218-227
34	THE USAGE OF IRONY IN O. HENRY'S STORY "THE GIFT OF THE MAGI"	Fayzulloyeva Zilola Zafarovna	228-230
35	A STUDY ON CUSTOMER ATTITUDE TOWARDS THE USAGE AND PROBLEMS OF PLASTIC MONEY - WITH REFERENCE TO THE WOMEN CUSTOMERS OF SBI BANK OF MANGALORE CITY	Dr. Sowmya Praveen K, Dr. C.K. Hebbar	231-234
36	INNOVATIVE SUPPLY CHAIN SOLUTION FOR INDIAN AUTOMOBILE MANUFACTURING SECTOR: A CASE STUDY <a href="https://doi.org/10.36713/epra7336">https://doi.org/10.36713/epra7336</a>	Sanjay Choudhary , Deepanshu Arora, Sunil Kumar Jakhar , Krishna Nandan, Amogh Sharma	235-238
37	IMPROVING THE EFFECTIVENESS OF TREATMENT OF PATIENTS WITH BREAST CANCER BY OPTIMIZING MODERN METHODS OF RADIATION DIAGNOSTICS	Isakova Shakari Isakovna	239-241
38	ACCEPTABILITY AND EFFECTIVENESS OF MELC-BASED SUPPLEMENTARY LEARNING MATERIALS IN PHYSICAL EDUCATION 9 <a href="https://doi.org/10.36713/epra7331">https://doi.org/10.36713/epra7331</a>	Jeffrey A. Castillo, LPT	242-253
39	STUDY AND DETERMINATION OF ANTHELMINTIC ACTIVITY OF ETHANOLIC LEAF EXTRACT OF PASSIFLORA EDULIS SIMS	Prashant Singh, Ayasha Singh, Kush biswas	254-258
40	OPTIMIZATION OF DAYLIGHT IN MUSEUMS AND ART GALLERIES <a href="https://doi.org/10.36713/epra7327">https://doi.org/10.36713/epra7327</a>	Ar. Kirti Varandani, Ar. Vibhuti Joshi, Ar. Sangeeth S Pillai	259-265
41	IMPROVED PERFORMANCE OF PHOTOVOLTAIC BASED EMBEDDED DUAL POWER SOURCE SL-QUASI Z SOURCE INVERTER FOR IM DRIVE <a href="https://doi.org/10.36713/epra7328">https://doi.org/10.36713/epra7328</a>	S. Priyadharsini, T. S. Balaji Damodhar, C. Kannan, L. Ganesh Babu	266-273
42	CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT LEGISLATION AND FRAMEWORK IN INDIA - A MINI	Yogesh Kumar Raj, Ar. S Choudhary	274-282

	REVIEW WITH BEST PRACTICES IN C & D WASTE MANAGEMENT <a href="https://doi.org/10.36713/epra7388">https://doi.org/10.36713/epra7388</a>		
43	PERCEPTIONS OF PARENTS AND LEARNERS TO MODULAR DISTANCE LEARNING AS CONTEMPORARY TEACHING STRATEGY <a href="https://doi.org/10.36713/epra7330">https://doi.org/10.36713/epra7330</a>	Emma S. Trovela	283-296
44	DEVELOPMENT OF ORBITAL WRAPPING MACHINE	Smitesh Bobde, Shailesh Dhomne, Saurabh Bobde, S G Ghugal	297-301
45	USE OF BIOLOGICALLY ACTIVE ORGANIC COMPOUNDS IN AGRICULTURE AND METHODS OF THEIR SYNTHESIS	M.S. Xatamova, L.M.Usmonova	302-305
46	THEORETICAL PROBLEMS OF COGNITOLIGY AND COGNITIVE LINGUISTICS	Atabayeva Zarnigor Bakhran kizi	306-309
47	STUDENTS PERCEPTION ON EDUCATIONAL LOAN WITH SPECIAL REFERENCE TO COIMBATORE DISTRICT	Mr. Nishanth Kumar H, Ms. P.Maheswari	310-315
48	A STUDY ON CUSTOMER SATISFACTION ABOUT BIG BASKET WITH SPECIAL REFERENCE TO COIMBATORE CITY	Chandru.S, Mr. K. Ponnnumani	316-320
49	SOCIAL MEDIA AND LEARNING OF BUSINESS SUBJECTS IN SENIOR SECONDARY SCHOOLS IN IKORODU LOCAL GOVERNMENT AREA OF LAGOS STATE <a href="https://doi.org/10.36713/epra5611">https://doi.org/10.36713/epra5611</a>	Fasae, Felicia Bosede Kehinde	321-328
50	GROUNDWATER SCENARIO OF AJMER DISTRICT, RAJASTHAN AN ENVIRONMENTAL ISSUE	Dr. Tripti Yadav	329-333
51	AVILABLE COVID-19 VACCINES FOR PUBLIC AND THEIR CHARACTERISTICS: A CASE STUDY	Balwant Singh, Sakshi Tripathi, Shivangi Tripathi	334-340
52	TEACHING STRATEGIES IN ONLINE DISTANCE LEARNING ON CRITICAL THINKING SKILLS AND TECHNICAL SKILLS OF THE STUDENTS <a href="https://doi.org/10.36713/epra7397">https://doi.org/10.36713/epra7397</a>	April L. Trilles	341-355
53	SWITCH IT UP: A SURVEY ON SWITCHING PRACTICES AMONG JUNIOR HIGH SCHOOL STUDENTS OF INTERNATIONAL SCHOOL FOR BETTER BEGINNINGS IN LUCENA CITY, QUEZON PROVINCE	Gian Placido Rodriguez Ramos	356-364
54	THE LIVED EXPERIENCES OF TEACHER AND STUDENTS IN PE AMIDST THE PANDEMIC <a href="https://doi.org/10.36713/epra7342">https://doi.org/10.36713/epra7342</a>	Ma. Isabel O. Mojica	365-372
55	INSIGHTS IN TO THE EMPLOYEE TRAINING PROGRAMMES OF INDIAN CEMENT INDUSTRY: AN EMPIRICAL STUDY	Ms. Jeevana Chitreddy, Prof.G.L. Narayanappa	373-376

	<a href="https://doi.org/10.36713/epra7433">https://doi.org/10.36713/epra7433</a>		
56	ROLE OF EDUCATION IS A MILESTONE OF WOMEN EMPOWERMENT	Ms. Parul Bhargava	377-380
57	DEVELOPMENT AND VALIDATION OF SELF-LEARNING MODULE IN HORTICULTURAL PRODUCTION	Gerlin P. Gallardo	381-391
58	SUPERCAPACITOR TECHNOLOGY	Vishal V. Mehtre, Kunwar Pratoon Singh	392-395
59	STRUCTURAL-FUNCTIONAL NATURE OF ECONOMIC CULTURE: BASIC APPROACHES	Jurayev Luqmon Narzilloyevich	396-398
60	FLUORIDE CONTENT IN GROUNDWATER QUALITY OF SOME VILLAGES IN RAJASTHAN, INDIA	Kishan Gopal Jhanwar, Rajeev Mehta, Preeti Mehta	399-406
61	A SURVEY ON LOWERING POWER CONSUMPTION IN CLOUD ENVIRONMENT WITH GREEN COMPUTING TECHNIQUES	Suraj Chandran, Abhijit Banubakode	407-414
62	TECHNOLOGY OF PRODUCTS OF INTERACTION OF OLEIC ACID AND MALEIC ANHYDRIDE	Feruza Boboqulova, Oytura Maksumova	415-418
63	EFFECTIVENESS OF STRUCTURED TEACHING PROGRAMME ON KNOWLEDGE REGARDING MANAGEMENT OF PREMENSTRUAL SYNDROME AMONG ADOLESCENT GIRLS	M.V. Hyrone Zohara, M.Sc.(N),	419-422
64	A REVIEW PAPER ON QUANTITATIVE ASSESSMENT OF SOLAR PV SYSTEM IN JAIPUR <a href="https://doi.org/10.36713/epra7508">https://doi.org/10.36713/epra7508</a>	Mr. Kishan Khatri Dr. Shweta Choudhary	423-431
65	FLYWHEEL STORAGE SYSTEM	Vishal V. Mehtre Rupsi Sharma	432-435
66	IMPACT OF GREEN ROOF ON HEATING AND COOLING IN CONTEXT OF DIFFERENT CLIMATIC ZONES IN INDIA <a href="https://doi.org/10.36713/epra7466">https://doi.org/10.36713/epra7466</a>	Ar. Ankur Bhardwaj, Dr. Shweta Chaudhary, Ar.Kirti Varandani	436-440
67	ASSESSMENT OF THE PROBLEMS IN THE MANAGEMENT OF URBAN HOUSING (A CASE STUDY OF OWERRI MUNICIPALITY, IMO STATE)	Nwabueze, O.p.O., Onwuka, E.O., Uzomba, N.I, Ekeh, C.U.N. Akuesi, C.U.	441-450
68	THE ROLE OF SCHOOLS IN YOUTH DEVELOPMENT <a href="https://doi.org/10.36713/epra7526">https://doi.org/10.36713/epra7526</a>	Ishita Kapur	451-455
69	PROFESSIONAL MENTORSHIP IN NURSING	Ms. Beulah Jasmine Rao, Dr. Ashok Dhanwal	456-458
70	A WEB APPLICATION ON HEALTH AND FITNESS "MY FITNESS BUDDY"	Avi Kadam, Aakash Maheshwari, Aman Thakre	459-463



# STRUCTURE, RISK FACTORS AND CLINICAL PECULIARITIES OF ORAL MUCOSA DISEASE

**Raxmonova Feruza Mutalibovna<sup>1</sup>,  
Oxunjonova Xayotxon Xosiljonovna<sup>2</sup>**

*<sup>1</sup>Assistant of the Department of Dentistry and Propaedeutics of Dental Diseases*

*<sup>2</sup>Assistant of the Department of Dentistry and Propaedeutics of Dental Diseases, Andijan State Medical Institute, Andijan City*

## ABSTRACT

**Aim.** To analyze the structure, risk factors and peculiarities of clinical manifestation as well as quality of initial diagnosis of oral mucosa and red border diseases.

**Materials and methods.** The study is based on the results of medico-consultative reception of 225 patients with oral mucosa diseases for the period of 2017—2021.

**Results.** It was established that in the structure of oral mucosa and red border diseases there predominate lichen rubber planus, chronic recurrent thrush and leukoplakia among the inhabitants of Perm and Perm region. The main local (chronic mechanic injury, smoking, irritating, allergenic and ulcerogenic action of drugs and oral hygienic preparations) and systemic (chronic cardiovascular, endocrine, digestive pathologies) risk factors of developing chronic oral mucosa diseases were detected. High percent of diagnostic errors and insufficient level of oncologic alarm among dentists was noted.

**Conclusion.** Detailed analysis of the results of clinicolaboratory investigations indicates a rather wide spectrum of oral mucosa diseases requiring special medical and diagnostic approaches as well as patients' follow-up observation in conditions of specialized centre

**KEY WORDS-** Oral mucosa diseases, lichen rubber planus, leukoplakia, risk factors, diagnosis, treatment.

## INTRODUCTION

Many forms of diseases of the oral mucosa are characterized by a chronic recurrent course, occur with pronounced clinical symptoms, can provoke and aggravate the course of systemic diseases (Sds), are accompanied by a decrease in dental quality of life indicators [1, 2, 3, 6].

The analysis of the prevalence and clinical structure of diseases of the oral mucosa in a particular region of the Republic of Uzbekistan with different socio-economic status of the population and the organization of dental services will identify the needs for specialized dental care, determine the primary tasks to improve the quality of diagnosis and treatment of patients with diseases of the oral mucosa. With this in mind, according to the data of a specialized 5-year medical consultation, a prospective clinical study was conducted to assess the structure, risk factors and features of the clinical manifestation of oral mucosa diseases in the residents

of Andijan. The aim of the work was also to analyze the quality of the primary diagnosis of diseases of the oral mucosa and the red border of the lips in dental institutions in Andijan.

The aim of the study was to study the risk factors, clinical features, and quality analysis of the primary diagnosis of diseases of the oral mucosa and the red border of the lips.

## MATERIALS AND METHODS OF RESEARCH

In the period from 2017 to 2021, 225 people from the city of Andijan and the Andijan region applied to the Department of Faculty Dentistry and Propaedeutics of Dental Diseases of the Andijan State Medical Institute for medical advice on diseases of the oral mucosa.

Clinical examination of patients was carried out in accordance with the WHO recommendations (Kraemer J. R. et al., 1980) on a 4-level diagnostic



system [5]. The examination included clarification of the main complaints and anamnesis of the disease, an objective assessment of the state of the oral cavity (PR): teeth, periodontal disease, oral mucosa and ccG according to visual and computer analyses. According to the indications, cito -, histo - and microbiological studies of the biomaterial (smear-print, biopsy material, oral fluid) were performed. The data of the complex examination were recorded in the outpatient medical history and the dispensary card of the patient with the pathology of oral mucosa.

To assess the quality of the primary diagnosis of the disease of the oral mucosa, copies of the dental patient's medical records, referrals of dentists, and anamnesis data were analyzed.

## RESULTS AND DISCUSSION

Among the examined patients, residents of the regional center dominated (84.2%), 15.8% of patients — residents of the Andijan region. Patients were more often referred to a consultative appointment by dentists of municipal dental clinics

**Table 1. Distribution of patients with oral mucosa pathology by age and sex abs. number, %**

Gender	Age (years)								Total	
	2020-34		35-44		45-64		65 and older			
	abs.	%	abs.	%	abs.	%	abs.	%	abs.	%
Men	8	3,4	9	4,1	47	20,8	11	4,9	73	33,2
Women	15	6,8	22	9,8	97	43,7	16	6,5	150	66,8
Total	23	10,2	31	13,9	145	64,5	26	11,4	225	100

Various forms of precancerous ccG (limited precancerous hyperkeratosis, cheilitis Manganotti, cutaneous horn, warty precancer) were detected in 60 patients (2.8%). Various forms of pemphigus, lupus erythematosus, and exudative erythema multiforme were diagnosed in 0.3% of cases. A relatively high number of people with identified drug - related lesions of the oral mucosa and chemomucositis (0.6 and 0.7%, respectively) drew attention to themselves.

cPI oral mucosa was more often detected in women than in men.

in men (55.5 and 44.5%, with  $p < 0.001$ ), mainly at the age of 45-65 years. The relatively high prevalence of the disease in young men is shown (26.7% of men were under the age of 35). The structure of cPI was dominated by destructive forms of lesion: erosive - ulcerative (38.6%), exudative-hyperemic (17.4%), hyperkeratotic (12.6%) and bullous (7.8%). Attention was drawn to the fact that in 23.6% of cases, patients with a typical form of cPI were referred for consultation, the diagnosis of which should not cause difficulties with the classic manifestation. In 64.7% of cases, a severe continuously recurrent course of the disease with pronounced edematous pain (90.5%), sensory - paresthetic (72.3%), xerostomic (80.3%) and dysgeutic (58.0%) symptoms was revealed. General

(45.5%), private dental offices (23.9%) of Andijan region, medical institutions of various localities of Andijan region (15.3%); 15.3% of patients independently applied for medical advice.

The age and sex characteristics of the examined persons are presented in Table 1. Women (66.8%) were more often referred for diseases of the oral mucosa, mainly at the age of 45 to 64 years. The structure and prevalence of oral mucosa diseases identified by the results of a comprehensive examination of patients are presented in Table 2.

In the structure of diseases of oral mucosa and ccG, lichen planus (cPI), chronic recurrent aphthous stomatitis (hRAS) and leukoplakia (l) were predominant, detected in 31.5, 17.5 and 15% of patients, respectively. further in the frequency of occurrence were noted: glossitis (11.3%), mainly rhomboid, traumatic ulcers (8.2%), candidiasis (7.5%), papillomavirus (2.1%) and herpetic (1.8%) lesions of the oral mucosa.

complaints in all patients were manifested by psychovegetative syndrome, cancer and AIDS phobia (42.9, 32.2 and 24.9%, respectively). It was found that more often (91.8%) the severe recurrent course of cPI developed against the background of chronic Sz, the structure of which was dominated by diseases of the gastrointestinal tract (90.1%), endocrine (55.7%), cardiovascular (52.3%) and immune (22.6%) systems. The role of acute stress in the genesis (debut, exacerbation) of CPL SOPR was noted by 76.8% of patients. in most of the patients, non-sanitized PR was detected, local risk factors were established: chronic mechanical injury of the PR (55.7%), irritating, allergizing, lichenizing and xerogenic effects of drugs (19.7%) and hygiene products of the PR (16.4%). In 67.7% of patients with cPI of the PR, a combination of two or more SS was noted (more often a combination of arterial hypertension (AH), type II diabetes mellitus (DM) and chronic cholecystopancreatitis or AH, gastric ulcer hypothyroidism), in which patients were long-term prescribed up to 10 or more drugs (LP).

When assessing the quality of the primary diagnosis of cPI SOPR, it was revealed that only in 46.1% of cases it corresponded to the I and II diagnostic levels, when the dentist who referred the patient to the consultation stated the presence of a



pathology of SOPR or identified its nosological form. In 48.9% of cases, the diagnosis of CPL SOPR caused direct difficulties for dentists. A particularly high percentage of diagnostic errors was recorded in hyperkeratotic (85.7%), typical (57.1%), exudative - hyperemic and bullous forms of CPL oral mucosa (37.5 and 33.3%, respectively). Only in 5% of cases, the correct detailed diagnosis of the disease was established (in the erosive-ulcerative form of CPL oral mucosa). The low quality of the diagnosis of CPL oral mucosa was confirmed by a high number of under-examined patients (74.6%) and cases of overdiagnosis of CPL oral mucosa, defined as cancer of the SOPR (9.8%). only 16.8% of patients with CPL oral mucosa were registered with a dentist at the dispensary.

Chronic recurrent aphthous stomatitis was detected in 17.5% of cases, mainly in young people (20-34 years), and in women more than 2 times more often than in men (67.6 vs. 32.3%). There was a seasonal occurrence of exacerbations of hRAS (spring-autumn period). in the majority of patients, the disease lasted 3-5 years, and 46.8% of patients noted low effectiveness of the prescribed, mainly local, treatment. More often, the fibrotic form of hRAS was diagnosed (47.6%), the necrotic form was detected in 36.9%, the glandular form — in 13%, and the scarring form — in 2.5% of patients.

In 65.9% of patients, a chronic recurrent course of hRAS with typical pain and paresthetic symptoms was revealed.

The favorite areas of aft localization on the SOPR were identified: the retromolar region and transitional folds (46.8% each), the sublingual region (33.5%), the hard and soft palate (26.8%), the alveolar process (10.3%), the cheek mucosa (10.3%) and the tongue (8.5%).

## CONCLUSION

A comprehensive analysis of the results of clinical and laboratory studies indicates a fairly wide range of diseases of the oral mucosa that require special diagnostic approaches and dispensary monitoring. The identification of a large number of local risk factors, the low level of oral sanitation in patients with diseases of the oral mucosa indicate an insufficient amount of medical and professional measures carried out by local dentists. The high frequency of detection and difficulties in diagnosing precancerous diseases of the oral mucosa actualize the importance of oncological alertness in dentists.

The high percentage of people with non-sanitized oral cavity, the presence of a large number of local risk factors in patients with the pathology of oral mucosa, as well as a high percentage of direct diagnostic errors, under - examined patients and cases of overdiagnosis of diseases of oral mucosa indicate

the need to improve the provision of dental care to this category of patients in a specialized medical and diagnostic center.

## LIST OF LITERATURE

1. Gileva O. S., Libik T. V., Khalilaeva E. V. *Dental health in the criteria of quality of life. Medical Bulletin of Bashkortostan* 2011; 3: 6-11.
2. Gileva O. S., Shabunina I. G. *The main symptom complexes of lesions of the oral mucosa in systemic pathology. Nizhny Novgorod Medical Journal. Appendix "Dentistry". N. Novgorod* 2003; 5: 125-125.
3. O Gileva. S., E Khalilaeva. V., Libik T. V. *Multi-stage validation of the international quality of life questionnaire "Profile of the impact of dental health" ohip v-49-RU. ural Medical journal*; 8: 104-109.
4. Kuzmina E. M. *Stomatological morbidity of the Russian population. Moscow: MGMSu* 2009; 225.
5. Bates B., Bickley L., Huckelman R. A. *Clinical studies of patients with oral pathology.* 1997; 86.
6. Scully S., Flint S., Porter S. *Diseases of the oral cavity and maxillofacial region. Taylor and Francis* 2004; 595.



# HOMOGENEOUS SUBSET STANCE OF RHIZOME LENGTH AND OPERATIONAL MACHINE SPEED ON PLANTING PARAMETERS OF TRACTOR DRAWN TURMERIC PLANTER

**Muogbo P. C<sup>1</sup>, Obasa P. A<sup>2\*</sup>**

<sup>1</sup> National Root Crops Research Institute, Nyanya Sub- Station, Abuja, Nigeria.

<sup>2</sup> Department of Agricultural and Bioresources Engineering, Federal University of Technology, Minna, Niger State Nigeria.

\*Corresponding Author: **Obasa P. A**

## ABSTRACT

The production of the relatively homogeneous Subsets provided the request for a post-hoc test to address multiple comparisons of data collected on the planting parameter of the developed tractor turmeric planter consisting of a ground drive, adjustable metering system, furrow opening, furrow closing unit, press wheel, hopper, residue cutting edge and power transmission mechanism. The planting recital measurement of the turmeric rhizome planter was carried out using two variables, three levels of turmeric rhizome lengths at 30 mm, 45 mm and 60 mm and three levels of operating speeds at 8 km/h, 10 km/h and 12 km/h respectively. The Turkish post-hoc test and analysis of variance (ANOVA) reflects a substantial level between the post-hoc groups which provides better information on the factors impact within the framework community of the experimenter. Rhizome length as a significant effect in the community on planting production, fuel consumption, slipping of the wheel. Mainly the rhizome length of 60mm and no significant effect between 30mm and 45mm although there is no significant effect on the average field capacity of all three levels, the operating speed of the established planter was significant at each of the three levels of the plant parameter test performed all the reactions only the average field capacity shown. The planting parameters for the factors considered at three levels showed a significant impact at each level and demonstrated the actions of each treatment.

**KEYWORDS:** Development, Efficiency, Homogenous, Planter, Rhizome.

## INTRODUCTION

Post-hoc analysis also offers even more insight into discrepancies or similarities between particular groups and is thus an essential step in the analysis of data. Tukey's test is only one of the many approaches available for post-hoc analysis and, as mentioned above, is considered to be the best approach in a wide range of cases. (Aaron, 2018). Homogeneous subset test shows honest substantial difference of data that can

be HSD or LSD statistic; Post-Hoc tests implies to interpret the effects of experimental data. They are also based on the likelihood of reaching at least one false conclusion in a sequence of hypotheses tests; the probability of at least one type I error in a collection of comparisons.

The most popular post-hoc tests are the following: The Studentized Range (q) is the discrepancy between the largest and the smallest data



point in the sample determined by the sample standard deviations (Laerd,2018). The studentized range distribution is the probability distribution of studentized categories for discrete, equally distributed random variables that are normally distributed. It is mainly used in post-hoc studies, such as Tukey's HSD, to reduce the probability of Type I error. The form of the studentized range distribution depending on the sense of checking if two means are identical, it is similar to the T distribution. However, it takes into consideration of the number of means available. The more it means, the higher the critical value.

The Tukey Test (or Tukey procedure), also known as Tukey's Honest Significant Difference Test, is a post-hoc test based on the studentized range distribution. An ANOVA test can tell you if your overall results are statistically significant, but it won't tell you exactly where the differences lie. After running an ANOVA and finding significant results, you can run Tukey's HSD to find out which specific groups means (compared to each other) are different. The test compares all possible means pairs (Stephanie, 2017).

To exam all pairwise assessments among means using the Tukey HSD, calculate HSD for each pair of means using the following formula:

$$\text{HSD} = \frac{M_i - M_j}{\sqrt{\frac{MS_w}{n_h}}}$$

The output of the Homogenous Subsets is constructed by a request for post-hoc tests and addresses the same questions as the Multiple Comparisons table for post-hoc analysis, i.e. which pairs of groups have significantly different means of depending on the variable. Like the Multiple Comparisons table, the output of the Homogenous Subsets would not be interpreted if the main effect (in the Between Subjects Effect or ANOVA table) was not significant. Some post-hoc tests are only reported as homogenous subset output (e.g. Duncan, SNK); some are only reported as multiple comparison tables (e.g.

Sidak, Tamhane); and some are reported in both formats (e.g. Tukey HSD, Scheffe).

The developed turmeric planter tractor was tested for different forward speeds and transmission ratios. Performance indices such as missing index (imiss), precision index (ip) rhizome multiple index (imulti), feed quality index (iqf) and rhizome spacing (is) were used to evaluate rhizome planter performance in many previous reports (Singh, and Gautam 2015; Albushari,S.A. 2016; Mohamed, et al., 2016). The mean turmeric spacing ranged from 21.66 to 32.63 cm and from 20.53 to 31.13 cm, respectively. Optimum performance for the planting of ginger and Turmeric was at a forward speed of 0.97 km hr<sup>-1</sup> and a transmission ratio of 1:1.25. The average field capacity and efficiency was 0.14 ha hr<sup>-1</sup> and 78.76 percent respectively (Muogbo *et al.*,2019). Cost and time savings for mechanical planting were approximately 59.52% and 96.57% compared to manual planting. Based on the results of the performance evaluation, it is concluded that the developed rhizome planter is economical and efficient for rhizome planting (Muogbo *et al.*,2019).

## METHODOLOGY

Post-hoc test based on the studentized range distribution using Tukey's Honest Significant Difference Test, was used to analysed the planting parameter of the performance evaluation conducted on the developed turmeric rhizome tractor drawn turmeric planter. Two factors and three of turmeric rhizome lengths at 30 mm, 45 mm and 60 mm and three levels of operating speeds at 8 km/h, 10 km/h and 12 km/h respectively were analysed.

## RESULT AND DISCUSSION

Descriptive statistics (Table 1) provide some useful descriptive statistical information, including mean, standard deviation and 95 per cent confidence intervals for the dependent variable planting parameter being investigated for each separate Group (fuel consumption, planting efficiency, wheel slippage, average field capacity) as well as when all groups are combined (Total). This table describes the standard deviation data of 2.91 percent for plant efficiency, 1.66 machine speed, with 18.51 field capacity.

**Table 1: Descriptive Statistics of planting parameter of developed turmeric planter**

	N	Minimum	Maximum	Mean	Std. Deviation
Machine speed	27	8	12	10.00	1.664
Mean field capacity (hah-1)	27	.61	97.00	4.3452	18.517
Efficiency (%)	27	60.00	69.80	64.830	2.910
Fuel consumption	27	2	4	3.01	0.546
Wheel slippage	27	3	4	3.73	0.444
Valid N (listwise)	27				

Homogeneous subsets of rhizome length (Tables 2) show which groups have the same mean planting condition and which of the groups have different mean planting status. It was noted that the mean field capacity group subset 1 was the same superscript, which means that there was no significant difference within the group, while among other response subsets there was a significant difference in the fuel consumption of the tractor during planting in relation to the turmeric lengths at all three levels. The planting

efficiency group was significant at a turmeric length of 45mm ( $64.21 \pm 0.03^a$ ) while there was no statistically significant difference in efficiency over the length of the planting. 30 mm and 60 mm ( $65.15 \pm 0.10^b$ ,  $65.12 \pm 0.26^b$ ). The wheel slippage analysis in relation to the length of the rhizome planted was significant at 45mm and 60mm ( $3.78 \pm 0.32^b$ ;  $3.69 \pm 0.05^a$ ) but there is no significant difference between 30mm and 45mm ( $3.72 \pm 0.01^{ab}$ ); 30mm and 60mm ( $3.72 \pm 0.01^{ab}$ )

**Table 2: Homogeneous subset of rhizome length on planting parameters**

Rhizome length	Mean field capacity (hah-1)	Efficiency (%)	Fuel consumption	Wheel slippage
30	$0.80 \pm 0.05^a$	$65.15 \pm 0.10^b$	$3.19 \pm 0.06^c$	$3.72 \pm 0.01^{ab}$
45	$11.4 \pm 0.002^a$	$64.21 \pm 0.03^a$	$2.81 \pm 0.20^a$	$3.78 \pm 0.32^b$
60	$0.81 \pm 0.08^a$	$65.12 \pm 0.26^b$	$3.022 \pm 0.4^b$	$3.69 \pm 0.05^a$

Means for groups in homogeneous subsets are displayed. Based on observed means. The error term is Mean Square (Error) = 0.002. Uses Harmonic Mean Sample Size = 9.000.

A Tuckey post-hockey test in Table 3 revealed that the machine speed contributed a significant problem to the planting parameter in this study only the mean field capacity which shows no effect in relation to the speed at 8  $\text{Kmh}^{-1}$ , 10  $\text{Kmh}^{-1}$  and 12  $\text{Kmh}^{-1}$  and higher speeds ( $0.80 \pm 0.05^a$ ,  $11.42 \pm 0.002^a$ ,  $0.81 \pm 0.08^a$ ). Compared to other parameters with pure difference at planting efficiency  $62.14 \pm 0.40^a$ ,  $63.96 \pm 1.02^b$ ,  $68.39 \pm 0.75^c$ ; fuel consumption increases with speed in planting with variation of 0.4 liter/min to 0.63

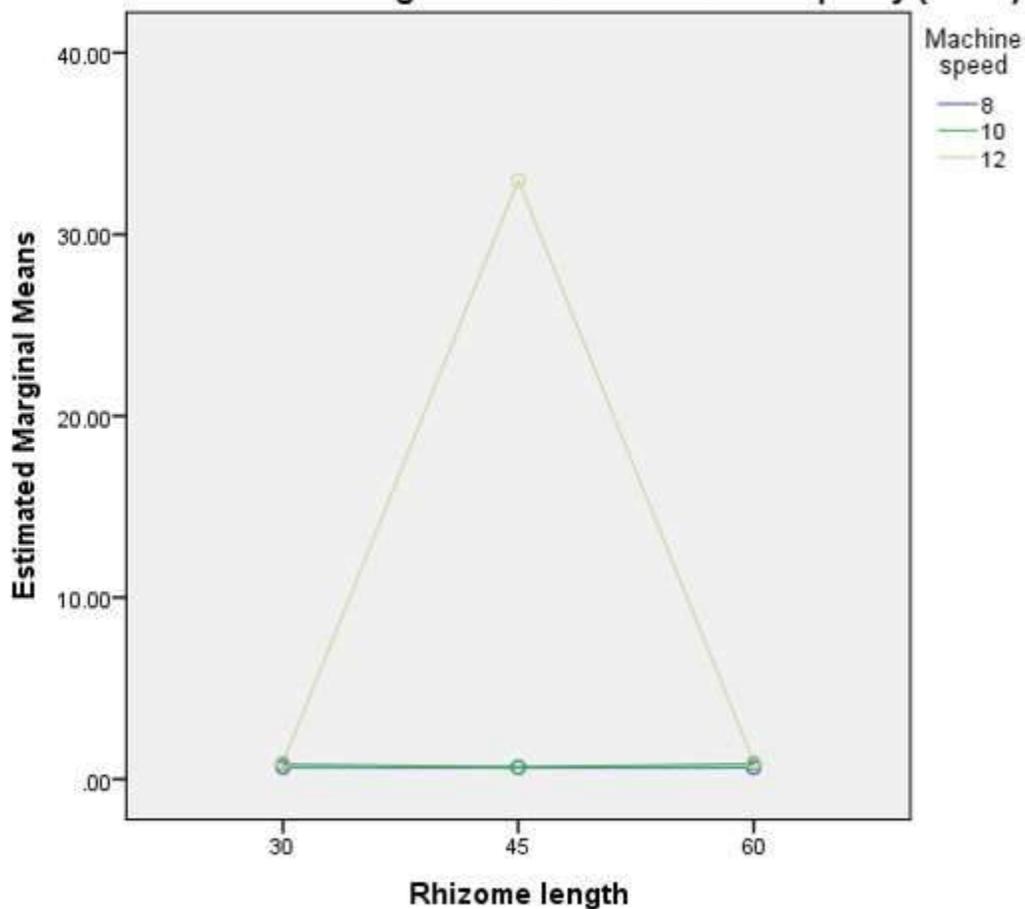
liter/min which is in conformed with established theory on manually operated multi-crop planter by (Kalay and Mose 2017; Nwakuba *et al.*, 2018). There was also statistically significant difference between the wheel slippage groups ( $4.27 \pm 0.58^c$ ,  $3.71 \pm 0.07^b$ ,  $3.23 \pm 0.50^a$ ) it shows that the high the speed of planting the less the wheel slippage.

**Table 3: Homogeneous subset of machine speed effect on planting parameters of developed turmeric planter**

Machine speed Km <sup>h</sup> - <sup>1</sup>	Mean field capacity (hah <sup>-1</sup> )	Efficiency (%)	Fuel consumption (lha <sup>-1</sup> )	Wheel slippage %
8	0.80±0.05 <sup>a</sup>	62.14±0.40 <sup>a</sup>	2.4±0.44 <sup>a</sup>	4.27±0.58 <sup>c</sup>
10	11.42±0.002 <sup>a</sup>	63.96±1.02 <sup>b</sup>	3.03±0.29 <sup>b</sup>	3.71±0.07 <sup>b</sup>
12	0.81±0.08 <sup>a</sup>	68.39±0.75 <sup>c</sup>	3.6±0.92 <sup>c</sup>	3.23±0.50 <sup>a</sup>

Means for groups in homogeneous subsets are displayed. Based on observed means. The error term is Mean Square (Error) = 0.002. Uses Harmonic Mean Sample Size = 9.000.

Estimated Marginal Means of Mean Field Capacity (hah<sup>-1</sup>) mean plot (Figure 1) shows that the relationship of planting machine speed and rhizome length follows the same trend at 8 and 10 kmh<sup>-1</sup>, which means that there is no major impact on both speeds in terms of length while the speed at 8 and 10 kmh<sup>-1</sup>.

**Figure 1: Estimated Marginal Means of Mean Field Capacity (hah-1)**

12 kmh<sup>-1</sup> increased with a shift in rhizome length but decreased from 45 mm to 60 mm in length,



which suggests that there is a major impact on the interaction of the two key factors at 12 kmh<sup>-1</sup>, the result was commensurate with the earlier analysis.

The Mean Complot Estimated Marginal Means of Efficiency (percent) indicates that the relationship between the speed of the planting machine and the length of the rhizome following the same trend at 8 and 10 kmh<sup>-1</sup>, which means that there is no major impact on both speeds in terms of length (Figure 2). The mean efficiency decreased at a rhizome length of 45 mm but

the speed at 12 kmh<sup>-1</sup> opposed to the Marginal Means of Efficiency (percentage) at 8 and 10 kmh<sup>-1</sup>, the mean planting efficiency at a system speed of 12 kmh<sup>-1</sup> was higher in the values teams. Minimum performance was 67.8 per cent at 60mm rhizome length, while the highest was 69.9 per cent at 45mm rhizome length. This was consistent with the study (Oduma *et al.*, 2014; Muogbo *et al.*, 2019). on field performance analysis of developed turmeric planter.

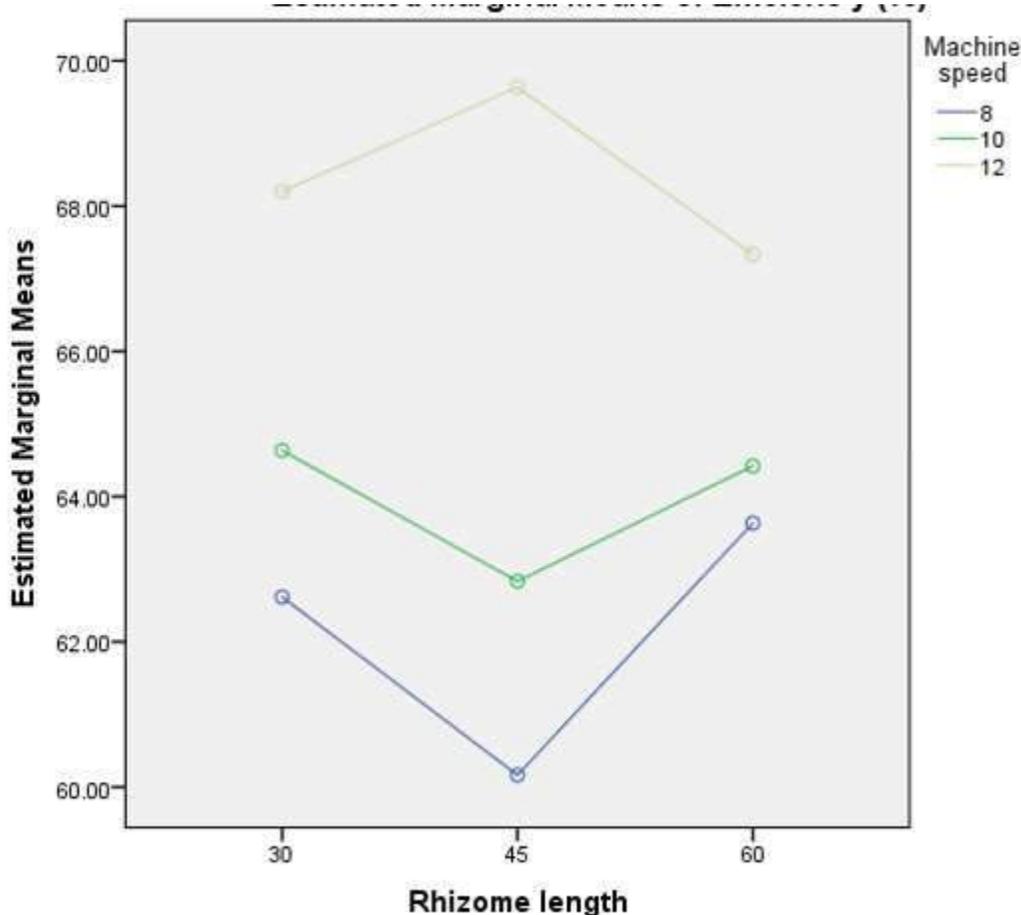


Figure 2: Estimated Marginal Means of Efficiency (%)

### The Mean plot Estimated Marginal Means of Wheel slippage (%)

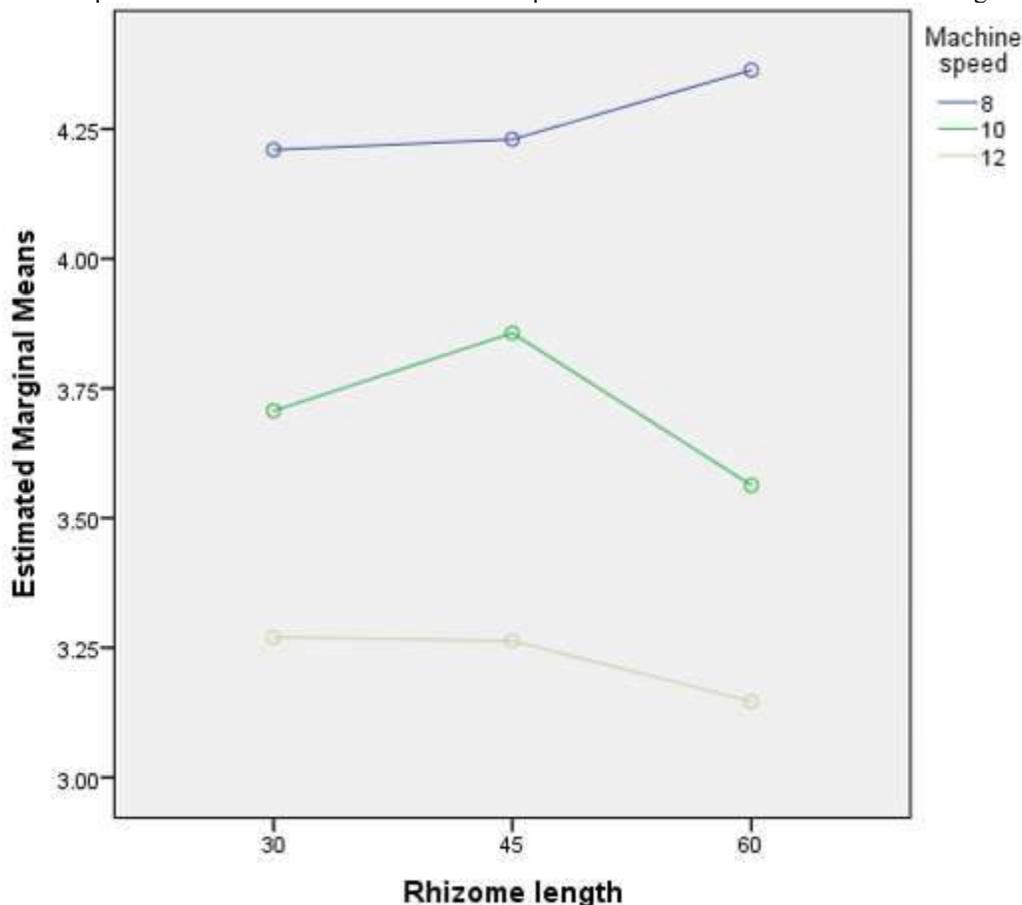
The relationship between the speed of the planting machine and the length of the rhizome indicates that the graph (Figure 3) shows the speed at 12 kmh<sup>-1</sup> as the lowest slippage of the wheel at a margin of 3.25 to slightly above 3 points compared to the other two speeds measured in this analysis with a

median slippage of 3.5 to 4.25 points above the speed as a relative impact on the degree of slipping of the machine during planting. There is an important influence on the duration of the speed at the three speeds. The wheel slippage varied at various speeds to lengths at rhizome lengths between 45 mm, speeds of 10 and 12 kmh<sup>-1</sup> having the maximum slippage at rhizome sizes of 45 mm before starting decrease while



the slippage of the wheel increased with an increase in rhizome size. (Ugwuishiwu and Onwualu, 2009) indicated that the speed of the mechanized machine

was affected by the rate of field slippage. The speed at 8 kmh<sup>-1</sup> shows major changes at 10 and 12 kmh<sup>-1</sup> speeds relative to the turmeric rhizome length.



**Figure 3: Estimated Marginal Means of Wheel slippage**

## CONCLUSION

This research was able to determine the key sublevel factor as it affects the plating parameters within the group and between the test groups. Differences and improvements in each test parameter have been resurrected to better explain each degree of meaningful impact. The interaction of planting speed and turmeric rhizome length was a graphic representation and can be used to further extrapolate other regions within the 8 to 12kmh<sup>-1</sup> treatment boundary and the 30 to 60 mm turmeric rhizome length.

## REFERENCES

1. Aaron Schlegel (2018); Tukey's Test for Post-Hoc Analysis; <https://aaronSchlegel.me/tukeys-test-post-hoc-analysis.html> Fri 07 September 2018.
2. Laerd statistics (2018); One-way ANOVA in SPSS Statistics. <https://statistics.laerd.com/spss-tutorials/one-way-anova-using-spss-statistics.php>.
3. Stephanie; (2017) Studentized Range Distribution; <https://www.statisticshowto.com/studentized-range-distribution/sh>.
4. Kalay K. and Moses, S.C. (2017). Performance evaluation of manually operated multi-crop planter for okra. *Journal of Pharmacognosy and Phytochemistry SPI*: pp. 264-269.
5. Muogbo C, Agidi G, Nnaemaka R N (2019). Field performance analysis of a tractor-drawn turmeric



- rhizome planter. Poljoprivredna Tehnika 44(2): pagaes 33-46 DIO:10.5937/poljtech 190233M.*
6. Oduma, O., Nwakuba, N.R. and Igboke, M.E. (2014). Performance evaluation of a locally developed pigeon pea thresher. *International Journal of Applied Science, Technology and Engineering research* 3(2):20 – 31.
  7. Ugwuishiwu, B.O. and Onwuatu, A.P. (2009). Sustainability and Cost of Agricultural Mechanization in Nigeria as Affected by Macro-Economic Policies. *Journal of Agricultural Engineering and Technology*, 17 (2), December, 2009.
  8. Mohamed, M.A., Kheiry, A.N., Rahma, A.E., Yousif, H.A. (2016). Performance evaluation of two Planter makes as affected by forward speeds. *Journal of Agricultural Science and Practice*, 2: 16 -22.
  9. Singh, T.P. and Gautam Vijay (2015). Development and Performance Evaluation of a Gladiolus Planter in Field for Planting Corms. *International Journal of Agricultural and Biosystems Engineering* Vol. 9, No: 12 pp 1243-1248.
  10. Albushari, S.A. (2016). Effect of different seed drill covering devices on forage sorghum seed emergence and machine performance. A research project, College of Agricultural Studies, Sudan University of Science and Technology.



## **ROLE-PLAYING GAMES IN THE DEVELOPMENT OF DIALOGUE SPEECH IN THE PROCESS OF TEACHING A FOREIGN LANGUAGE**

<sup>1</sup>Shahnoza Ilxambekovna Matyakubova, <sup>2</sup>Sitora Baxodirovna Djabbarova, <sup>3</sup>Charos G'anisherovna Uralova

<sup>1</sup>Teacher of Samarkand State Medical Institute, Uzbekistan

<sup>2</sup>Teacher of Samarkand State Medical Institute, Uzbekistan

<sup>3</sup>Student of Samarkand State Institute of Foreign Languages, Uzbekistan

### **ABSTRACT**

*The subject of this scientific article is features of teaching dialogical speech in English lessons based on the use of role-playing games at the A2 level of education. To solve the set tasks, the theoretical: analysis of literature on pedagogy, psychology and methods of teaching foreign languages methods were used. The purpose of this article is to study the effectiveness of the use of role-playing games as a means of developing the ability of dialogical speech at the A2 level of teaching a foreign language (English).*

**KEY WORDS:** "psychological justification", classification of W. Gerhard, stages of the role-playing game, series of episodes, educational process.

### **INTRODUCTION**

Learners value the opportunity to be active participants. The article carried out have revealed that they have great chances to assimilate the knowledge that they have learned in the process of active action, and that they have great abilities to use it in their own lives. The relevance of this scientific article is due to several factors. First, keeping middle school students interested is not an easy task. To get students interested, it is necessary to use teaching methods and aids that will make the learning process easier, and the children more receptive to learning new material. Gaming technologies, in particular role-playing games, help teachers in this. Secondly, one of the main problems is the teaching of oral speech. In language learning, only theoretical skills, it is not enough to have it is necessary to consolidate them in practice, to be able to use them in real role-playing to represent situations, life.

The game helps students to be close to real ones, and to form speaking skills. Thirdly, there is a serious problem of inability to overcome the presence

of a language barrier. This problem can be eliminated by immersion in the culture of the country, the target language, using gaming technologies, namely role-playing games. During the role-playing game, students feel the ease of the situation, forget about the fear of making a mistake, and are fully open to learning a foreign language.

### **MAIN PART**

The specificity of a foreign language as an academic discipline is determined by the fact that it, characterized by features inherent in language in general as a sign system, is at the same time determined by a number of features of mastery and possession that are distinct from the native language. A foreign language is used to express thoughts. Therefore, the language is facing the speech-thinking activity in a foreign language is a complex mental process. The task of a foreign language teacher is to determine the nature of the difficulties in transferring the realities of one language to another and to be able to help in overcoming difficulties.



The need for widespread use of game techniques is dictated by the specifics of the subject: in conditions when all communication problems can be solved in the native language, the new game is a "psychological justification" for the transition to a foreign language. In the conditions of a modern school, methodologists, teachers are looking for opportunities to improve the quality and effectiveness of teaching a foreign language. Role-playing gives such an opportunity.

It allows you to take into account the age characteristics and interests of students; it can be an effective means of creating a motive for foreign language dialogue; contributes to the implementation of an activity-based approach in teaching a foreign language, when the student is in the center of attention. Communication situations simulated in a role-playing game make it possible to bring speech activity in the lesson closer to real communication.

The central component of the role-playing role, social is more precisely the totality of interpersonal roles, the performance of which by students involves them in the process of communication and mastery of communication. The selection and distribution of roles is an important pedagogical technique that presupposes the teacher's knowledge of the individual psychological characteristics of the trainees, their interests, opportunities and life experience. Only a creative approach allows the teacher to rationally distribute roles between students, bearing in mind the prospect of the formation of speech skills and harmonious development of the personality. Role theory has taken on large dimensions in its development. It is currently being used in social psychology, sociology, play, theatrical art.

The role comes from the Latin word "rolutus" roll, the scroll on which the text of the drama for prompters was written in ancient Greece and Rome; later the actor himself read the text from Rolutus. The role began to be understood as "person", "mask", "personality". The concept of "role" has become directly related to the use of certain social functions by a person.[1] There are various ways to classify roles. From the point of view of teaching role-based communication, the most interesting is the classification of W. Gerhard, according to which roles are divided into: [2]

a) Status, which can be assigned from birth or acquired during the role of a citizen of a certain state, belonging to a class, and so on;

b) Positional roles, which are usually coded by rules that determine a certain position in society: professional, family roles, and so on;

c) Situational roles, presented in the form of fixed standards of behavior and activity, to play which it is enough to be short-term participants in a

communication situation. The role of a guest, tourist, pedestrian, and so on. For the development of foreign language conversational speech skills, the most interesting is the playing of situational roles.

These roles are not formulated, they allow for freedom of playing, they represent ample opportunities for expressing personal interests, which corresponds to the activity-based approach to learning. According to the theory of social roles, a person occupies a certain place in the system of social relations, determined by the concept of "position". Each personality has many positions. Researchers distinguish three main ones: professional; public; [3] family. Researchers identify the following functions of role-playing games[4]: motivational-stimulating; educational; orienting; compensatory. Let's take a closer look at these functions. The purpose of the role play is the activity to be performed. As a model of interpersonal communication, role play creates the need for communication in a foreign language. From this position, it performs a motivational and incentive function. The teaching function is that role-playing game largely determines the selection of language means, promotes the development of speech skills and abilities, and allows students to model communication in various speech situations. The upbringing function suggests that in role-playing games discipline, mutual assistance, activity, readiness to be involved in different types of activities, independence, the ability to defend one's point of view, take initiative, and find the optimal solution in certain conditions are brought up.

Role play forms in schoolchildren the ability to play the roles of another person, to see themselves from the position of a communication partner. It orientates students to planning their own speech behavior and the behavior of the interlocutor, develops the ability to control their actions, to give an objective assessment of the actions of others. Thus, role-playing plays an orientation function. The compensatory function of role-playing games is manifested in the fact that it is in play that the contradiction between the child's need for action and the inability to carry out the operations required by the action is resolved. Children strive for communication, and role play gives them the opportunity to realize their desire.[5]

Supervised RPG is simpler and can be based on dialogue or text. In the first case, students get acquainted with the basic dialogue and practice it. Then, together with the teacher, they discuss the content of the dialogue, work out the norms of speech and the necessary vocabulary. After the etiquette of THIS, students are invited to compose their own version of the dialogue, relying on the basic one, and



using the supports written on the board (supports can be prepared in advance on cards and distributed to students). The new dialogue can be similar to the basic one, but it is necessary to use a different content, a different form of questions and answers, this dialogue can be shorter or longer than the basic one. In addition, as needed, the teacher can give instructions during the role play. [6]

The second type of controlled role play is text based role play. In this case, after acquaintance with the text, the teacher can invite one of the students to play the role of a character from the text, and the other students can interview him. Moreover, students - reporters can ask not only questions, the answers to which are in the text, but also any other ones of interest to them, and the student playing the role of a character can show his imagination when answering these questions. As in the first case, the teacher can give instructions, helping students during the role play.[7]

More complex is a moderately controlled role-playing game, in which participants receive a general description of the plot and a description of their roles. The problem is that the features of the role-playing behavior are known only to the performer himself. It is important for the rest of the participants to guess which line of behavior their partner is following, and make an appropriate decision about their own reaction.

The most challenging are free and lengthy role-playing games that open up room for initiative and creativity. As for the free role-playing game, when it is conducted, the students themselves must decide what vocabulary to use, how the action will develop. The teacher only names the topic of the role play and then asks the students to design different situations that involve different aspects of the topic. Also, the teacher can divide the class into groups and invite each group to choose the aspect of the proposed topic that is closest to them. At the same time, if necessary, he helps students in assigning roles and in discussing what needs to be said about the chosen situation, or provide some other assistance.

Long-term role play involves acting out a series of episodes (for example, from the life of a class) over a long period. Episodic role-playing game involves playing out a separate episode.[8] From the point of view of students, role play is a play activity in the process of which they play certain roles. From the position of the teacher, role play acts as a form of organizing the educational process, the purpose of which is to form and develop the speech skills and abilities of students. In the game, the teacher can occupy the following positions: leader (scriptwriter, director), participant (pupils' partner in the game), observer (control over the course of the

game in the classroom), absent (leaves the classroom, leaving the players).

The success of the role play is essential. That is why the methodologists identify the stages of role-playing and suggest an algorithm for developing a role-playing game in foreign language lessons. Most of the researchers distinguish the following stages of the role-playing game:[9]

1. The preparatory stage includes the preliminary work of the teacher and students. Teacher training involves: a) choosing a topic and formulating a problem; b) selection and repetition c) clarification of the parameters of the situation: time, place, number of participants, degree of formality; d) preparation of game attributes: visual aids, cards; e) clarification of the goal of the game and the planned end result. Student preparation consists of: a) finding additional data on a topic or studying handouts; b) repetition of speech formulas and vocabulary on the topic. Preparation for the game can last from a few minutes to several days. At this stage, it is necessary to carry out a series of training exercises necessary for the subsequent role-based communication.

2. Conducting the game. The whole class is divided into groups. As for the subject of discussion, it can be the topic of a textbook, articles from foreign magazines or newspapers, a movie. You can also role play based on a painting or series of drawings. If the game has been prepared in advance, then you can start it immediately after clarifying the situation. The distribution of roles is carried out in accordance with age and individual characteristics. Of great importance for the successful conduct of the game is how well the teacher can prepare students for this form of activity.

3. Stage of control of the game. The stage of control and analysis of the game can follow immediately after its completion or be carried out in subsequent lessons, depending on the complexity of the game. A psychologically more appropriate job that follows immediately after the game is to exchange opinions about her success, difficulties and successful moments.[10]

Summing up the results of the game. There is also a more detailed plan: preparatory stage in the classroom (introductory conversation of the teacher, familiarization with the role situation and vocabulary); preparatory stage at home (reading texts, articles on the problem); the game itself; The final stage. The final stage is a necessary element of the role-playing game, it involves the performance of certain tasks (for example, write a letter to a friend, an article in a newspaper on the problem, etc.)

Depending on the goals of the lesson and the level of training, role-playing games can be conducted: in pairs; in triads; in subgroups; in the



whole group. Role-playing games in pairs are the simplest kind of games. Role-playing games in subgroups can be conducted in different ways. Sometimes all subgroups have to play at the same time, and the teacher supervises their work, moving from one group to another. It is also possible that the subgroups play in turn: one subgroup plays, and the rest listen and evaluate in order to take part in further communication.[11]

## CONCLUSION

Game technologies are of deep pedagogical value, this is the sphere of communication in which the student reveals himself, his development and education takes place; it motivates, encourages action. Using the play method of teaching, we solve important methodological problems such as: psychological readiness of students to communicate; multiple repetition of language material; training students in choosing the desired speech option. Another important advantage of it is that it can be used as a lesson, part of a lesson, or as an element of extracurricular work.

Role play is an educational technique in which students, having chosen a role, must speak freely within the given circumstances. It can be used in teaching schoolchildren of any age. As a model of interpersonal communication, it creates the need for communication. It promotes the formation of educational cooperation, partnerships. Improves the quality of education; provides communication practice in foreign language lessons. She realizes a more successful mastery of the material, conditions for the complex use of existing knowledge, motivates, provides direct communication, on A foreign language is not afraid to make mistakes, thereby overcoming the language barrier.

In conclusion, the use of dialog form of communication based on role-playing games at A2 level in English lessons is a very important aspect in teaching dialogical speech. At the middle stage of learning, play is also an important component, because at this stage of education, students lose motivation. Role-play is a great way to raise the motivation level of students, because when it is carried out, students experience an emotional outburst, and role-play makes the learning process, sometimes difficult and tedious, fun, and this increases the motivation to learn. Thus, summing up the results of the article done, we can say that the goals and objectives set by us earlier have been achieved. The purpose of this scientific article, the study of the effectiveness was the use of role-playing games as a means of developing the ability of dialogical speech at the A2 level of teaching a foreign language (English). We can say with

confidence that this goal has been achieved. Speaking about the tasks of teaching dialogical speech using role-playing games, it should be noted that experimental methods of teaching dialogical speech are now actively practiced. However, there are still many questions in this area that require theoretical and experimental research.

## REFERENCES

1. Kallimulina V.O. *Role-playing games in teaching dialogical speech* / V.O. Kallimulina // *Foreign languages at school*. - 2003. - No. 3. - P. 17–25
2. Gerhard R. E., Abdulla A. M., Much S. /, Hudson J. B. *Isolated ultrafiltration in the therapy of volume overload accompanying oliguric vascular shock state*//*Amer. Heart J.*—1979.—Vol. 98.—P. 567
3. Golovin S.Yu. *Dictionary of a psychologist - practice* / S. Yu. Golovin. - M.: AST, 2001. -- 976 p.
4. Konyshova A.V. *Modern methods of teaching English language* / A. V. Konyshova. - M.: Petra System, 2005. -- 298 p.
5. Solovova E. N. *Methods of teaching foreign languages: educational allowance*. - M.: Education, 2006. -- 239 p.
6. Sklyarenko N.K., Oleinik T.I. *Teaching dialogical speech with using role-playing games in grade 6* / N.K.Sklyarenko, T.I. Oleinik // *Foreign languages at school*. - 1985. - No. 1. - P. 28–33.
7. Weinburg // *Foreign languages at school*. - 2002. - No. 6. - S.-35-40
8. Diomidova G.S. *Role play in foreign language lessons [Electronic resource]* / G. S. Diomidova
9. Galskova N. D. *Gez, N. I. Theory of teaching foreign languages: tutorial*. - M.: Publishing Center "Academy", 2006. - 336 p.
10. Ivantsova G. Yu. *Games in English* / G. Yu. Ivantsova // *Foreign languages at school*. - 2008. - No. 4. - S. 52–56.
11. Kallimulina V.O. *Role-playing games in teaching dialogical speech* / V.O. Kallimulina // *Foreign*



# VODCASTING: A TOOL TO AID MODULAR LEARNING IN ENGLISH

**Rica Mae B. Javier**

*Faculty, Suba National High School Gagalog Annex*

## ABSTRACT

*This study focused on the use of vodcasting as a teaching aid in providing English lessons to students who are into modular distance learning. It aimed to identify the level of students' perceptions using vodcast in terms of teacher focused variables such as: voice quality, language use, knowledge of the subject; determine the level of students' engagement using vodcast in terms of learning engagement, learning satisfaction and viewing willingness; provide students' performance during pre-test and post-test using vodcasting; and find out if there is a significant difference between the pre-test and post-test upon the implementation of vodcasting.*

*The study utilized quantitative method research to find out the effectiveness of vodcasting as a tool in language teaching. The researcher administered a pre-test before the use of vodcasting as a teaching innovation, after the second grading period and the use the of vodcast in delivering the lessons in English, the posttest was given. Also, a self-made questionnaire was given to identify the level of perceptions of the students in using vodcast.*

*The respondents of the study were the forty (40) low-achieving students from Grade 7-10 of Suba National High School Gagalog Annex in the district of Majayjay, for the school year 2020-2021.*

*The data gathered were tallied and interpreted using Weighted Average Mean (WAM) and Paired T-test. Hence, the result revealed that the level of perceptions of the students to the teacher who used vodcast were given the weighted average mean of 3.63, 3.72 and 3.72 in terms of voice quality, language use and knowledge of the subject respectively. On the other hand, the level of perceptions of students in learning engagement obtained a weighted average mean of 3.67, 3.75, and 3.69 when it comes to learning engagement, learning satisfaction and viewing willingness particularly. Therefore, students who are in the mode of modular distance learning find it motivating and enjoyable when viewing vodcast as an instrument in presenting lessons in English.*

*The findings revealed a significant difference between the students' performance based on the pre-test and post- test scores. The computed  $t = -14.476, -9.100, -11.665$  and  $-9.611$  and  $p = 0.00$  means that lower than 0.05 level of significance, the null hypothesis was rejected.*

## INTRODUCTION

The Philippine education sector faced a critical issue because of the Corona Virus Disease (COVID) 19 Pandemic. Putting everyone's health on the line is crucial but education must continue. With the Department of Education's (DepEd) initiative in upholding its role in delivering quality education for every Filipino student while protecting them from current deadly virus, the distance learning was implemented.

Distance Learning refers to the learning delivery modality in which, learning takes place between the teacher and the learners who are

geographically remote from each other during instruction. This modality has three types: Modular Distance Learning (MDL), Online Distance Learning (ODL), and TV/Radio-Based Instruction. (Quinones, 2020).

In the Philippine context, the delivery of education has greatly changed and is popularly known as "New Normal Education." Since public and private schools adhere to the safety and security of educators and learners, teaching had to be performed remotely with the use of digital and modular platforms; however, ensuring that learning progresses among students despite the absence of



face-to-face classes. Modular learning is the most popular type of Distance Learning in the country. This learning modality is currently used by all public schools because according to a survey conducted by the Department of Education (DepEd), learning through printed and digital modules emerged as the most preferred distance learning method of parents with children who are enrolled this academic year (Bernardo, 2020). This is also in consideration of the learners in rural areas where internet is not accessible for online learning.

The first quarter of implementation of modular distance learning was recorded successful with no major difficulties; however, in Suba National High School Gagalog Annex where number of parents are high school graduates and working daily, students find it hard to cope and understand lessons in their modules especially in English subject because the contents of the self-learning material do not meet their learning capacity. Given that these instructional materials will be assessed by students on their own, mostly.

Some of the critical issues brought by the so-called New Normal of the Philippine Education System include the focus and concentration of the learners and the comfort of studying at home with less or no supervision at all. Students tend to divert their attention to instead of focusing on and prioritizing their homeschooling. The parents' or guardians' educational background is not well equipped with proper education (Students' New Normal: Modular Distance Learning).

In response, teachers begin using and incorporating audio and video materials which are not new means of presenting lessons to compensate the absence of the teacher. This is viewed of prime importance in order to enhance the teaching and learning conditions amidst time of crisis.

Accordingly, the podcasting system of delivering pedagogical materials can be used to alleviate the available challenges. The educational podcasting technology is defined as a method of presenting teaching/learning resources which can include a variety of different forms such as audio, video, or a synchronized version of both, PowerPoint Presentations, online applications, etc., to learners via constructing accessible RSS feeds (Takeda, 2014).

Particularly, video podcasting technology or 'vodcasting' has proven to be in the forefront of distance education in general and computer assisted language learning in particular (Faramarzi, 2020). This tool bridges the gap between the students and teacher who are under remote process of learning. More so, Hassanzadeh and Marefat (2014) provided a brief introduction of how to use vodcasting in order to enhance instruction. They assumed that vodcasts

may give the students an opportunity to receive supplemental multimodal presentation, which is generally beneficial, particularly in the apprehension of complex concepts.

This study is predominantly focused on identifying the effectiveness on the use of vodcasting in English as an aid to the learning process of the learners who have hard time studying under modular instruction and to delivering the lessons more clearly.

## RESEARCH METHODOLOGY

The study utilized quantitative method research to find out the effectiveness of vodcasting as language teaching strategy in reducing language learning difficulties of low achieving students from grades 7, 8, 9 and 10 of Suba National High School Gagalog Annex.

Descriptive method of research was used to determine the frequency of language learning difficulties of the respondents before and after the exposure to the vodcasting strategy. Results of pre and post assessment were used to measure the significant difference in the respondents' frequency of language learning difficulties in the making of the research. Also, a questionnaire about the teacher efficiency in using vodcast and learning engagement of the students was administered to determine the perceptions of the students who used vodcast as an aid to learning English lessons.

The respondents of the study were the forty (40) low-achieving students from Grade 7-10 of Suba National High School Gagalog Annex in the district of Majayjay, for the school year 2020-2021. The mastery level for the first quarter was used to identify the low-achieving learners who have 70-75 grade in English subject. Since all the students were under modular distance learning and experiencing language learning difficulties, the researcher decided to choose the locale and the said institution as an immediate environment where access of data was greatly possible and observable.

Purposive sampling technique was utilized through identifying the low-achieving students from grade level 7 to 10. They were chosen as subject to be taught using vodcast lessons in second quarter. There were 10, 12, 9 and 9 students from grade 7, 8, 9 and 10 respectively who underwent teaching and learning using vodcast.

### Research Procedure

Necessary permits and communication letters to conduct the study were first secured. A letter of approval was sought from the Office of the Administrations and consent from the students in the locale of the study to allow the researcher to conduct.

The researcher administered a pre-test on the lessons to be taken for the entire second quarter in



English. The printed copies of the examination were distributed together with the self-learning modules of the learners through the paramovers of the school. They were the ones who deliver and retrieve the learning package essentials of the learners residing in their respective barangays.

Similarly, the researcher prepared the lessons for the second quarter in English and recorded the discussions with detailed instructions on the learning tasks to be answered by the learners. The recorded lesson was called the enhanced vodcast (Kay, 2012) where the teacher captured the video footage of the slideshow or the soft copy of the modules provided with audio explanation. These vodcast lessons were sent to the students through Bluetooth, share it, messenger and uploaded in the Facebook page of the students. The schedule of the uploading of the vodcast lesson was Tuesday evening and to be viewed on Wednesday for English time.

Finally, after utilizing this strategy in teaching, the researcher conducted the post-test and the validated questionnaire on the use of vodcast. The same process was done in the distribution of the pre-test and questionnaire; however, the researcher also provided an online google forms for easy retrieval of information since there were students who can access the internet.

As soon as the sets of instruments were administered and carefully accomplished by the respondents, retrieval of the questionnaires or the data gathering instruments immediately followed. This was handled carefully by the researcher to observe confidentiality of the information of the respondents.

The researcher tallied, tabulated the gathered numerical data and were presented in tables. The

analysis and interpretation of the gathered data were followed.

#### Research Instrumentation

The researcher employed a pre-test and post-test to determine the effectiveness of the vodcasting as language teaching strategy towards the second language learners. The learning tasks in the self-learning modules was utilized as the main language material to determine the effectiveness of the vodcasts prepared by the researcher. The content of the learning episodes in the vodcasts are the lessons in the first and second quarter of the modules consisting of grammar and literature topics. The vodcasts were sent to the learners through share it and were also available in the messenger and Facebook page of the school. In addition, a teacher-made questionnaire about the teacher's efficiency in using vodcast and learning engagement of the students was administered to determine the perceptions of the students who used vodcast as an aid to learning English lessons.

The questionnaire was made up of two parts (1) teacher-focused factors that include voice quality, language use and knowledge on the subject (2) students' related factors that consist of learning engagement, learning satisfaction and viewing willingness. Thus, it was a 4-point Likert scale questionnaire, 4 being the highest point and 1 being the lowest point.

#### Statistical Treatment

The data gathered were collected and sorted for the treatment and analysis in response to the problems posed in the part 1 of this research. Appropriate statistical treatments were applied to determine the significant difference and find out the effectiveness of vodcast as a tool in language learning under modular instruction.

**Table 1. Statistical Tools Used in the Study**

<b>Statement of the Problem</b>	<b>Statistical Treatment</b>
1. What is the level of students' perceptions on teacher use of vodcast with regard to voice quality, language used, and knowledge of the subject?	Weighted Mean and Standard Deviation
2. What is the level of the following students' factors related to using vodcast: learning engagement, learning satisfaction, and viewing willingness?	Weighted Mean and Standard Deviation
3. What is the level of students' performance before and after using vodcast as revealed by pre-test and post-test?	Weighted Mean and Standard Deviation
4. Is there a significant difference between the pre-test and post-test performance of the students?	Paired T-test

**RESULTS AND DISCUSSIONS****Students' Perceptions using Vodcast**

Table 2 presents the weighted mean distribution and standard deviation of students'

insights on teacher use of vodcast as an aid in learning in terms of voice quality of the teacher who delivers lesson using this mode of learning.

**Table 2. Level of Students' Perceptions on Teacher Use of Vodcast With Regards to of Voice Quality**

Indicator	Mean	SD	Verbal Interpretation
1. The teacher speaks clearly and understandably in the vodcast.	3.55	0.61	Strongly Agree
2. The teacher models appropriate inflection and enunciation.	3.65	0.58	Strongly Agree
3. The teacher speaks loudly enough for everyone to hear and changes tone and pace to maintain students' interest.	3.58	0.61	Strongly Agree
4. The teacher uses very interesting expression and sounds throughout the vodcast.	3.74	0.55	Strongly Agree
5. The teacher talks with certainty and confidence.	3.65	0.58	Strongly Agree
<b>Weighted Mean: SD</b>	<b>3.63 : 0.59</b>		
<b>Verbal Interpretation</b>	<b>Strongly Agree</b>		

**Legend**4  
3  
2  
1**Range**3.26-4.00  
2.51-3.25  
1.76-2.50  
1.00-1.75**Verbal Interpretation**Strongly Agree  
Agree  
Disagree  
Strongly Disagree

As shown in Table 2, the use of vodcast as a tool to aid language learning under modular instruction in terms of voice quality was found interesting with average weighted mean of 3.63 and SD of 0.59. The statement *The teacher uses expression and sounds very interesting throughout the vodcast* garnered the highest weighted mean score of 3.74 and an SD of 0.55. This implies that the teacher who delivers the vodcast lesson maintains the interest of the learners who view the vodcast through the sounds and expressions executed by the teacher.

The statements *The teacher talks with certainty and confidence* and *The teacher models appropriate inflection and enunciation* obtained the same weighted mean score of 3.65 and 0.58 SD. Also, the statement *The teacher speaks loudly enough for everyone to hear and changes tone and pace to maintain students' interest* achieved a weighted mean score of 3.58 and an SD of 0.61.

On the other hand, the statement *The teacher speaks clearly and understandably in the vodcast* gained the lowest weighted mean of 3.55 and an SD of 0.61. This means that the teacher in the vodcast might be speaking in a speedy manner where the students find it hard to listen and understand.

As Parra (2016) implies podcasts are useful for auditory learners in the sense that they can hear the information at their own pace, and it even reduces shyness and fosters motivation. This is the main reason why the teacher should demonstrate a quality

speaking voice most importantly because of the platform being used in teaching like vodcast.

Thus, teachers' tone of voice could also be the source of motivation for the students to listen and learn effectively using vodcast. This also helps the diverse learners who prefer various way of teaching discover meaningful insights and experiences. Thus, students can easily locate instructions from the self-learning module because it was being shown in the vodcast with additional explanation from the teacher who handles the subject herself.

As strengthened by Chan et al. (2011), the use of audio podcasting not just for the development of listening skills, which is often and rightly advocated because of the auditory nature of the medium, but also for other language skills and areas, especially the transmission of culture and country information. Hence, teachers must be sensitive enough in the production of audio material especially if the lesson tackles the listening skills of the students because it can be crucial for the learners to focus on the listening material in the vodcast.

In sum, the elements like voice projection, sound and pronunciation play a big role in the production of learning material like vodcast. These help the learners understand better the information being supplied by the teachers. Since vodcast is a combination of audio and video material, the expressions and gestures also facilitated the way of



perceiving the idea and concept being taught by the teacher.

perceptions towards vodcasting in terms of language used by the teacher in discussing lessons in English.

Table 3 on the next page illustrates the weighted mean distribution on respondents'

**Table 3. Level of Students' Perceptions on Teacher Use of Vodcast With Regards to Language Use**

Indicator	Mean	SD	Verbal Interpretation
1. The teacher includes language features and variety that are related to our experiences to make the vodcast interesting.	3.60	0.63	Strongly Agree
2. The teacher uses familiar language and correct grammar in the vodcast.	3.74	0.55	Strongly Agree
3. The teacher adapts speech for the content and task, demonstrating command of formal English.	3.70	0.56	Strongly Agree
4. The teacher uses specific clear vocabulary.	3.76	0.43	Strongly Agree
5. The teacher uses strategies and knowledge of language conventions.	3.79	0.41	Strongly Agree
<b>Weighted Mean : SD</b>	<b>3.72 : 0.52</b>		
<b>Verbal Interpretation</b>	<b>Strongly Agree</b>		

**Legend**

4  
3  
2  
1

**Range**

3.26-4.00  
2.51-3.25  
1.76-2.50  
1.00-1.75

**Verbal Interpretation**

Strongly Agree  
Agree  
Disagree  
Strongly Disagree

The first statement, *The strategies and knowledge of language conventions were exemplified by the teacher who used vodcast to present lessons to students* got the highest rating of M=3.79, SD=0.41. This was followed by the statement, *The learners can relate and understand the topics in English because the teacher uses specific and clear vocabulary* with M=3.76, SD=0.43. It can be noted that the teacher had shown different combinations of ways to manipulate language to show the audience something in a unique way.

In addition, the remaining statements, *The teacher uses familiar language and correct grammar in the vodcast* and *'adapts speech for the content and task, demonstrating command of formal English* got M=3.74, SD=0.55 and M=3.70, SD=0.56 respectively. Although, it was observed that the teacher includes language features and variety that are related to the students' experiences to make the

vodcast interesting, it got the lowest rating of M=3.60, 0.63. This suggests that the language used by the teacher was contextualized and localized to make it related to the experiences of the learners since the respondents are the low-achieving students. The language material was familiar to them that it made the vodcast lesson noteworthy for them.

Based on the result, it can be drawn that the students shown affirmation in terms of the language use by the teacher who performs vodcast in presenting the lesson in English with an evident overall mean of 3.72. The learners can follow the teacher's discussion because the language of instruction is easy and familiar to them.

For the last table under teacher-focused, Table 4 below discloses the weighted mean distribution on the students' perceptions using vodcast in terms of the knowledge of the subject of the teacher.

**Table 4. Level of Students' Perceptions on Teacher Use of Vodcast With Regards to Knowledge of the Subject**

Indicator	Mean	SD	Verbal Interpretation
1. The teacher communicates full understanding of the topic.	3.78	0.48	Strongly Agree
2. The teacher exemplifies creativity and clear explanation of the learning tasks.	3.68	0.59	Strongly Agree
3. The teacher makes a great connection to the topic and enhance the students' understanding.	3.63	0.56	Strongly Agree
4. The teacher demonstrates full knowledge with explanations and elaborations.	3.73	0.45	Strongly Agree
5. The teacher has impressive insights and engaging control of information.	3.80	0.46	Strongly Agree
<b>Weighted Mean : SD</b>	<b>3.72 : 0.51</b>		
<b>Verbal Interpretation</b>	<b>Strongly Agree</b>		

Legend	Range	Verbal Interpretation
4	3.26-4.00	Strongly Agree
3	2.51-3.25	Agree
2	1.76-2.50	Disagree
1	1.00-1.75	Strongly Disagree

The teacher who discussed language lessons in the form of vodcast exhibited impressive insights and engaging control of information with the highest rating of  $M=3.80$ ,  $SD=0.46$ . It was followed by the statement, *The teacher communicates full understanding of the topic* with the rating of  $M=3.78$ ,  $SD=0.48$ . This reveals that the teacher in the vodcast showed the mastery of the lesson because the learners were impressed and engaged with the delivery of information with total awareness of the lessons.

In the same manner, the statements *The teacher demonstrates full knowledge with explanations and elaborations*, and *The teacher exemplifies creativity and clear explanation of the learning tasks*, gained a weighted mean of 3.73 and 3.68 with 0.45 and 0.59 SD respectively. The learners responded favorably with the statement, *The teacher makes a great connection to the topic and enhance the students' understanding* though it got the lowest weighted mean of 3.63 with 0.56 SD. This means that

the lessons presented by the teacher was logically connected with each other because the learners can find the relation among the information given.

From these, the level of students' perception to teacher using vodcast as to knowledge of the subject has a descriptive rating of strongly agree and was disclosed by the over-all mean of 3.72.

As a conclusion, despite the contradictory literature, the respondents of the current study paid close attention to the teacher's way of presenting the lesson through vodcasting medium in terms of voice quality, language use and knowledge of the subject in a positive response.

#### Students' Engagement Using Vodcast

Table 5 unfolds the level of students' learning engagement using vodcast. Similar to the prior tables in teacher-focused statements, the table obtained a descriptive rating of strongly agree.

**Table 5. Level of Students Factors related to Vodcast in Terms With Regards to Learning Engagement**

Indicator	Mean	SD	Verbal Interpretation
1. My listening skills improved as a result of viewing the vodcast.	3.65	0.60	Strongly Agree
2. Video podcasts motivate me to work on grammar lessons more.	3.58	0.65	Strongly Agree
3. I extend time learning the subject because of the vodcasts.	3.69	0.54	Strongly Agree
4. Viewing the vodcasts helped me greatly in learning the grammar and vocabulary of English.	3.70	0.60	Strongly Agree
5. The information I review and learn from viewing the vodcasts contributed greatly to my knowledge of English subject.	3.73	0.53	Strongly Agree
<b>Weighted Mean : SD</b>	<b>3.67 : 0.59</b>		
<b>Verbal Interpretation</b>	<b>Strongly Agree</b>		

Legend	Range	Verbal Interpretation
4	3.26-4.00	Strongly Agree
3	2.51-3.25	Agree
2	1.76-2.50	Disagree
1	1.00-1.75	Strongly Disagree

The fifth statement, *The learners found the information they learned from viewing the vodcasts contributed greatly to their knowledge of the English subject* has the highest rating of  $M=3.73$ ,  $SD=0.53$ . Also, the learners rated the statement *Viewing the vodcasts helped me greatly in learning about grammar and vocabulary of English* with  $M=3.70$ ,  $SD=0.60$ . This entails that the learners were highly engaged with the vodcast lesson utilized by the teacher because they enhanced and developed their grammar and vocabulary skills.

The statements *I extend time learning the subject because of the vodcasts*, *My listening skills improved as a result of viewing the vodcast*, and *Video podcasts motivate me to work on grammar lessons more* garnered weighted mean scores of 3.69, 3.65 and 3.58 with SDs of 0.54, 0.60 and 0.65

respectively. They uncover the effectiveness of vodcast as a learning guide among the students because it helped them improve their comprehension and motivated them to learn and work more on their weakness in the subject.

The level of students' perceptions using vodcast with regards to learning engagement got a descriptive rating of strongly agree and was disclosed by the over-all mean of 3.67. Thus, this implies that learning English through vodcast is an effective tool to reach the learners who are having hard time learning the subject.

Therefore, the use of vodcasting in education manifested positive effect among the learners. It does not only supplement the lessons of the teacher but enhances the skills of the students as well.

**Table 6. Level of Students Factors related to Vodcast With Regards to Learning Satisfaction**

Indicator	Mean	SD	Verbal Interpretation
1. Video podcasting materials are helpful in enhancing my vocabulary control.	3.88	0.33	Strongly Agree
2. The vodcasts are useful in learning grammar lessons.	3.71	0.46	Strongly Agree
3. The vodcasts make it easier for me to learn English lessons.	3.70	0.46	Strongly Agree
4. I am satisfied with the vodcast as a learning tool for this subject.	3.81	0.42	Strongly Agree
5. The vodcasts provide clear information about the practical contents and topics.	3.64	0.60	Strongly Agree
<b>Weighted Mean : SD</b>	<b>3.75 : 0.47</b>		
<b>Verbal Interpretation</b>	<b>Strongly Agree</b>		



<b>Legend</b>	<b>Range</b>	<b>Verbal Interpretation</b>
4	3.26-4.00	Strongly Agree
3	2.51-3.25	Agree
2	1.76-2.50	Disagree
1	1.00-1.75	Strongly Disagree

The data presented above reveal that video podcasting materials are helpful in enhancing the vocabulary control of the learners with the highest rating of (M=3.88, SD=0.33). The respondents were satisfied with the vodcast as a learning tool for English subject (M=3.81, SD=0.82). It can be noted that the students find the use of vodcast satisfying and helpful since they do not have tutors to teach them.

The students believed that vodcasts are useful for learning grammar and it makes easier to learn English lessons, and it provides clear information about the practical contents and topics with M=3.71, SD=0.46, M=3.70, SD=0.46, and

M=3.64, SD=0.60 respectively. This means that the vodcast lessons assisted the students in studying the concepts and topics in English because it provides useful insights that are highly applicable in real-life scenarios.

From the gathered result, the level of students' perceptions towards vodcasting with regards to learning satisfaction obtained a strongly agree descriptive rating and showed that learners enjoy new learning venture using vodcast in English lessons. This was evidently disclosed by the over-all mean of 3.75.

**Table 7. Level of Students Factors related to Vodcast With Regards to Viewing Willingness**

<b>Indicator</b>	<b>Mean</b>	<b>SD</b>	<b>Verbal Interpretation</b>
1. I view the vodcasts more than once/ repeatedly.	3.55	0.69	Strongly Agree
2. I love viewing the vodcasts because I gain confidence in my abilities to do English language activities.	3.71	0.62	Strongly Agree
3. I love viewing the vodcasts because I gain confidence in my ability to learn independently.	3.65	0.51	Strongly Agree
4. I love viewing the vodcasts because I gain confidence in my ability to understand the lessons in English.	3.86	0.35	Strongly Agree
5. I spend time watching the vodcast, because I understand the lessons easily.	3.68	0.57	Strongly Agree
<b>Weighted Mean : SD</b>	<b>3.69 : 0.57</b>		
<b>Verbal Interpretation</b>	<b>Strongly Agree</b>		

<b>Legend</b>	<b>Range</b>	<b>Verbal Interpretation</b>
4	3.26-4.00	Strongly Agree
3	2.51-3.25	Agree
2	1.76-2.50	Disagree
1	1.00-1.75	Strongly Disagree

The data above reveal that the students love viewing the vodcasts because they gain confidence in their ability to understand the lessons in English and to do English language activities (M=3.86, SD=0.57) and (M=3.71, SD=0.62) respectively. It can be concluded that through watching the vodcast, the confidence of the students to understand and performed related tasks in English lessons was increased.

The remaining statements, *They spend time watching the vodcast so that they will understand the lessons easily*, and *They love viewing the vodcasts because I gain confidence in my ability to learn independently* acquired M=3.68, SD=0.57 and M=3.65, SD=0.51 respectively.

In like manner, students would return to viewing the vodcasts more than once has a favorable response, but it accumulated the lowest weighted mean score of 3.55 with 0.69 SD. This infers that students would love to re-watch the vodcast lesson once again because they gained confidence in their capacity in perceiving the language lessons.

The level of students' perceptions using vodcast in terms of viewing willingness got a strongly agree rating and was disclosed by the over-all mean of 3.69. This is true that learners are mostly visual because they learn better when they see things and moving objects.



Additionally, Litchfield, Dyson, Wright, Pradhan and Courtille (2010) highlighted the superiority of vodcasting tasks in improving multimedia communication skills and raising the students' awareness about the potentials of the vodcasting technology.

In sum, vodcast promotes different learning engagement and satisfaction among the learners especially in today's learning set-up of distance learning, students tend to look for a different way of teaching and learning process since the teacher is not around.

**Table 8. Students' Mean Performance in the Pre-test**

Student's Performance	Grade 7	Grade 8	Grade 9	Grade 10
Mean	13.4	14.79	14.06	13.28
SD	4.73	5.01	5.42	2.95
Remarks	Fair	Fair	Fair	Fair

**Legend**

	Range	Remarks
5	40.01-50.00	Excellent (E)
4	30.01-40.00	Very Satisfactory (VS)
3	20.01-30.00	satisfactory (S)
2	10.01-20.00	Fair (F)
1	0.00-10.00	Needs Improvement (NI)

Table 8 shows the student's mean performance in the pre-test conducted before using the vodcasting. The students showed *Fair* performance with the mean score of 13.4 and an SD of 4.73 for grade 7 learners. This suggests that students had established a subject knowledge baseline on the topics covered for the second quarter.

14.79, 14.06 and 13.28 and SD of 5.01, 5.42 and 2.95 respectively. This implies that most of students' knowledge was based on what they learned in the previous year. They have retained basic information and ideas taught in the said coverage of the topic in the pre-test.

The grades 8, 9 and 10 students also showed a fair performance with weighted mean scores of

**Table 9. Students' Mean Performance in the Post-test**

Student's Performance	Grade 7	Grade 8	Grade 9	Grade 10
Mean	28.4	26.33	27.50	26.50
SD	4.69	5.92	6.59	5.60
Remarks	VS	VS	VS	VS

**Legend**

	Range	Remarks
5	40.01-50.00	Excellent (E)
4	30.01-40.00	Very Satisfactory (VS)
3	20.01-30.00	Satisfactory(S)
2	10.01-20.00	Fair (F)
1	0.00-10.00	Needs Improvement (NI)

Table 8 indicates the students' performance in the post-test given after using vodcasting. The students showed *Very Satisfactory* performance in the post test as indicated by the mean scores of 28.4 and an SD of 4.69 for the grade 7 learners. It can be acknowledged that the students performed better in English through the application of vodcast lesson.

additional knowledge in learning the topics in English through the use of vodcasting in presenting the lectures of the teacher.

The grade 8 learners as well displayed a *Very Satisfactory* performance with the rating of M= 26.33, SD= 5.92. This reveals that students achieved

More so, Grades 9 and 10 also accumulated a *Very Satisfactory* remark with (M= 27.50, SD= 6.59) and (M= 26.50, SD= 5.60) respectively. Therefore, vodcasting achieved its design as an effective tool to aid learning among the learners.



In sum, the result means that students increase in their performance as well. increased their scores in post- test which indicates an

**Table 10. Difference between the Students' Pre-test and Post-test Performance**

Students' Performance	Grade 7		Grade 8		Grade 9		Grade 10	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
<b>Mean</b>	13.4	28.4	14.79	<b>26.33</b>	14.06	27.50	13.28	26.50
<b>t-value</b>	-14.476		-9.100		-11.665		-9.611	
<b>p-value</b>	.000		.000		.000		.000	
<b>Analysis</b>	<b>Significant</b>		<b>Significant</b>		<b>Significant</b>		<b>Significant</b>	

Table 10 discloses the difference between the students' performance in the pre-test and post-test as indicated by the computed t- value and p- value. The students showed the *Fair* performance in the pre-test and *Very Satisfactory* performance in the post-test.

The findings present that there is a significant difference between the students' performance based on the pre-test and post- test scores. The computed t-value -14.476 and p-value of .000 for Grade 7 revealed that the strategy used, vodcasting, served its purpose of supporting the learning capacity of the students under modular instruction.

The t-value of -9.100 and p-value of 0.00 for Grade 8 showed a significant difference in the process of using vodcasting as a tool to help the learners study their lessons in English.

For Grade 9, the t-value of -11.665 and p-value of 0.00 exposed the significant effect of vodcasting in the process of teaching and learning under new normal education. Since the teachers are physically absent, the vodcast lesson substitutes the presence of the teachers.

Lastly, the t-value of -9.611 and p-value of 0.00 for Grade 10 suggested that if it is lower than 0.05 level of significance, hence, the null hypothesis was rejected.

The interpreted results of this chapter acknowledged that teachers play a key role in using vodcast as an aid for language teaching for they have the prime responsibility of creating a successful language learning environment. Also, it is considered that vodcast is a useful aid for instruction since most of the public schools in the Philippines implements modular distance learning where the presence and guidance of the teachers are most needed.

Consequently, vodcasting showcased positive effect among the learners and it gave them the chance to harness the macro skills in English, listening, viewing, speaking and reading.

## CONCLUSION

In view of the aforementioned findings, the study has drawn the following conclusions:

1. Vodcasting is an effective tool to aid language learning under modular instruction.
2. Vodcasting can motivate and give confidence to the learners through the delivery of the vodcast with teacher's good quality of voice, familiar language use and mastery of the subject matter.
3. Vodcasting can promote listening, speaking and viewing skills among the learners since the teacher assisted the instruction through audio and video material.
4. The use of vodcast in delivering the lesson was found interesting and enjoyable for the learners because it gives them the chance to learn at their own pace.
5. Vodcasting engaged the students in learning the lessons in English through providing materials that are related and connected to their experience.

## RECOMMENDATIONS

In light of the foregoing findings and conclusions of this study, the following recommendations are offered:

1. The vodcast lessons produced by the researcher could be further evaluated and improved by other teachers, so they will become more reliable based on their perception.
2. Another set of questionnaires may be used to shed light on the other elements on the vodcast lesson performed by the teacher.
3. Questionnaires on teachers and students related factors on vodcast lessons may be further revised and validated by more experts.
4. Similar, related or follow-up studies may be conducted utilizing students from other schools.



5. Other types of video podcasting may be explored in presenting lessons to show variation of results and findings.

## REFERENCES

1. Bernardo, J. (2020, July 30). *Modular Learning most preferred parents: DepEd. ABS-CBN News*. Retrieved from <https://news.abs-cbn.com/news/07/30/20/modular-learning-most-preferred-by-parentsdeped>
2. Bilbao, J. (2010). *Use of vodcasting in Higher Education to improve student Learning*. WSEAS TRANSACTIONS ON MATHEMATICS.
3. Bolliger, D. U., Supanakan, S. & Boggs, C. (2010). *Impact of podcasting on student motivation in the online learning environment*. *Computers and Education*, 55,714-722.
4. Borgia, L. (2010). *Enhanced vocabulary podcasts in fifth grade classrooms*. *Reading Improvement*. 46(4), 263-272
5. Brown, L. (2011). *Podcasting and vodcasting to BSc geography students*. *Planet*, 24(1), 62-67.
6. Chan, W. M. (2014). *Video podcasting as a supplementary language learning tool—A study of its use, student access and perceptions*. *Electronic Journal of Foreign Language Teaching*, 11(1), 183-206.
7. Chin, M. (2020). *Students' New Normal: Modular Distance Learning*. *Unique Philippines*. Retrieved from <https://www.uniquephilippines.com/students-new-normal-modular-distance-learning/>
8. Coutinho, C., & Rocha, A. (2010, March). *Screencast and vodcast: an experience in secondary education*. In *Society for Information Technology & Teacher Education International Conference* (pp. 1043-1050). Association for the Advancement of Computing in Education (AACE).
9. Dangle, Y. & Sumaoang, J.(2020). *The Implementation of Modular Distance Learning in the Philippine Secondary Public Schools*. 3rd International Conference on Advanced Research in Teaching and Education. Dublin Republic of Ireland.
10. Faramarzi, S. (2018). *The Impact of Vodcasting Tasks on Iranian Intermediate EFL Learners' Listening Comprehension, their Engagement, and their Attitudes in an E-learning Project*. Unpublished Doctoral Dissertation. Islamic Azad University, Isfahan (Khorasgan) Branch, Iran
11. Faramarzi, S. & Elekaei, A. (2015). *Podcasting: New Insights into Distance Language Learning*. *Journal of Applied Linguistics and Language Research* 2(4), 207-221.
12. Faramarzi, S., Tabrizi, H. H., & Chalak, A. (2019). *The Effect of Vodcasting Tasks on EFL Listening Comprehension Progress in an Online Program*. *International Journal of Instruction*, 12(1), 1263-1280.
13. Faramarzi, S., Tabrizi, H. H., & Chalak, A. (2019). *LEARNERS' PERCEPTIONS AND ATTITUDES TOWARDS L2 VODCASTING TASKS IN AN E-LEARNING PROJECT*. *Teaching English with Technology*, 19(3), 3-21.
14. Faramarzi, S., Tabrizi, H. H., & Chalak, A. (2020). *Vodcasting tasks in online L2 classes: investigating the potentials and challenges in distance language learning*. *International Journal of Technology Enhanced Learning*, 13(1), 24-43.
15. Fisher, A., Exley, K., & Ciobanu, D. (2014). *Using Technology to Support Learning and Teaching*. Routledge Taylor & Francis Group. London and New York.
16. Gonulal, T. (2020). *Improving Listening Skills with Extensive Listening Using Podcasts and Vodcasts*. *International Journal of Contemporary Educational Research*, 7(1), 311-320.
17. Heilesen, S. B. (2010). *What is the academic efficacy of podcasting?* *Computers & Education*, 55(3), 1063-1068. doi:<http://podcasting8010.wikispaces.com/file/view/What+is+the+academ+efficacy+of+podcasting>.
18. Hu S. (2014) *Pretesting*. In: Michalos A.C. (eds) *Encyclopedia of Quality of Life and Well-Being Research*. Springer, Dordrecht. [https://doi.org/10.1007/978-94-007-0753-5\\_2256](https://doi.org/10.1007/978-94-007-0753-5_2256)
19. Jarvis, C., & Dickie, J. (2010). *Podcasts in Support of Experiential Field Learning*. *Journal of Geography in Higher Education*, 34(2), 173-186. doi:10.1080/03098260903093653
20. Johnes, G. (2010). "Case Study: Podcasts as a Learning Tool in Economics," *Economics Network*.
21. Kay, R. H. (2012). *Exploring the use of video podcasts in education: A comprehensive review of the literature*. *Computers in Human Behavior*, 28(3), 820-831. doi:<http://dx.doi.org/10.1016/j.chb.2012.01.011>
22. Liebenberg, J. & Gruner, S. (2017). *ICT Education: 46th Annual Conference of the Southern African Computer Lecture's Association, SACLA*. Magaliesburg, South Africa. Revised Selected Papers. Springer International Publishing.
23. McGarr, O. (2009). *A review of podcasting in higher education: Its influence on the traditional lecture*. *Australasian Journal of Educational Technology*, 25(3), 309-321
24. Mc Graw, H. *Richard's Meyer Cognitive of Multimedia Learning*. Retrieved from <https://www.mheducation.ca/blog/richard-mayers-cognitive-theory-of-multimedia-learning>
25. Morris, N. P. (2010). *Podcasts and mobile assessment enhance student learning experience and academic performance*. *Bioscience Education*, 16. doi:<http://eric.ed.gov/?id=EJ912076>



26. Palalas, A. (2010). *Using mobile devices to extend English language learning outside the classroom*. In D. Metcalf, A. Hamilton, & C. Graffeo (Eds.), *mlearn2009: 8th World Conference on Mobile and Contextual Learning Proceedings*. Orlando, FL: University of Central Florida.
27. Quinones, M. T. (2020, July 3). *DepEd clarifies blended, distance learning modalities for SY 2020- 2021*. Philippine Information Agency. <https://pia.gov.ph/news/articles/1046619>
28. Rae, M. & McCarthy, M. (2017). *The impact of vodcast utilisation upon student learning of Physiology by first year graduate to entry medicine students*. *Journal of the Scholarship of Teaching and Learning*, Vol. 17, No. 2, April 2017, pp. 1-23.
29. Sadeghi, M. (2019). *A Shift from Classroom to Distance Learning: Advantages and Limitations*. *International Journal of Research in English Education*
30. Shim, J.P., Shropshire, J., Park, S., Harris, H., and Campbell, N. (2010) "Perceived Value of Podcasting: Student Communication-Medium Preferences," pp. 2186-2194. *Proceedings of the 12th Americas Conference on Information Systems, Acapulco, Mexico*.
31. Stavrianos, A. T., & Syropoulos, A. (2019). *The Use of Postcasting/Vodcasting in Education*. In *Advanced Methodologies and Technologies in Modern Education Delivery* (pp. 520-530). IGI Global.
32. Sweller, J., *Cognitive load during problem solving: Effects on learning*, *Cognitive Science*, 12, 257-285 (1988).
33. Sweller, J., *Instructional Design in Technical Areas*, Camberwell, Victoria, Australia: Australian Council for Educational Research (1999).
34. Steven McClung Ph.D. & Kristine Johnson M.S. (2010) *Examining the Motives of Podcast Users*, *Journal of Radio & Audio Media*, 17:1, 82-95, DOI: 10.1080/19376521003719391
35. Tavoosy, Y. & Jelveh, R. (2019). *Language teaching strategies and techniques used to support students learning in a language other than their mother tongue*. *International Journal of Learning and Teaching*, 11(2), 077–088.
36. Wahab, S. & Ghafoor Z. (2013). *Vodcast as Instruction Material in Teaching Listening and Speaking Skills*. Retrieved from [http://www.languageinindia.com/dec2013/zaheer\\_vodcast.pdf](http://www.languageinindia.com/dec2013/zaheer_vodcast.pdf)
37. White, C. (2003). *Language Learning in Distance Education*. doi:10.1017/cbo9780511667312 *The idea of distance language learning*. (2003). *Language Learning in Distance Education*, 1-25. doi:10.1017/cbo9780511667312.003
38. Yeh, C-C. (2013). *An investigation of a podcast learning project for extensive listening*. *Language Education in Asia*, 4, 135-149.



# THE IMPLEMENTATION OF FLEXIBLE LEARNING IN ENGLISH: INPUT FOR PRACTICE SUSTAINABILITY

**Ms. Cristina G. Trinidad**

*Master of Arts in Education Student, Laguna State Polytechnic University-Sta.Cruz, Campus, Philippines*

## ABSTRACT

The research titled “**THE IMPLEMENTATION OF FLEXIBLE LEARNING IN ENGLISH: INPUT FOR PRACTICE SUSTAINABILITY**” this study aimed to find out the status of implementation of Modular and Online Distance Learning, the performance of first quarter grade in English, problems met by students and teachers, the level of involvement of parents and the level of readiness of school. Thirty eight (38) English Teachers from Pedro Guevara Memorial National High School, ten (10) English Teachers from Gov.Felicisimo T. San Luis Integrated Senior High School and selected fifty (50) students from Santa Cruz District were requested to participate in the study. The research design used in this study was descriptive method of research. Random Sampling was used and the statistical treatment of data such as mean, standard deviation, *f*-value and *p*-value was used to compute, analyze the given data and interpret it. Analysis revealed that the status of implementation of flexible learning modalities: Input for practice sustainability can contribute to further improve the modality by knowing the different problems encountered by teachers and students as well as their perception. Parent’s involvement in the utilization of flexible learning influenced learners to be motivated and enjoy answering the learning task. Schools have materials to produce modules and do some alternatives to make study possible. The effect of flexible learning modalities to the first quarter performance in English confirms that Modular distance learning (print), modular distance learning (digital), online distance learning (synchronous) does not have the significant effect on the flexible learning modalities on the first quarter performance of the students in English while online distance learning (asynchronous) have a significant effect on the flexible learning modalities on the first quarter performance of the students in English. Majority of the modalities does not have a significant effect on the first quarter grade of the learners. When it comes to the effect of flexible learning modalities to the readiness of school, It shows that modular distance learning (print) and modular distance learning (digital) have significant effect on the flexible learning modalities to the level of school readiness then online distance learning (synchronous) and online distance learning (asynchronous) does not have a significant effect on the flexible learning modalities to the level of school readiness. It only means that the hypothesis is partially accepted.

## INTRODUCTION

Faced with the need to teach English to a large number of students and to secure the health of every personnel due to pandemic, leads the Department of Education in Philippines to create different ways of learning to protect the safety and well-being of learners, teachers and personnel. In addition, through different modalities, learners and teachers can communicate and give information to each other. Junior High Schools from Santa Cruz District had their Learning Continuity Plan which helps both learners and teachers by having flexible learning modalities. It is provided with learning while at home using Modular Distance Learning and the Online Distance Learning. Moreover, it provides opportunities for interaction with some elements of student that controls over time, place path or pace.

In today’s generation technology arises in which everyone can access on the internet and do the activities online and offline. Flexible learning modalities in New Normal Education seem to be one of the problems in school that needs focus. Variety of problems are encountered such as internet connection between



teachers and students which plays a vital role in communicating from each other, the difficulties of providing module for learners then parents who guide their children does not have sufficient knowledge and time to answer the module. In this way, students are not prepared to answer the task without assistance.

The study aimed to find out the status of implementation of Modular and Online Distance Learning, the performance of first quarter grade in English, problems met by students and teachers, the level of involvement of parents and the level of readiness of school.

Specifically, it sought to answer the following questions: (1)What is the status of implementation of the flexible learning modalities utilized by DepEd English Teachers in Santa Cruz District in terms of the following learning modalities?? 1.Modular Distance Learning 1.1 Modular (Print) 1.2 Modular (Digital) 2.Online Distance Learning 2.1 Synchronous 2.2 Asynchronous (2) What is the extent of utilizing the new normal flexible learning modalities as perceived by the respondents in terms of the following indicators? a.First Quarter Performance in English (3.) What are the common problems met by the students and teachers in the utilization of flexible learning modalities? (4)What is the extent of parent’s involvement in the utilization of flexible learning modalities? (5)How ready is the school in the implementation of flexible learning modalities?(6) Do the flexible learning modalities significantly affect the extent of outcomes in terms of:a.First Quarter Performance in English b.Level of Schools’ Readiness.

## MATERIALS AND METHODS

Random Sampling was used in this study to identify the status of implementation of flexible leaning modalities in Junior High School’s Sta.Cruz, District ,the performance of first quarter grade in English, problems met by students and teachers, the level of involvement of parents and the level of readiness of school. Students and teachers were the direct respondents of this study.

After the title had been approved by the faculty of Graduate Studies and Applied Research of Laguna State Polytechnic University Sta. Cruz Main Campus, the researcher asked permission to the Schools Division Superintendent of Laguna, followed by the Junior High School Head in Santa Cruz District. The researcher also sought to help for the assistance of the statistician for the analytical interpretation, computation and tabulation of the data according to the presented variables in the study. Regular consultation with the adviser and members of the panel regarding on the progress and possible changes or revisions of the study was experienced by the researcher.To administer the distribution of questionnaires, experts were consulted to validate the adequacy of questions asked and for reproduction of materials. The researcher oriented the respondents of the selected junior high school English teachers and students on the objectives of the study in order to gather the complete data which are necessary for the completion of this research paper works. The researcher told them to take time in answering the questionnaires and collect it after a weeklong of waiting. As the document collected, the data based on the information that were gathered will be tabulated, analyzed and interpreted by the r The main tool in this study is a researcher-made questionnaire. The questionnaire contains question based on the problem areas of investigation that the English Teachers and students would answer to be able to check the truthfulness of the data and information which gather through major instrument.

## RESULTS AND DISCUSSION

### Status of Implementation of the Flexible Learning Modalities utilized by Department of Education

Table 1 showed that the status of Flexible Learning Modalities Utilized by Department of Education in terms of Modular Distance Learning (Print).

**Table 1. Status of the Implementation of Flexible Learning Modalities Utilized by Department of Education in Terms of Modular Distance Learning (Print)**

Indicator	Mean	SD	Verbal Interpretation
1. I am motivated to learn using print materials because my family is there to support and guide me in answering the activities.	4.20	0.94	Implemented
2. I love to learn new things in every task in the module because studying at home gives me the feeling of freedom and luxury of being less pressured.	4.27	0.80	Highly Implemented
3. I can set my preferred schedule in finishing the tasks in the module.	3.40	1.35	Moderately Implemented



4. I have my way of learning and I am more focused on finishing the learning tasks.	3.80	0.77	Implemented
5. I can easily answer the tasks because the contents of the module are easier to understand than those in the books.	3.53	0.92	Implemented
6. I can use print materials in any location.	3.80	0.56	Implemented
7. I am comfortable using print materials to learn.	3.80	0.68	Implemented
<b>Weighted Mean: SD</b>	<b>3.83: 0.91</b>		
<b>Verbal Interpretation</b>	<b>Implemented</b>		

<i>Legend</i>	<i>Range</i>	<i>Verbal Interpretation</i>
5	4.21-5.00	Highly Implemented
4	3.41-4.20	Implemented
3	2.61-3.40	Moderately Implemented
2	1.81-2.60	Fairly Implemented
1	1.00-1.80	Not Implemented

The use of Modular Distance learning as to print is one of the flexible learning modalities utilized by Department of Education was found enjoyable and important by the learners. The (M= 4.27, 4.20, 3.80,3.53, 3.40) and was noticed in the table. Learners strongly agreed based on the result of highly implemented that print module gives the feeling of freedom and luxury of being less pressured (M= 4.27, SD= 0.80). On the other hand, most of the learners agreed that print module is implemented and it is easier to understood than those in the books (M= 3.53, SD= 0.92) The (WM= 3.83, SD= 0.91) indicated that learners agreed that it is implemented in which the use of modular distance learning as to print was gratifying. The learners are guided by other family members to answer the activities.

**Status of the Implementation of Flexible Learning Modalities Utilized by Department of Education in Terms of Modular Distance Learning (Digital)**

Table 2 shows moderately implemented result of status of implementation of flexible learning modalities utilized by Department of Education in terms of modular distance learning (digital).

**Table 2. Status of the Implementation of Flexible Learning Modalities Utilized by Department of Education in Terms of Modular Distance Learning (Digital)**

<b>Indicator</b>	<b>Mean</b>	<b>SD</b>	<b>Verbal Interpretation</b>
1. I am willing to learn because the learning materials and instruction can actually be obtained in digital or soft copy at any time.	3.38	0.74	Moderately Implemented
2. I am able to learn new ways in technology that excites me to accomplish the task online.	3.38	1.06	Moderately Implemented
3. I can easily send my answer in every learning task to my teacher through Facebook messenger.	3.25	1.04	Moderately Implemented
4. I have my schedule for answering the module.	3.50	1.31	Implemented
5. Even if I have no internet connection using my cellphone or laptop is not difficult, I can easily study because the content of the module is saved in a digital format or soft copy.	3.38	1.30	Moderately Implemented
6. It saves my time in answering the modules. Once I'm finished for the day, I can do other things at home.	3.38	0.74	Moderately Implemented
7. If there are tasks I find hard to understand, I can spend as much time as I want to study them.	3.38	0.52	Moderately Implemented
<b>Weighted Mean : SD</b>	<b>3.38 : 0.95</b>		
<b>Verbal Interpretation</b>	<b>Moderately Implemented</b>		



<i>Legend</i>	<i>Range</i>	<i>Verbal Interpretation</i>
5	4.21-5.00	Highly Implemented
4	3.41-4.20	Implemented
3	2.61-3.40	Moderately Implemented
2	1.81-2.60	Fairly Implemented
1	1.00-1.80	Not Implemented

The use of modular distance learning (digital) was found to be exciting for learners because they have new ways to learn and they are resourceful in answering the task through digital way thus it should be in moderate way. The (M= 3.38, 3.38, 3.25, 3.50, 3.38, 3.38, 3.38) was noticed in the table. Learners agreed that having a schedule for answering the module gives them the feeling of less stress. On the other hand, most of the learners showed that it is moderately implemented because they can easily study the content of the module is saved in a digital format or soft copy which acquired the (WM=3.38, SD=1.30).

### **Status of the Implementation of Flexible Learning Modalities Utilized by Department of Education in Terms of Online Distance Learning (Synchronous)**

Table 3 demonstrates implemented in the status of implementation of flexible learning modalities utilized by Department of Education terms of online distance learning (synchronous).

**Table 3. Status of the Implementation of Flexible Learning Modalities Utilized by Department of Education in Terms of Online Distance Learning (Synchronous)**

<b>Indicator</b>	<b>Mean</b>	<b>SD</b>	<b>Verbal Interpretation</b>
1. I can work online at home while the teacher assigns work and check it in digital form.	4.11	0.90	Implemented
2. I can use my comfortable furniture at home while enjoying free movement and a chance to further pursue my education. I don't have to worry about gaining access to a classroom or sitting on uncomfortable desks.	3.83	0.99	Implemented
3. Studying online is even made more interactive with the use of video conference. It improves my ability to acquire and retain knowledge on a given subject.	3.72	0.83	Implemented
4. I am more focused and dedicated to complete the task successfully.	4.06	0.64	Implemented
5. I have access to any of the resources using my gadget.	3.83	0.79	Implemented
6. I can understand the lesson effectively because the teacher explains the lesson at the exact time and I have my classmates who interact virtually.	3.89	0.58	Implemented
7. I enjoy learning virtually with my classmates together in the classroom with our teacher while working through their digital lessons and learning tasks.	4.06	0.94	Implemented
<b>Weighted Mean : SD</b>	<b>3.93 : 0.81</b>		
<b>Verbal Interpretation</b>	<b>Implemented</b>		

<i>Legend</i>	<i>Range</i>	<i>Verbal Interpretation</i>
5	4.21-5.00	Highly Implemented
4	3.41-4.20	Implemented
3	2.61-3.40	Moderately Implemented
2	1.81-2.60	Fairly Implemented
1	1.00-1.80	Not Implemented



The use of online distance learning (synchronous) was found to be agreeable and pleasurable by learn which made them committed in doing the learning tasks online. They also enjoy learning new ways in technology as well as discover the different usage of websites. The (M= 4.11, 3.83, 3.72, 4.06, 3.83, 3.89, 4.06) and the (SD=0.90, 0.99, 0.83, 0.64, 0.79, 0.58, 0.94) was noticed in the table. Learners agreed that they are relaxed while doing the activities at home. It obtained the over-all weighted mean of 3.93 and standard deviation of 0.81 which resulted to Implemented.

### Status of the Implementation of Flexible Learning Modalities Utilized by Department of Education in Terms of Online Distance Learning (Asynchronous)

Table 4 presents the result of implemented in status of the implementation of flexible learning modalities utilized by Department of Education in terms of online distance learning (asynchronous).

**Table 4. Status of the Implementation of Flexible Learning Modalities Utilized by Department of Education in Terms of Online Distance Learning Asynchronous**

Indicator	Mean	SD	Verbal Interpretation
1. I can easily search for answers in the internet whenever my teacher assigns learning task.	4.22	0.83	Highly Implemented
2. I can chat or send a message to my teacher through messenger to ask questions if I don't understand the activity.	4.22	0.44	Highly Implemented
3. I can make my study schedule during the time the tasks are given and study the recorded video based on my own pace, path, and availability.	3.67	0.71	Implemented
4. After I finished answering the tasks, I have more time to spend with my family at home.	4.00	0.50	Implemented
5. I can get enough rest and sleep. I can also set my alarm, do morning routines, and then turn on my computer to start my day of learning.	3.00	1.12	Moderately Implemented
6. My teacher answers my question online that enables me to learn more and do the activities effectively.	3.56	0.73	Implemented
7. I developed my determination, responsibility, and self-control in finishing the task. I am able to maintain the right pace of learning without any stress.	3.44	0.88	Implemented
<b>Weighted Mean : SD</b>	<b>3.73 : 0.85</b>		
<b>Verbal Interpretation</b>	<b>Implemented</b>		

<i>Legend</i>	<i>Range</i>	<i>Verbal Interpretation</i>
5	4.21-5.00	Highly Implemented
4	3.41-4.20	Implemented
3	2.61-3.40	Moderately Implemented
2	1.81-2.60	Fairly Implemented
1	1.00-1.80	Not Implemented

The use of online distance learning (asynchronous) was found to be amenable which made them to be motivated in doing the learning task online without following the time for the reason that they have their own choice. Basically, they developed their willpower, accountability, and self-will in finishing the task and able to maintain the right step of learning without any pressure. The (M=4.22, 4.22, 3.67, 4.00, 3.00, 3.56, 3.44) and the (SD=0.83, 0.44, 0.71, 0.50, 1.12, 0.73, 0.88) was noticed in the table.

### Outcomes Utilized the New Normal Flexible Learning Modalities in terms of First Quarter Grade

Table 5 demonstrates the outcomes utilized in the new normal flexible learning modalities in terms of first quarter grade in English.



**Table 5. Outcomes Utilized the New Normal Flexible Learning Modalities in terms of First Quarter Grade**

	<b>Modular Print</b>	<b>Modular Digital</b>	<b>Synchronous</b>	<b>Asynchronous</b>
<b>Mean</b>	87.6	90.63	90.83	89.89
<b>SD</b>	4.79	4.57	2.5	5.13
<b>Verbal Interpretation</b>	Proficient	Advanced	Advanced	Proficient

*Legend:*

1	70.00-74.99	Beginning
2	75.00-79.99	Developing
3	80.00-84.99	Approaching Proficiency
4	85.00-89.99	Proficient
5	90.00-100	Advanced

As indicated in the table most learners who prefer learning modalities in terms of modular as to print got the (M= 87.6, SD=4.79) and with interpretation of proficient the same as the learners in online distance learning as to asynchronous got the (M= 89.89, SD= 5.13) with interpretation of proficient. On the other hand, learners who chose modular as to digital got the (M= 90.63, SD= 4.57) with interpretation of advanced also online distance learning as to synchronous got the (M= 90.83, SD= 2.5) with the interpretation of advanced also.

### **Common Problems Met by the Students in the Utilization of Flexible Learning Modalities**

Table 6 presents the common problems met by learners in the utilization of flexible learning modalities.

**Table 6. Common Problems Met by the Students in the Utilization of Flexible Learning Modalities**

<b>Indicator</b>	<b>Mean</b>	<b>SD</b>	<b>Verbal Interpretation</b>
1. I am easily distracted and I have a problem in time management which hinders me from finishing the task on time.	3.58	1.20	Challenging
2. I feel unmotivated because I find it difficult to answer the learning tasks.	3.42	1.05	Challenging
3. I am not provided with a strong internet connection that online learning requires; thus I fail to catch up with the lessons.	3.00	1.25	Moderately Challenging
4. Studying in distance is a challenge for me. I feel frustrated because I gain less support from my parents in answering the tasks.	2.80	1.20	Moderately Challenging
5. I have a problem in internet connection and gadget; I find it difficult to answer the tasks especially the ones that require online research.	2.92	1.18	Moderately Challenging
<b>Weighted Mean : SD</b>	<b>3.14 : 1.20</b>		
<b>Verbal Interpretation</b>	<b>Moderately Challenging</b>		

*Legend*

	<b>Range</b>	<b>Verbal Interpretation</b>
5	4.21-5.00	Highly Challenging
4	3.41-4.20	Challenging
3	2.61-3.40	Moderately Challenging
2	1.81-2.60	Fairly Challenging
1	1.00-1.80	Not Challenging



Learners often experience destruction and problem about time management (M= 3.58, SD= 1.20). Others feel unmotivated with the (M= 3.42, SD=1.05). The poor internet connection that online learning requires were sometimes experienced and learners fail to catch up with the lesson got the (M= 3.00, SD= 1.25). Less support from parents in answering the task with the (M= 2.80, SD=1.25). It can be shown that learners encounter the different difficulties occasionally which results to Moderately Challenging and has a weighted mean of 3.14 and standard deviation of 1.20.

### Common Problems Met by the Teachers in the Utilization of Flexible Learning Modalities

Table 7 shows the results of often based from common problems met by the teachers in the utilization of flexible learning modalities.

**Table 7. Common Problems Met by the Teachers in the Utilization of Flexible Learning Modalities**

Indicator	Mean	SD	Verbal Interpretation
1. I have difficulties when it comes to my availability to guide or support my students when they need it most particularly the complicated task since they do independent learning.	2.31	1.17	Fairly Challenging
2. Technological issues disrupt my work, particularly when talking to students online.	3.60	0.89	Challenging
3. I find it hard to check several students' output with different learning tasks every week.	3.29	1.05	Moderately Challenging
4. Preparing lessons during this pandemic is way more challenging than before since the concern is not just limited to make sure that the learning will be transferred to the learners, but also to make sure that this is delivered to them effectively.	4.27	0.68	Highly Challenging
5. Aside from fluctuating to an interrupted internet connection, I am bothered by the unnecessary background noises I hear, as these serve as distractions to my students and myself.	3.94	0.56	Challenging
<b>Weighted Mean : SD</b>	<b>3.48 : 1.12</b>		
<b>Verbal Interpretation</b>	<b>Challenging</b>		

#### Legend

5

4

3

2

1

#### Range

4.21-5.00

3.41-4.20

2.61-3.40

1.81-2.60

1.00-1.80

#### Verbal Interpretation

Highly Challenging

Challenging

Moderately Challenging

Fairly Challenging

Not Challenging

The common problems met by the teachers in the utilization of flexible learning modalities was found challenging in which teachers who experienced troubles in distance learning tend to develop sense of acceptance to resolve problems in their own way. Even if they experienced it frequently being resourceful is needed in accomplishing the tasks. The (M=2.31, 3.60, 3.29, 4.27, 3.94) and the (SD=1.17, 0.89, 1.05, 0.68, 0.56) was noticed in the table. It indicates that the difficulties they experienced have a weighted mean of 3.48 and standard deviation of 1.12. Teachers tend to encounter different problems. They often run into trials in this new normal education.

### Extent of Parent's Involvement in the Utilization of Flexible Learning

Table 8 illustrates the extent of parent's involvement in the utilization of flexible learning.



**Table 8. Extent of Parent's Involvement in the Utilization of Flexible Learning**

Indicator	Mean	SD	Verbal Interpretation
1. The involvement of supportive parents can allow the students to learn and succeed on their own.	4.44	0.76	Highly Involved
2. Parents know when to lean in and lean out of their children's experience in doing the learning tasks.	3.98	0.71	Involved
3. Parents have a direct impact on the education their children receive, especially in an online learning set-up.	4.34	0.80	Highly Involved
4. Modular and online learning is a huge help to students because parents and family members can supervise them in learning.	4.12	0.66	Involved
5. Parents connect with the teachers to monitor their children's learning.	4.12	0.75	Involved
<b>Weighted Mean : SD</b>	<b>4.20 : 0.75</b>		
<b>Verbal Interpretation</b>	<b>Involved</b>		

<i>Legend</i>	<i>Range</i>	<i>Verbal Interpretation</i>
5	4.21-5.00	Highly involved
4	3.41-4.20	Involved
3	2.61-3.40	Moderately Involved
2	1.81-2.60	Fairly Involved
1	1.00-1.80	Never Involved

The extent of parent's involvement in the utilization of flexible learning influenced learners to have a deeper understanding of learning task that made them feel appreciated and encouraged to learn. This was proven through the result of involved. As indicated the (M=4.44, 3.98, 4.34, 4.12, 4.12) and (S=0.76, 0.71, 0.80, 0.66, 0.75) was noticed in the table. It achieved the results of Involved with a weighted mean of 4.20 and standard deviation of 0.75. It reflects that having parent's involvement plays an indispensable role in new normal education.

**The Level of Readiness of School in the Implementation of Flexible Learning Modalities**

Table 9 indicates the result of readiness of the school in the implementation of flexible learning modalities.

**Table 9. Level of Readiness of School in the Implementation of Flexible Learning Modalities**

Indicator	Mean	SD	Verbal Interpretation
1. The school provides alternatives to make the learning modality efficient for other students.	4.08	0.82	High Readiness
2. The school communicates with other stakeholders and LGU's to deliver the educational materials needed in distance learning.	4.13	0.67	High Readiness
3. The school provides initial effort in ensuring that all students have access to the internet.	3.48	0.80	High Readiness
4. The school provides various preparations to guide teachers, parents, and learners in the conduct of basic education in the new normal.	3.98	0.67	High Readiness
5. The school ensures that all teachers feel confident in using the tools to assign materials for every learning modality.	4.02	0.60	High Readiness
<b>Weighted Mean : SD</b>	<b>3.94 : 0.75</b>		
<b>Verbal Interpretation</b>	<b>High Readiness</b>		

<i>Legend</i>	<i>Range</i>	<i>Verbal Interpretation</i>
5	4.21-5.00	Very High Readiness
4	3.41-4.20	High Readiness
3	2.61-3.40	Moderate Readiness
2	1.81-2.60	Low Readiness
1	1.00-1.80	Unreadiness



The level of readiness of the school in the Implementation of Flexible Learning Modalities results to high readiness that attests to be prepared in this kind of situation. The (M=4.08, 4.13, 3.48, 3.98, 4.02) and (S=0.82, 0.67, 0.80, 0.67, 0.60) was noticed in the table. It shows high readiness with the weighted mean of 3.94 and standard deviation of 0.75.

### Effect of Flexible Learning Modalities to the First Quarter Performance in English

Table 10 confirms the effect of flexible learning modalities to the first quarter performance in English.

**Table 10. Effect of Flexible Learning Modalities to the First Quarter Performance in English**

Flexible Learning Modalities	Mean	First Quarter Performance	Mean	R Square	F-value	p-value	Analysis
Modular Print	3.83	Modular Print	87.6	.001	.007	.933	Not Significant
Modular Digital	3.38	Modular Digital	90.63	.372	3.562	.108	Not Significant
Synchronous	3.93	Synchronous	90.83	.034	.568	.462	Not Significant
Asynchronous	3.73	Asynchronous	89.89	.583	9.794	.017	Significant

This reflects the effect of flexible learning modalities on the first quarter performance of the learners in English. The computed p- values on the modular print (p= .933) modular digital (p=.462) are higher than .05 level of significance indicating no significant effect on the said factor to the first quarter performance in English. On the other hand, the (p= .017) in asynchronous is much lower than .05 level of significance indicating significant effect on the said factor to the first performance of the learners in English.

### Effect of Flexible Learning Modalities to the Level of School Readiness

Table 11 determines the effect of flexible learning modalities to the school readiness.

**Table 11. Effect of Flexible Learning Modalities to the School Readiness**

Flexible Learning Modalities	Mean	School Readiness	Mean	F- value	p- value	Analysis	
Modular Print	3.83		3.94		5.908	.022	Significant
Modular Digital	3.38				27.301	.004	Significant
Synchronous	3.93				3.034	.066	Not Significant
Asynchronous	3.73				.123	.975	Not Significant

This indicates the effect of learning modalities on the school readiness. The computed p-values on the modular print (p= 0.22) modular digital (p= .004) are much lower than .05 level of significance indicating significant effect on the said factor to the school readiness. On the other hand, the computed (p= .066) in synchronous and (p= .975) asynchronous are higher than .05 level of significance indicating no significant effect on the said factor to the school readiness.

## CONCLUSION

In light of the findings in this study, it can be concluded that the status of implementation of flexible learning modalities: Input for practice sustainability can contribute to further improve the modality by knowing the different problems encountered by teachers and students as well as their perception. Parent's involvement in



the utilization of flexible learning influenced learners to be motivated and enjoy answering the learning task. Schools have materials to produce modules and do some alternatives to make study possible. The effect of flexible learning modalities to the first quarter performance in English confirms that Modular distance learning (print), modular distance learning (digital), online distance learning (synchronous) does not have the significant effect on the flexible learning modalities on the first quarter performance of the students in English while online distance learning (asynchronous) have a significant effect on the flexible learning modalities on the first quarter performance of the students in English. Majority of the modalities does not have a significant effect on the first quarter grade of the learners. When it comes to the effect of flexible learning modalities to the readiness of school, It shows that modular distance learning (print) and modular distance learning (digital) have significant effect on the flexible learning modalities to the level of school readiness then online distance learning (synchronous) and online distance learning (asynchronous) does not have a significant effect on the flexible learning modalities to the level of school readiness. It only means that the hypothesis is partially accepted.

### **Acknowledgements**

The undertaking and completion of this study has been made possible because of the support and assistance of some people. The author hereby expresses her sincere gratitude to the following, who shared their authentic and unselfish concern, assistance and spiritual support.

**HEAVENLY FATHER**, the ultimate creator of all things for his countless gifts of love, hope, knowledge and strength to make this research fruitful.

**LAGUNA STATE POLYTECHNIC UNIVERSITY**, her Alma Mater, for serving as instrument to achieve the researcher's goals and become professionally developed.

**Dr. MARIO R. BRIONES**, University President, for his great endeavour in helping individuals who are yearning for professional growth.

**Dr. FLORHAIDA V. PAMATMAT**, Dean of Graduate Studies and Applied Research, Thesis Adviser and Language Critic for her unending considerations, helping hands in the whole process of the study also her incomparable support and brilliant ideas, her intellectual insights and considerable suggestions in bringing out the best of the study then for patiently and brilliantly editing the language of the manuscript of the researcher.

**Dr. MERILYN P. JUACALLA**, her Statistician, for undertaking the statistical tasks brilliantly, for her guidance and moral support in upbringing the study's credibility.

**Dr. CAEZAR D. PAMIN**, in memory in heaven of her Subject Specialist for his positive criticisms, comments and suggestions for the enhancement of the study.

**Dr. AILEEN M. DARAN**, her Technical Expert for her immense support and pedagogic pieces of advice in the duration of the study.

**Dr. MERLEN B. SANCHA**, her external panel, for helping and guiding her in the details of manuscript.

**Dr. MARITES A. IBAÑEZ**, Schools Division Superintendent, for her trust, approval and encouragement.

**Dr. SANTIAGO F. FAJILAGO**, Principal of Pedro Guevara Memorial National High School for his approval and selfless cooperation.

**Dr. RAUL D. L.R. CAISIP**, Principal of Gov. Felicisimo T. San Luis Integrated senior High School, for his trust and support.

**MRS. PERLA LAQUINDANUM**, English Coordinator of GFTSISHS and the selected students from Santa Cruz District for their support and cooperation;

**Mr. ERYL A. GARANTUZA and Ms. JENY ANN G. TARACATAC**, my co-teachers for their comments and suggestions for the betterment of the study;

My principal, **Dr. NELSON R. UMALI** of Lumban National High School for his moral support.

The researcher's parents, **FLORENCE TRINIDAD** and **CRISALDO TRINIDAD** as well as **ARLOVIN ANILLO** and her sisters **ARVEE**, **ALYSSA** and **in-laws** for their immeasurable support and inspiring encouragement from the beginning up to the completion of the study.

Her husband **Pat FITZ GERALD M. TOLEDO**, for always uplifting her up in pursuing her study and for the support and love given to her.



## REFERENCES

### A. Books

1. Alexander, P.A and Mayer R.E (2011), *Handbook of Research on Learning and Instruction*, New York
2. Bergmann, J. and Sams, A. (2014) "Flipped Learning: Gateway to Student Engagement ", *International Society for Technology in Education*, Washington D.C.
3. Clark, R. and Mayer , R. (2016), *E- Learning and the Science of Instruction: Proven Guidelines for Consumers:United States of America*
4. *Education Digest (2015) A Crowd Sourced White Paper from the Center for Digital Education (2015).Contextual Collaboration-What is it? Why does it matter? Where do I start? Prakken Publishing*
5. Kendra, E.(2018) *Teaching with the brain in mind. (2nd Ed.)*Alexandria, VA:Association for supervision and curriculum.
6. Mayer, R.(2012) *Multimedia Learning,Second Editon*, Cambridge
7. Morrison R. S. et. al (2011) *Designing Effective Instruction 6<sup>th</sup> Edition*, John Wisley & Sons, Inc. U.S.A.
8. Salandanan (2011) *Teacher Education Journal*, Quezon City Kather Publishing Inc.
9. *United Nations Educational, Scientific and Cultural Organization. (2013). Policy guidelines for mobile learning. Paris: France.*

### B. Magazine/Journals/Periodicals

1. *American Psychological Association (2012) Facing the School Dropout Dilemma*
2. Baghetto R.A (2001) *Virtually in the Middle Clearing House*, 75,5

### C. Unpublished Materials

1. Alea, L. A., Fabrea, M. F., Roldan, R. D. A., & Farooqi, A. Z. (2020). Teachers' Covid-19 awareness, distance learning education experiences and perceptions towards institutional readiness and challenges. *International Journal of Learning, Teaching and Educational Research*, 19(6), 127-144.
2. Abrami, P. C., Bernard, R. M., Bures, E. M., Borokhovski, E., & Tamim, R. M. (2011). Interaction in distance education and online learning: Using evidence and theory to improve practice. *Journal of Computing in Higher Education*, 23(2-3), 82-103.
3. Arar, K., Abu-Asbah, K., & Nasra, M. A. (2014). Arab parents' involvement in school reform in Israel. *International Journal of Educational Reform*, 23(2), 133-153.
4. Aydin, C. C., & Tirkes, G. (2010). Open source learning management systems in distance learning. *TOJET: The Turkish Online Journal of Educational Technology*, 9(2).
5. Barrow, M. and Rouse C. (2009) *Technology's Edge:The Educational Benefits of Computer Aided Instruction*, *American Economic Journal: Economic Policy*, American Economic Association, vol. 1 (1) pages 52-74
6. Bedall-Hill, N., Jabbar, A., & Al Sheri, S. (2011). Social mobile devices as tools for qualitative research in education: iPhones and iPads in ethnography, interviewing, and design-based research. *Journal of the Research Centre for Educational Technology*, 7, 67-89.
7. Boulos, M. N. K., Taylor, A. D., & Breton, A. (2005). A synchronous communication experiment within an online distance learning program: A case study. *Telemedicine Journal & e-Health*, 11(5), 583-593.
8. Bradley, C., Haynes, R., Cook, J., Boyle, T., & Smith, C. (2009). Design and development of multimedia learning objects for mobile phones. In M. Ally (Ed.), *Mobile learning: Transforming the delivery of education and training* (pp. 157-182). Edmonton, Canada: Athabasca University Press.
9. Broadbent, J., & Poon, W. L. (2015). Self-regulated learning strategies & academic achievement in online higher education learning environments: A systematic review. *The Internet and Higher Education*, 27, 1-13.
10. Cabela (2017) *Teachers Delievery of Materials and Resource in Cluster III Secondary Schools*, Unpublished Master Thesis, Laguna State Polytechnic University Sta. Cruz, Campus Sta. Cruz, Laguna
11. Chou, P. N., & Chen, W. F. (2008). Exploratory study of the relationship between self-directed learning and academic performance in a web-based learning environment. *Online Journal of Distance Learning Administration*, 11(1).
12. Crampton, A., Ragusa, A. T., & Cavanagh, H. (2012). Cross-discipline investigation of the relationship between academic performance and online resource access by distance education students. *Research in Learning Technology*, 20(1), n1.
13. Crisostomo, B.G.A (2015) *Development and Evaluation of Module in Conversational English*, Unpublished Master Thesis. Laguna State Polytechnic University, Sta. Cruz Campus, Sta. Cruz, Laguna
14. Dolenc, K., Pesek, I., & Aberšek, B. (2013). Modular and branched structure of individualized intelligent e-learning materials for science and technology subject course. *Problems of Education in the 21st Century*, 57, 16.
15. Exeter, D. J. et al. (2010) 'Student engagement in very large classes: the teachers' perspective', *Studies in Higher Education*, vol. 35, no. 7, pp. 7617005.
16. Estacio, E. (2017) *The Performance of Grade 9 Students Under Flipped Classroom Approach*; Unpublished Master Thesis, Laguna State Polytechnic University Sta. Cruz, Campus



17. Gupta, C. A., Singh, B., & Marwaha, T. (2013). Relationship between Social Media and Academic Performance in Distance Education. *Universal Journal of Educational Research*, 1(3), 185-190.
18. Jabilles, A.B (2010) Validation of Organic Chemistry Workbook for Paramedical Courses, Eulogio Amang Rodriguez Institute of Science and Technology, Sta. Mesa
19. Jackson, M. E. (2010). Where are the parents: The parent's perspective of parent involvement in education. *Dissertation Abstract International Section A: Humanities and Social Sciences*, Vol 71(4-A). George Washington University, Washington, D.C. ProQuest Information & Learning.
20. Karal, H., & Cebi, A. (2012). Views on modular assessment and evaluation process in distance education. *Procedia-Social and Behavioral Sciences*, 46, 2073-2077.
21. Kuo, Y. C., Walker, A. E., Schroder, K. E., & Belland, B. R. (2014). Interaction, Internet self-efficacy, and self-regulated learning as predictors of student satisfaction in online education courses. *The internet and higher education*, 20, 35-50.
22. Lapada (2020) Teachers' Covid-19 Awareness, Distance Learning Education Experiences and Perceptions towards Institutional Readiness and Challenges, Retrieved from <https://www.researchgate.net/publication/342992348>
23. Lopez-Perez, M. V., Perez-Lopez, M. C. & Rodriguez-Ariza, L. (2011). Blended learning in higher education: Students' perceptions and their relation to outcomes. *Computers & Education*, 56(3), 818-826. <http://dx.doi.org/10.1016/j.compedu.2010.10.023>
24. Liu, J. (2013). E-learning in English classroom: Investigating factors impacting on ESL (English as Second Language) college students' acceptance and use of the Modular Object-Oriented Dynamic Learning Environment (Moodle).
25. Lowe, P. (2010) Top Ten Ways to Improve Student Achievement are Create Learners; Retrieved from: [http://www.huffingtonpost.com/pam-low/top-10-ways-to-improve-st\\_b\\_786205.pdf](http://www.huffingtonpost.com/pam-low/top-10-ways-to-improve-st_b_786205.pdf)
26. Magill D. (2008), What Part of Self-Paced Don't You Understand? Retrieved from: [http://www.uwex.edu/disted/conference/resource\\_library/proceedings/08\\_12392.pdf](http://www.uwex.edu/disted/conference/resource_library/proceedings/08_12392.pdf)
27. Mwase, D., Simuyaba, E., Mwewa, G., Muleya, G., & Simui, F. (2020) Leveraging Parental involvement in the Education of their Children as a Conflict Resolution strategy in selected Secondary Schools, Zambia
28. Navia, Evelyn P. (2015) Work Text in Library Lessons using 4 A's Approach Unpublished Masters Thesis, Laguna State Polytechnic University-SCC.
29. Orlando J. (2014) To improve Student Performance, Start Thinking Like a Coach, Retrieved from: <http://www.facultyfocus.com/articles/educational-assessment/improve-student-performance-start-thinking-like-a-coach/>
30. Owolabi, S. O. (2016). Policy making and educational policy analysis. Kampala: Makerere University Press.
31. Perris, K., Zhang, W. & Poon, T. (2001) An Investigation of Distance Learners Preferences for and Barriers to Online Learning in Hong Kong, *Indian Journal of Open Learning*, 13(2), 139-149.
32. Sarmiento E. (2007) Determinants of Academic Performance and Division Achievement Test Scores of Grade IV Pupils in Pulong Sta. Cruz Elementary School, Unpublished Master Thesis Laguna State Polytechnic University Sta. Cruz Campus, Sta. Cruz, Laguna
33. Shachar, M., & Neumann, Y. (2010). Twenty years of research on the academic performance differences between traditional and distance learning: Summative meta-analysis and trend examination. *MERLOT Journal of Online Learning and Teaching*, 6(2).
34. Shchitov, A. G., Ol'ga, G. S., Shchitova, D. A., Stasinska, P., & Chieu, D. T. (2015). Features of the learning modular system moodle use in teaching the Russian language to Russian and foreign Students at an Institution of Higher Education. *Procedia-Social and Behavioral Sciences*, 215, 170-175.
35. Sejpal, K. (2013). Modular method of teaching. *International Journal for Research in Education* Vol. 2,(2), Feb. 2013 (IJRE) ISSN: 2320-091X.
36. Sung, E., & Mayer, R. E. (2012). Five facets of social presence in online distance education. *Computers in Human Behavior*, 28(5), 1738-174
37. Villegas (2019) Learning Resource Material Depicting Distinctive Cultures in Cavinti, Laguna. Master Thesis, Laguna State Polytechnic University, Sta. Cruz Campus, Sta. Cruz, Laguna cited Khasier, M (2006) A Concept in the Classroom, MOD Magazine
38. Wang, S. L. & Wu, P.Y. (2013) To explore the roles of self-efficacy, student feedback, self-learning strategies, performance & receiving feedback in web based learning
39. Watson, G. L., Sanders-Lawson, E. R., & McNeal, L. (2012). Understanding parental involvement in American public education. *International Journal of Humanities*

#### D. Internet and Electronic Sources

1. Alcober (2020) DepEd salutes all teachers on World Teachers' Day. Retrieved from: [DailyTribune.com.ph](http://DailyTribune.com.ph)
2. Al-Huneidi & Schreurs (2012) Constructivism Based Blended Learning in Higher Education, Hasselt University, Hasselt, Belgium Retrieved from: <https://online-journals.org/index.php/i-jet/article/view/1792/2137>
3. Bernardo(2020) Modular learning most preferred by parents: DepEd Retrieved from: <https://news.abs-cbn.com/news/07/30/20/modular-learning-most-preferred-by-parents-deped>, Posted at Jul 30 2020 12:38 PM | Updated as of Jul 30 2020 06:56 PM



4. *Beaudry, J. (2014) Visual Literacy for Teaching and Learning Essential Knowledge and Skills to Create, Use and Assess Concept Maps and Graphic Organizer. Retrieved from: <http://www.meshguides.org/guides/node/228>*
5. *Bock (2021). What is random sampling?. Retrieved from: <https://www.displayr.com/what-is-random-sampling/>*
6. *Department of Education OUCL-2020-307, Suggested Measures to foster academic ease during COVID19 Pandemic Retrieved from: <http://deped.gov.ph>*
7. *Department of Education, Regional Order 10. s. 2020 PIVOT 4A (BOW) Budget of Work. Retrieved from: <http://deped.gov.ph>*
8. *Fedina, N. V., Burmykina, I. V., Zvezda, L. M., Pikalova, O. S., Skudnev, D. M., & Voronin, I. V. (2017). Study of educators' and parents' readiness to implement distance learning technologies in preschool education in Russia. *Eurasia Journal of Mathematics, Science and Technology Education*, 13(12), 8415–8428. <https://doi.org/10.12973/ejmste/80802>*
9. *FluidSurveys Team (2014). Descriptive research: defining your respondents and drawing conclusions. Retrieved from: <http://fluidsurveys.com/university/descriptive-research-defining-respondents-drawing-conclusions/>*
10. *Gordon Pask, *Conversation Theory*; Retrieved from: <https://web.cortland.edu/andersmd/learning/pask.htm>*
11. *Grgurović, M. (2011). Blended learning in an ESL Class: A case study. *CALICO Journal*, 29 (1), 100-117.*
12. *Llego(2020) DepEd Learning Delivery Modalities for School Year 2020-2021, Retrieved from: <https://mb.com.ph/2020/04/30/role-of-parents-in-the-new-normal-in-education-crucial-deped/>*
13. *Magsambol(2020) DepEd: 40% of public school teachers trained for distance learning. Retrieved from <https://rappler.com>*
14. *Malipot (2020) Present issues during blended learning dry run, DepEd told <https://mb.com.ph/2020/08/05/present-issues-during-blended-learning-dry-run-deped-told/> Published August 5, 2020, 3:09 PM*
15. *Malipot, M. H. (2020). DepEd expands online learning platforms for out-of-school learners. Retrieved April 1, 2020, <https://news.mb.com.ph/2020/04/01/deped-expands-online-learning-platform-for-out-of-school-learners/>*
16. *McLeod(2020), Lev Vygotsky's Sociocultural Theory, Retrieved from: <https://www.simplypsychology.org/vygotsky.html#:~:text=Vygotsky's%20approach%20to%20child%20development,%20knowledge%20through%20social%20negotiation.>*
17. *OECD(2011) Building High Quality teaching:Lessons from around the world, Retrieved from <http://oecd.com>*
18. *Ozturk, D. S., Ozturk, F., & Ozen, R. (2018). The relationship between prospective teachers' readiness and satisfaction about web-based distance education. *Turkish Online Journal of Distance Education*, 19(1), 147–162. <https://doi.org/10.17718/tojde.382791>*
19. *Republic Act 10533 s. 5. P.B. and H Rule II Section 2 Enhanced Basic Education Act of 2013 Retrieved from: [www.officialgazette.gov.ph/downloads/20130904-IRR10533-BSA.pdf](http://www.officialgazette.gov.ph/downloads/20130904-IRR10533-BSA.pdf)*
20. *Rita, A (2020) DepEd pushes internet allowance for teachers. Retrieved from: <http://gmanews.com>*
21. *Serysheva, J.V., & Shchitov, A.G. (2014). *Russkij jazyk i kultura rechi. Uchebnik. (Electronic version)*. URL: <http://stud.lms.tpu.ru/course/view.php?id=9/> Data check 11/08/2015. [Russian language and speech culture. Tutorial]. (Rus.)*
22. *Tatum, C. and Lenel, J. (2012) A Comparison of Self-Paced and Lecture/Discussion Methods in an Accelerate Learning Format. <http://connection.ebscohost.com/articles/75144343/comparison-self-paced-lecture-discussion-methods-accelerate-learning-format>*
23. *Tomacruz (2020) Bakuna muna': Duterte rejects August opening of classes <https://www.rappler.com/nation/duterte-rejects-august-opening-classes> MAY 26, 2020 1:37 AM PHT*
24. *United Nations Educational and Scientific Organization(UNESCO) Curriculum localization, Challenges and Opportunities. Retrieved from [http://www.ibe.unesco.org/fileadmin/user\\_upload/COPs/Pages\\_documents/Resource\\_Packs/TTCD/sitemap/Module\\_4\\_2CONCEPT.HTML](http://www.ibe.unesco.org/fileadmin/user_upload/COPs/Pages_documents/Resource_Packs/TTCD/sitemap/Module_4_2CONCEPT.HTML)*
25. *Visaya, Jr. V (2020) Cagayan Valley villagers favor blended learning for students. Retrieved from: [Philippine News Agency.gov.ph](http://PhilippineNewsAgency.gov.ph)*
26. *Y Yoo, H Lee, IH Jo, Y Park(2015) Emerging issues in smart learning Retrieved from: [link.springer.com](http://link.springer.com)*



## ENHANCING ENGLISH VOCABULARY THROUGH DIGITAL LEARNING APPLICATIONS

**Ammi Grace L. Ramos**

### ABSTRACT

*The purpose of this study was to determine the effect of using digital learning applications in enhancing English vocabulary of Grade VI students of Capitol View Christian School. Simple random sampling technique was used in this study to the randomly selected Grade VI students of Capitol View Christian School (S.Y. 2020-2021) were utilized as the respondents of the study. Descriptive research method design was used in this study in gathering and treating the data. A researcher-made questionnaire was used as the main instrument in order to obtain the necessary data. The data were treated using appropriate statistical treatments which were the Mean, Standard Deviation and Pearson r.*

*Using Digital Learning Applications do have effect in enhancing the English vocabulary of the students with the findings show that there is a Significant Effect on using digital learning application to the student's performance in vocabulary test as Kahoot ( $F= 11.55, p=.001$ ), Quizizz ( $F= 59.06, p= .000$ ), Quizlet ( $F= 24.42, p= 0.00$ ). The  $p$ - values are all lower than 0.05 (level of significance) thus the null hypothesis was rejected.*

### I. INTRODUCTION

These days distance learning requires the use of online resources to encourage, motivate and facilitate in the learning process of a child.

There is a wide scope of online resources. It is of vital significance to induce understudies familiar with them. Learners should have access to the internet to grasp the information they need. With the current situation in education, the use of technology is required in teaching and learning this area. In accordance to Chen, W. et al. (2017), he stated that technology is being increasingly integrated as a part of teaching in view of enhancing students' engagement and motivation.

Another noteworthy viewpoint is building vocabulary, which could be a complex process in learning English for enhancing different skills. Learners need to improve their vocabulary to be fluent and skilled in terms of listening, reading and speaking. The utilization of vocabulary terms is fundamental when learning a language.

In expansion to the conceivable need of correspondence between individual words and individual implications, the term "word" has difficulties also with the different linguistic and morphological stages of the vocabulary. Teachers try to develop students' vocabulary. In some cases, learners may have certain fear in learning new words in asynchronous learning that requires online learning, which can happen in different areas and not at the same time.

With respect to this matter, the instructors or teachers ought to familiarize vocabulary words by applying a certain technique or strategy to the learners. However, if the technique or strategy is not in order, the result tends to bring out the learners to memorize

the words and this will not help them in developing their vocabulary truthfully.

There are many techniques to improve students' vocabulary. One of them is through English vocabulary games with the use of various digital learning tools. They support learning the target language when learners are involved in the games and have fun without noticing that they are learning the target language, and furthermore it is a pleasure for the teacher to present the language in an enjoyable atmosphere.

Kahoot, Quizizz, and Quizlet are examples of English vocabulary online games in this digital age, wherein the learners can enjoy learning English in a fun way despite of the current situation and it can enhance their vocabulary.

According to Chen, et al (2017), they said that Kahoot fostered wider and active student participation, and yet provided students with the opportunity to retain their most desirable personal choice of participation.

In addition, Medina (2017) considered Kahoot as a tool for vocabulary teaching and learning in English classes. It also provides further evidence that the use of Kahoot in the learning process can increase student learning motivation and increase student vocabulary. The students from Capitol View Christian School enjoy using Kahoot in the classroom learning process, and this media is easy to use by them.

One of the applications that is proven to be effective in teaching a vocabulary is Quizizz application. According to Mei, Ju, & Adam (2018), they stated that Quizizz is a kind of digital game that provides a multiplayer classroom activity that allows all your students to practice together by computer, iPad, tablet and smartphone and create a fun learning activity for the students. They also stated that Quizizz can effectively enhance the attention, interest, creativity, and community relationships of students.



That is why Quizizz is one of the most frequently used applications used by the teacher.

Another digital learning application is Quizlet. According to Foster (2009), Quizlet is a popular online education platform which “allows users to create and study sets of flashcards online using a suite of game-like study tools.”

In addition, it facilitates a rote learning environment which can be useful for many subjects, especially language and vocabulary training stated by Sanosi (2018).

This research study is a preliminary attempt to identify and describe the English vocabulary learning online applications that will support English vocabulary acquisition in and out of the classroom of the learners.

## II. METHODOLOGY

### Participants

The respondents of the study were the selected thirty (30) Grade VI pupils of Capitol View Christian School in Santa Cruz, Laguna, S.Y 2020-2021. To gather information and data in the study, the formulated questionnaire was the primary instrument used in order to elicit answer to the basic questions raised. The research assessed the respondents by answering the questionnaire during the actual gathering of data in order to answer questions which were found highly technical in nature.

### Instruments

The respondents of the student-respondents were tabulated to determine the frequencies and

equivalent percentages for convenience of statistical computations using the following formulas appropriate for the two basic questions raised in this study.

For sub problem one (1) effect of digital learning applications of Grade VI pupils and the learning of English vocabulary, the weighted mean formula was used by converting the responses into scores, after which chi-square test was utilized to determine the acceptance or rejection of null hypothesis at five percent significant level. For sub problem two (2) with respect to the degree of the effect of digital learning applications, standardized deviation, arithmetic mean, R correlation and T-test formulas were employed. Standardized deviation formula used to determine the variability of Digital Learning Applications and Performance in English Vocabulary. R correlation formula to know the relationship established between of Digital Learning Applications and Performance in English Vocabulary.

## III. RESULTS AND DISCUSSIONS

### Level of Digital Learning Application in Learning English Vocabulary

This presents the data gather in Enhancing English vocabulary through digital learning application and its effect in the performance in vocabulary test. The data are presented with accordance with the statement of the problem of the study, specifically the level of digital learning application in English vocabulary.

**Table 1. Level of Digital Learning Application in Learning English Vocabulary of students' respondents in terms of Kahoot**

By means of Kahoot, This....	Mean	SD	Verbal Interpretation
1. increased my motivation and involvement in learning new English vocabulary.	4.63	0.67	Strongly Agree
2. helped me to understand the English vocabulary effectively.	4.83	0.46	Strongly Agree
3. allowed me to practice my English vocabulary skill in real-time.	4.57	0.77	Strongly Agree
4. helped me in engaging in learning new English vocabulary.	4.60	0.67	Strongly Agree
5. improved my English vocabulary achievement.	4.73	0.64	Strongly Agree
<b>Weighted Mean: SD</b>	<b>4.67: 0.65</b>		
<b>Verbal Interpretation</b>	<b>Strongly Agree</b>		

#### Legend

5

#### Range

4.21-5.00

4

3.41-4.20

3

2.61-3.40

2

1.81-2.60

1

1.00-1.80

#### Verbal Interpretation

Strongly Agree

Agree

Moderately Agree

Disagree

Strongly Disagree

The use of digital learning application in English vocabulary in terms of Kahoot, the increase on students' motivation and involvement in learning new English vocabulary was experienced (M= 4.63, SD= 0.67). The students also strongly agree that Kahoot helped the students to understand vocabulary effectively (M= 4.83, SD= 0.46). Kahoot also allowed the students to practice their English vocabulary skill in real-time (M= 4.57, SD= 0.77). Kahoot as one of the digital applications helped students engaged in learning vocabulary (M= 4.60, SD=0.67). Lastly, Kahoot

improved student's English vocabulary achievement (M= 4.73, SD= 0.64). The weighted mean indicated that the students strongly agree that the used of digital learning application like Kahoot helped, allowed students to practice and improved vocabulary achievement.

The findings of this study are supported by Chen, et al (2017) Kahoot fostered wider and active student participation, and yet provided students with the opportunity to retain their most desirable personal choice of participation. In addition, Medina (2017)



considered Kahoot as a tool for vocabulary teaching and learning in English classes. It also provides further evidence that the use of Kahoot in the learning process

can increase student learning motivation and increase student vocabulary.

**Table 2. Level of Digital Learning Application in English Vocabulary of students' respondents in terms of Quizizz**

By means of Quizizz, This.....	Mean	SD	Verbal Interpretation
1. helped me to become more interested in learning English vocabulary.	4.63	0.76	Strongly Agree
2. helped me to understand the English vocabulary effectively.	4.63	0.67	Strongly Agree
3. was an easy to access and user-friendly learning application.	3.07	0.37	Moderately Agree
4. helped me in monitoring my ratings in the learning process.	4.60	0.67	Strongly Agree
5. was a great tool in assessing what I have learned.	4.70	0.60	Strongly Agree
<b>Weighted Mean: SD</b>	<b>4.33: 0.89</b>		
<b>Verbal Interpretation</b>	<b>Strongly Agree</b>		

**Legend**

5	4.21-5.00
4	3.41-4.20
3	2.61-3.40
2	1.81-2.60
1	1.00-1.80

**Verbal Interpretation**

Strongly Agree
Agree
Moderately Agree
Disagree
Strongly Disagree

The use of digital learning application in English vocabulary in terms of Quizizz helped the students to become more interested in learning English vocabulary (M= 4.63, SD= 0.76). The students also strongly agree that Quizizz helped them to understand vocabulary effectively (M= 4.63, SD= 0.67). The students moderately agree that Quizizz was an easy to access and user-friendly learning application (M= 3.07, SD= 0.37). Quizizz as one of the digital applications helped students in monitoring their rating in the learning process (M= 4.60, SD=0.67). Lastly, Quizizz was a great tool in assessing what the students have learned (M= 4.70, SD= 0.60). The weighted mean

indicated that the students strongly agree that the used of digital learning application like Quizizz helped, allowed students to practice and improve vocabulary achievement.

The findings of this study are supported by Doug (2015) that Quizizz is a powerful tool in the classroom in terms of student engagement and assessment. Teachers can guarantee that all students will be engaged as all of the responses are shown on the real-time table of the students. Moreover, according to Bury (2017), it shows that the use of online assessment tools like Quizizz motivates students and sparks the interest of the students in the material being taught.

**Table 3. Level of Digital learning Application in English Vocabulary of students' respondents in terms of Quizlet**

By means of Quizlet, This.....	Mean	SD	Verbal Interpretation
1. facilitated me in choosing the right vocabulary tools in for insufficiency in vocabulary.	4.60	0.62	Strongly Agree
2. helped me in engaging in the target English vocabulary that I wanted to learn.	4.67	0.61	Strongly Agree
3. was a student-friendly online application in learning English vocabulary.	4.77	0.63	Strongly Agree
4. helped me in engaging in the learning activities until the end.	3.93	0.45	Agree
5. boosted my confidence in using the new English vocabulary.	4.63	0.81	Strongly Agree
<b>Weighted Mean: SD</b>	<b>4.52: 0.69</b>		
<b>Verbal Interpretation</b>	<b>Strongly Agree</b>		



<b>Legend</b>	<b>Range</b>	<b>Verbal Interpretation</b>
5	4.21-5.00	<i>Strongly Agree</i>
4	3.41-4.20	<i>Agree</i>
3	2.61-3.40	<i>Moderately Agree</i>
2	1.81-2.60	<i>Disagree</i>
1	1.00-1.80	<i>Strongly Disagree</i>

The use of digital learning application in English vocabulary in terms of Quizlet helped the students to facilitate them in choosing the right vocabulary tools in for insufficiency in vocabulary (M= 4.60, SD= 0.62). The students strongly agree that Quizlet helped them in engaging in the target English vocabulary that they wanted to learn (M= 4.67, SD= 0.61). The students also strongly agree that Quizlet was a student-friendly online application in learning English (M= 4.77, SD= 0.63). The students just agree that Quizlet helped them in engaging in the learning activities until the end (M= 3.93, SD=0.45). Lastly, Quizlet boosted student's confidence in using the new English vocabulary (M= 4.63, S= 0.81). The weighted

mean indicated that the students strongly agree that the used of digital learning application like Quizlet helped, allowed students to practice and improve vocabulary achievement.

The findings of the study are supported by Andarab (2017), Quizlet is an excellent teacher-student-friendly online application and a website providing seven powerful vocabulary learning tools for the creation of different vocabulary activities. In addition, Quizlet, as Shehane (2015) maintains, is an online vocabulary management system for teachers and students, and it helps them track vocabulary learning.

**Table 4. Level of Learning English Vocabulary of Students in Terms of Exposure**

<b>Indicator</b>	<b>Mean</b>	<b>SD</b>	<b>Verbal Interpretation</b>
1. I associated new words with those I already know.	4.67	0.61	Strongly Agree
2. I distinguished the words with similar and opposite meanings.	4.87	0.35	Strongly Agree
3. I paid attention to the unfamiliar usage of a known word.	4.80	0.48	Strongly Agree
4. I paid attention in the examples of how word is used.	4.83	0.46	Strongly Agree
5. I was able to use the newly-learned words in my own sentences.	4.90	0.31	Strongly Agree
<b>Weighted Mean: SD</b>	<b>4.81: 0.61</b>		
<b>Verbal Interpretation</b>	<b>Strongly Agree</b>		

<b>Legend</b>	<b>Range</b>	<b>Verbal Interpretation</b>
5	4.21-5.00	<i>Strongly Agree</i>
4	3.41-4.20	<i>Agree</i>
3	2.61-3.40	<i>Moderately Agree</i>
2	1.81-2.60	<i>Disagree</i>
1	1.00-1.80	<i>Strongly Disagree</i>

The level of learning English vocabulary of students in terms of exposure and in terms of using digital learning applications helped the students to associate new words with those they already know. (M= 4.67, SD= 0.621). The students strongly agree that in the level of exposure in using digital learning applications helped them distinguished the words with similar and opposite meanings. (M= 4.87, SD= 0.35). The students also strongly agree in the level of exposure supported them to pay attention to the unfamiliar usage of a known word (M= 4.80, S= 0.48). In the level of exposure in terms of paying examples of how word is used, the students also strongly agree (M=4.83, S=0.46). Lastly, the level of learning English

vocabulary of students in terms of exposure and in terms of using digital learning applications abled students to use the newly-learned words in my own sentences (M= 4.90, S= 0.31).

The findings of the study is supported by Ferlazzo (2020), he said that through the exposure in using of online learning tools or digital learning applications, the students can also write sentences and include images using new words they have learned. Olivia (2018), agreed that in the exposure in online and offline games in classroom activities can enhance the mastery of vocabulary since students encounter.

**Table 5. Level of Student's Performance in Vocabulary Test**

<b>Lowest Score</b>	<b>Highest Score</b>	<b>Mean</b>	<b>SD</b>	<b>Remarks</b>
27	30	28.97	1.22	Excellent



<b>Legend</b>	<b>Range</b>	<b>Remarks</b>
5	24.01-30.00	Excellent (E)
4	18.01-24.00	Good (G)
3	12.01-18.00	Average (A)
2	6.01-12.00	Fair (F)
1	0.00-6.00	Poor (P)

Result showed the level of students' performance in vocabulary test. As indicated in the table all of the students gained Excellent performance with the lowest score of 27 and highest score of 30 with the (M= 28.97, SD= 1.22). This implies that digital learning applications like Kahoot, Quizizz and Quizlet helped

the students achieved excellent performance in vocabulary test. Digital learning applications increased students' performance in English (Wichadee & Pattanapichet, 2018) and in vocabulary knowledge (Ciaramella, 2017).

**Table 6. Effect of Digital Learning Applications to the Student's Performance in the Vocabulary Test**

Digital Learning Applications	Mean	Performance in Vocabulary Test	Mean	F- value	p-value	Analysis
Kahoot	4.67		28.97	11.55	.001	Significant
Quizizz	4.38			59.06	.000	Significant
Quizlet	4.52			24.42	.000	Significant

The findings show that there is a Significant Effect on using digital learning application to the student's performance in vocabulary test as Kahoot (F= 11.55, p=.001), Quizizz (F= 59.06, p= .000), Quizlet (F= 24.42, p= 0.00). The p- values are all lower than 0.05 (level of significance) thus the null hypothesis was rejected. This means that students learned and enjoyed from Kahoot, Quizizz and Quizlet. They learned because these increased their motivation and involvement in learning new English vocabulary and these were student-friendly online applications in learning English vocabulary.

According to Peregoy and Boyle (2012) they stated that using digital learning applications improved earners' reading and writing skills. The results of their study indicated that technology tools enhanced learners' reading and writing skills because they are user-friendly, and learners can learn at a faster and more effective way.

The salient points of the study presented found that the level of digital learning application in learning English vocabulary of students in terms of Kahoot was confirmed by the mean of 4.67 with a standard deviation of 0.65 which reveals that in learning English vocabulary of students in terms of Kahoot was interpreted as "Strongly Agree".

In terms of the level of digital learning application in learning English vocabulary of students in terms of Quizizz, with the mean of 4.33 and with a standard deviation of 0.89 reveals that the status of learning English vocabulary in terms of Quizizz was interpreted as "Strongly Agree".

Next is the level of digital learning application in learning English vocabulary of students in terms of Quizlet with the mean of 4.52 and with a standard deviation of 0.69 reveals that the learning of English vocabulary in terms of Quizlet was interpreted as "Strongly Agree".

Then the level of learning English vocabulary of students in terms of frequency of use of digital learning applications with the mean of 4.81 with a standard deviation of 0.61 reveals that the frequency of use of digital learning applications was interpreted as "Strongly Agree".

Based on the data gathered the level of student's performance in vocabulary test with the mean of 28.97 with a standard deviation of 1.22 was remarked as "Excellent".

The findings show that there is a Significant Effect on using digital learning application to the student's performance in vocabulary test as Kahoot (F= 11.55, p=.001), Quizizz (F= 59.06, p= .000), Quizlet (F= 24.42, p=0.00). The p-values are all lower than 0.05 level of significance thus the null hypothesis was rejected. It further revealed that enhancing English vocabulary in the means of digital learning applications has a significant effect on the performance in the vocabulary test of the students.

#### IV. CONCLUSIONS

In accordance with the findings, the conclusions were drawn. The study concludes that students have an excellent in the performance in the vocabulary test and digital learning applications help them in achieving it.

There was a significant effect on enhancing English vocabulary in the means of digital learning applications and performance in the vocabulary test of the Capitol View Christian School, Grade VI pupils, therefore the null hypothesis that there is no significant effect had been rejected.

#### V. RECOMMENDATIONS

From the said findings and conclusions, these are the following recommendations. Digital learning applications were useful tools for students in enhancing



their English vocabulary, so that it is easier for them to understand it. These digital learning applications were recommended to use for these provide a positive environment in the classroom, increase energy and add fun while learning English vocabulary. The researcher also advised to use these digital learning applications for it was encouraging as these shown the positive effects that using Kahoot, Quizizz and Quizlet improve motivation and the students' satisfaction is positive. The significant also seen from the student's engagement in the learning process when using Kahoot, Quizizz and Quizlet. The pedagogist innovations from using of Kahoot, Quizizz and Quizlet will help teachers to create a comfortable and victorious learning and be able to make an evaluation through these digital learning applications. Teachers must also properly use these digital learning applications so that students are not tired when the game progresses. Teachers must choose the quizzes types with the right objectives so that they can make an evaluation of the teaching process. Future researchers may use other instruments aside from questionnaires to further determine the significance of digital learning applications to the performance in the English vocabulary test.

## REFERENCES

1. Andarab, M. S. (2017). *The effect of using Quizlet flashcards on learning English Vocabulary*. In M. Vihar (Ed.), *Proceedings of 113th IIER International Conference* (pp.37-41). Frankfurt, Germany.
2. Bury, B. (2017). *Testing Goes Mobile – Web 2.0 Formative Assessment Tools*. *International Conference ICT for Language Learning*. Retrieved February 12, 2019, from <https://conference.pixel-online.net/ICT4LL/files/ict4ll/ed0010/FP/4060-ETL2655-FP-ICT4LL10.pdf>.
3. Chen, W. et al (Eds). (2017, December). "Go Kahoot!" *Enriching classroom engagement, motivation and learning experience with games*. Paper Presented at the New Zealand International Conference on Computers in Education. Retrieved from <https://www.researchgate.net/publication/322150947>
4. Ciaramella, K. E. (2017). *The effects of Kahoot! on vocabulary acquisition and retention of students with learning disabilities and other health impairments*. Rowan University. Master Thesis
5. Doug. (2015, October 29). *Kahoot! or Quizizz? Lindbergh Interactive Classroom*. Retrieved from <https://lindberghlinc.blogspot.com/2015/10/kahoot-or-quizizz.html>
6. Ferlazzo, L. (2020). *10 Favorite Online Teaching Tools Used by Educators This Year*. <https://www.edweek.org/teaching-learning/opinion-10-favorite-online-teaching-tools-used-by-educators-this-year/>
7. 2020/11
8. Foster, H. (2009). *Building learner-generated vocabulary logs with Quizlet*. *The Language Teacher*. (33)
9. Medina, E. G. L., & Hurtado, C. P. R. (2017). *Kahoot! A digital tool for learning vocabulary in a language classroom*. *Revista Publicando*, 4(12 (1)), 441-449.
10. Mei, S. Y., Ju, S. Y., & Adam, Z. (2018). *Implementing Quizizz as Game Based Learning in the Arabic Classroom*. *European Journal of Social Sciences Education and Research*, 12(1),208.<https://doi.org/10.26417/ejser.v12i1.p208-212>
11. Ovilia, R. (2018). *Digital Games In Digital Learning Environment; What Makes Them Effective In Embodying Vocabulary Mastery?*
12. Peregoy, S., & Boyle, O. (2012). *Reading, writing and learning in ESL: A resource book for teachers*. New York: Allyn & Bacon.
13. Sanosi, A. B. (2018). *The effect of Quizlet on vocabulary acquisition*. *Asian Journal of Education and e-Learning*, 6(4), 71-77.
14. Shehane, M. J. (2015). *Five tips for using Quizlet in the language learning classroom*. Retrieved July 4, 2016 from <https://www.linkedin.com/pulse/5-tips-using-quizlet-language-learning-classroom-michael-j-shehane/>
15. Wichadee, S., & F. Pattanapichet. (2018). *Enhancement of performance and motivation through application of digital games in an English language class*. *Teaching English with Technology* 18.1: 77-92.



# **SEMANTIC AND FUNCTIONAL FEATURES OF THE VERB WITH THE MEANING “TO WORK” IN JAPANESE AND RUSSIAN LANGUAGE (Comparative study)**

**Fatkulina Luiza**

*Tashkent State University of Oriental Studies, Department of Japanese Philology*

*Senior lecturer, ORCID: <https://orcid.org/0000-0001-6531-9440>*

Article DOI: <https://doi.org/10.36713/epra7234>

DOI No: 10.36713/epra7234

## **ABSTRACT**

*Within the framework of this article, the verb "работать" (to work) is analyzed with the exact from the point of view of its semantics in Russian and Japanese languages. The analysis of polysemy and synonymous features of the verb "to work" is carried out in the semantic field. Descriptive, comparative, typological and empiric methods was used for study. In result, exact similarities and differences between meaning of the verb "to work" and their functions were defined following factual materials and scientific theories.*

**KEY WORDS:** *semantics, semantical field, functional feature, to work, pragmatic competence, synonyms.*

## **INTRODUCTION**

Language develops through social experience. Learners who are studying a new language automatically make some pragmatic failures not knowing the semantic, namely, meaning field of the foreign language's words also not realizing functional features of those words without the pragmatic competences. Pragmatic competence is essential for investigating functional features of the target to be able to apply the linguistic units on the right time and with appropriate interlocutors. We have selected the verb with the meaning "to work" which is most used verb in any language and its comparative study gives chance to the language learners to distinguish differential and identifying also absolute same points.

## **LITERATURE REVIEW**

The verb "работать" refers to completed verbs, the subject and object can be either a person or an inanimate object. In Russian linguistics investigation on lexical and semantic features of the verb had started in 60<sup>th</sup> of XX century and it is still considered to be a hot topic for researches. A number of scholars such as L.A.Bogdanova, L.M.Vasilyev, R.M.Gaysina, V.L.Ibragimova, T.A.Kildibekova, E.V.Kuznetsova, V.P.Abramov, N.P.Sidorova<sup>1</sup> have conducted effective and wide researches on Russian verbs: their classification and formation as well as the interaction and intersection matters of Verb LSG (lexical semantic groups).<sup>2</sup>

<sup>1</sup> Ярема Елена Владимировна. Функционально-семантические особенности глаголов движения. Диссертация. Армавир, Россия. 2008.

<sup>2</sup> <http://www.nauteh-journal.ru/files/d77fb4b8-e61e-4b66-8d69-7d57143075f5>



The features of Japanese verbs have been studied depending on various principles and perspectives. There are two directions of Japanese researchers on the topic “Verb”. Supporters of the first group tend to examine the meaning of the verb from the typological and language, in contrast with “do-type” languages such as English, based on a cognitive-typological point of view (Ikegami’s (1981, 1991)<sup>34</sup> Shibatani’s (1973<sup>5</sup>, 1976a<sup>6</sup>, b<sup>7</sup>, Shibatani and Pardeshi 2002<sup>8</sup>)) whereas another direction approached verb meaning from the standpoint of morphology and syntax, an approach seen in verb classifications based on aspect (e.g. Kindaichi 1950; Kudo 1995), and in various studies undertaken within the framework of Kageyama’s (1996) lexical conceptual structure (LCS)<sup>9</sup>

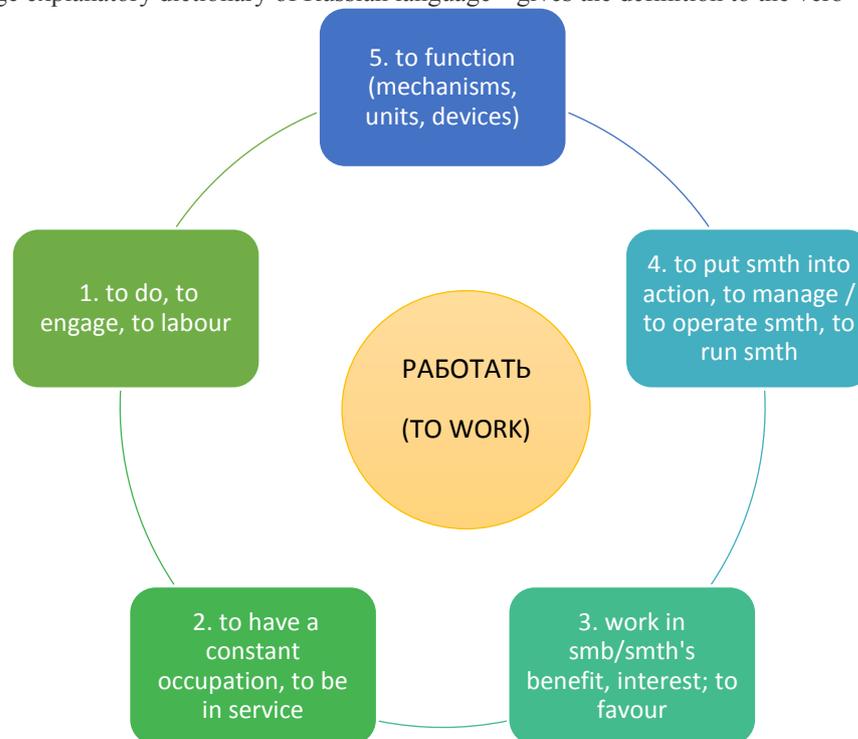
In this article functional and semantic features of the verb with the meaning “to work” in Japanese and Russian language will be discussed and investigated comparatively.

## METHOD OF RESEARCH

The article was followed using descriptive, comparative, typological and empiric methods. Facts are described and compared with one another in various languages, as well as conducting investigation using empiric method via observation written and alive situations.

### ❖ *Semantic and functional features of the verb “работать” in Russian*

Large explanatory dictionary of Russian language<sup>10</sup> gives the definition to the verb “работать” as following:



<sup>3</sup> Ikegami, Yoshihiko. 1981. Suru to naru no gengogaku: Gengo to bunka no taiporozii e no siron [Linguistics of BECOME and DO: an essay in the typology of language and culture]. Tokyo: Taishukan.

<sup>4</sup> Ikegami, Yoshihiko. 1991. DO-language and BECOME-language: two contrasting types of linguistic representation. In Yoshihiko Ikegami (ed.), The empire of signs: semiotic essays on Japanese culture, 258–326. Amsterdam: John Benjamins.

<sup>5</sup> Shibatani, Masayoshi. 1973. Semantics of Japanese causativization. Foundations of Language 9. 327-373.

<sup>6</sup> Shibatani, Masayoshi. 1976a. Causativization. In Masayoshi Shibatani (ed.), Japanese generative grammar (Syntax and semantics 5), 239–294. New York: Academic Press.

<sup>7</sup> Shibatani, Masayoshi. 1976b. The grammar of causative construction: A conspectus. In Masayoshi Shibatani (ed.), The grammar of causative constructions (Syntax and Semantics 6), 1-40. New York: Academic Press.

<sup>8</sup> Pardeshi, Prashant, Kazuyuki Kiryū, Heiko Narrog (eds.) 2015. Yuu-tui-doosi no tuugengoteki-kenkyuu: Nihongo to syogengo no taisyoo kara mietekuru mono [Crosslinguistic studies on paired verbs: insights from comparisons of Japanese and other languages]. Tokyo: Kurosio.

<sup>9</sup> Matsumoto Yo. The semantics of Japanese verbs. Handbook of Japanese semantics and pragmatics Publisher: De Gruyter Mouton. 2020.

<sup>10</sup> Большой толковый словарь русского языка. Гл. ред. С. А. Кузнецов. Первое издание: СПб.: Норинт, 1998.



*Analysis of each meaning of “РАБОТАТЬ” contrasting with Japanese and English via factual materials.* Five independent semantic areas were found in Russian verb “работать” and analyzed this verb’s semantic-functional features comparatively. As an object of this research, besides Japanese, we decided to include English verb “to work” either only for contrasting in order to get more clear results.

to do, to engage, to labor	Russian	Писатель <b>работает</b> над книгой.
	Japanese	さっか ほん じゅっさく 作家が本を <b>述</b> 作している。
	English	A writer <b>is working</b> on his book.
to have a constant occupation, to be in service	Russian	<b>Работать</b> на всю семью.
	Japanese	ぜんかぞく はたら 全家族のために <b>働</b> く。
	English	To work for everybody in family.
	Russian	<b>Работать</b> слесарем / бухгалтером/ директором школы. Работать переводчиком
	Japanese	せいびし/かいけいし/こうちょう はたら 整備士/会計士/校長として <b>働</b> く。 ほんやく しごと <b>翻</b> 訳の仕事をする。
	English	<b>To work</b> as a mechanic / accountant / school principle. <b>To work</b> as a translator.
work in smb/smith's benefit, interest; to favour	Russian	Я <b>работаю</b> в туристическом агентстве.
	Japanese	つと 私は、旅行会社に <b>勤</b> めています。
	English	I <b>work</b> for a travel agency.
to put smth into action, to manage / to operate smth, to run smth	Russian	<b>Работать</b> молотом (вилами, педалями, рычагом)
	Japanese	しょう ひつよう ハンマーを <b>使用</b> する 必 要があります。
	English	<b>To use/operate a</b> hammer (lever, shovel, pitchfork, pedals)
to function (mechanisms, units, devices)	Russian	Магазин <b>работает</b> без перерыва.
	Japanese	じかんえいぎょう コンビニは24時 間 営 業 です。
	English	The store is <b>open</b> 24/7.



	Russian	В такие минуты мозг <b>работает</b> особенно чётко.
	Japanese	のう いちばんこうりつ はたら じかんたい ” ごぜんちゅう” か 脳が一番効率よく働く時間帯は;"午前中;"と書いてありました <sup>11</sup> 。
	English	At such moments she/he <b>thinks</b> clearly.
	Russian	Почему же ЭТОТ калькулятор <b>не работает!</b>
	Japanese	この計算機はどうして動かないだろう
	English	I wonder why this calculator <b>won't work!</b>



Russian verb “**работать**” with the semantic field “*to do, to engage, to labor*” does not always match with Japanese verb which gives the meaning “to work”. Working on a book is expressed with 述作する in Japanese which requires pragmatic competence and functional feature changes to another verb.



Semantic field “to have a constant occupation, to be in service” can be expressed same meaning verbs in three languages (**работать** – to work – はたらく) But the functional point of occupation can be replaced with 仕事をする (do work, do career) in Japanese.



Semantic field “work in smb/smith benefit, interest; to favor” is also clearly to be understood and used as can be applied with words **работать** – to work – はたらく. Meanwhile, lingua-pragmatics of Japanese play vital role in any case. In this field using つとめる is the best option.



Russian word’s meaning “to put smth into action, to manage / to operate smth, to run smth” cannot be translated as “work” or “働く・動く・勤める which are related to “to work”. In Japanese and English same meaning verb “to use” and 使用する can show similarity between Japanese and English connotation whilst Russian verb “**работать**” owns wide polysemy.



Meaning of function (mechanisms, units, devices): About the “working non-stop, namely 24/7 three languages demonstrated three different cases. Russian applies “**работать**”, English uses “open” (adjective) and Japanese doesn’t have exact translation of the word, but it is available to realize the “nonstop work” via context in Japanese.



のう はたら  
**мозг работает** - 脳が **働く** - one **thinks** clearly. Semantical and functional similarities with Russian and Japanese, in contrast in English different verb is used to explain or describe the situation.

It is important define the minimum semantic field in analyzing the verb semantically and then identifying similarities and differences in meaning, also finding their common semantem makes the research deep and clear to explore structure description and meaning. In semantic analysis comparing the differences and similarities of the word meaning is the best method to realize the differences between synonyms, polysemy and antonyms.

<sup>11</sup> <https://www.kensup.co.jp/1486.html>



Semantic field plays a significant role in semantic study as "Related to the concept of hyponymy, but more loosely defined, is the notion of a semantic field or domain. A semantic field denotes a segment of reality symbolized by a set of related words. The words in a semantic field share a common semantic property."<sup>12</sup> Andersen<sup>13</sup> states "Traditionally, semantic fields have been used for comparing the lexical structure of different languages and different states of the same language." We agree that the investigation on the same language's features is essential, whereas comparative study on two or more languages' characters is more effective and detailed. Since determination of the main points of the target topic can be exact and wide by the contrast study. Furthermore, "learning a foreign language is not limited with learning its grammar, vocabulary, and pronunciation. Being able to choose the appropriate word at the right time and for the right addressees is vital point of the communication and it is related to the knowledge in semantics."

In Ojegov's<sup>14</sup> dictionary these verbs below mentioned are the synonyms of "работать" (to work)

- ✚ Трудить – to force somebody to work (archaic) (*Заставлять работать*), to accomplish something working hard (oral) (*Старательно выполнять*);

Я годами **трудился**, чтобы изменить свою жизнь.

I **worked** for years to get my life back on track.

This verb highlights that action is accomplished with a lot of effort.

- ✚ Трубить – to perform for longer period (monotonously and tediously) (*долгосрочно делать (монотонно или утомительно)*);

This verb highlights long and boring period of the action.

- ✚ Вкалывать – to work, to work hard (*работать, тяжелая работа*);

- ✚ Ломить - to work hard (difficult and troublesome) *тяжелая работа (сложная и мучительная)*;

The verbs mentioned above relate to common oral speech and emphasizes the work's tiring and hard feature.

- ✚ Ишачить - to perform hard work (*выполнять тяжелую работу*).

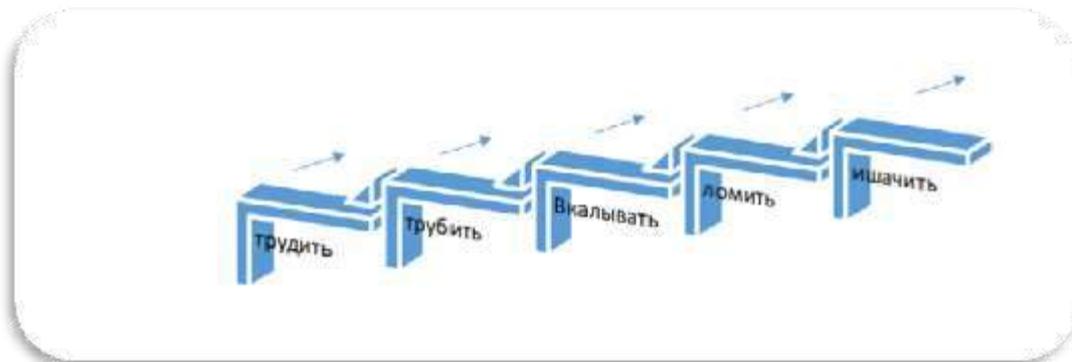
This verb's origin is "ishak – eshak" in Uzbek language with meaning "donkey". Donkey works hard but it is never loved. In this kind of case, in Russian language ишачить is used with the purpose to show how hardworking but underestimated the accomplisher of the work is.

Не можешь же ты всю жизнь на нее **ишачить**.

You can't go on **slaving** for her all your life.

There are more than 70 synonyms for "работать" in dictionaries<sup>15</sup> of Russian language, but in our article we have decided to select 5 of them and compare with Japanese units.

- Gradual analyze of "работать" due to its meaning "how hard to work":



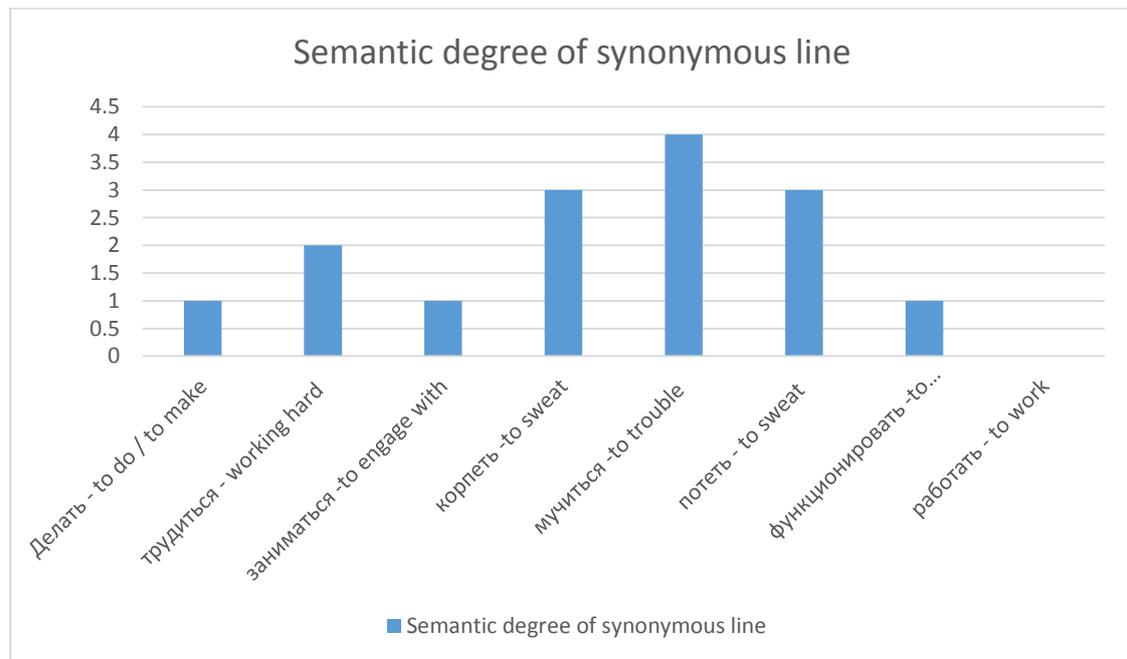
<sup>12</sup> Brinton, Laurel J. (2000). The structure of modern English: a linguistic introduction. Illustrated edition. John Benjamins Publishing Company. ISBN 9789027225672, p.112

<sup>13</sup> Andersen, Peter Bøgh (1990). A theory of computer semiotics: semiotic approaches to construction and assessment of computer systems. Volume 3 of Cambridge series on human-computer interaction. Cambridge University Press. ISBN 0-521-39336-1, ISBN 978-0-521-39336-2. , p.327

<sup>14</sup> С. Н. Ожегов Толковый словарь русского языка Москва ООО «Бета Фрейм», 2003. — 430 с.

**SYNONYMS of “Работать” in Russian and their semantical comparison with other languages**

Russian	Japanese	English	Semantic degree
Делать	擦る・行う	To make, to do	neutral
1. трудиться	働く	To labour, to trouble	Highlighting the hardness
заниматься	従事する	To be engaged in, to be occupied with	neutral
корпеть	毛穴に	To pore over, sweat over	Colloquial, emphasize
мучиться	くるしむ・悩む	To suffer, to be tormented	Negative meaning, emphasize the hardness
потеть	汗をかく	To sweat	Colloquial
функционировать	作用する・機能を果たす	To function	formal
служить	ーのために働く	To work for	neutral

**Japanese equivalent verbs to Russian “работать” and their functional and semantic features**

はたら

働く - to work, to act, to commit, to work on, to labor, to do

работать, действовать, совершать, работать, трудиться, делать

頭の働かない人 — lit. person whose head (brain) doesn't work – Тупой человек (stupid man) In colloquial

Russian language this phrase can be expressed as “У него голова **не работает**” where “работать” is used. 頭の働かない人 can be translated word by word into both English and Russian language with same meaning and structure.



かれ かずかず わるごと はたら

彼は数々の悪事を働いた。 - He committed many kinds of crimes. - Он совершил много видов преступлений. In this example, the verb 働く has *polysemy* with the verb 犯す and is translated into both English and Russian with the same equivalents such as “to commit” and “совершать”. 働く = to commit = совершать

動く - move, work, run, operate, shift, swing  
двигаться, работать, сдвигать, качаться

機械が動かなくかった。 Машина перестала работать. - The machine stopped working. To describe the operation of the particular mechanism or machine, the verb 動く is required whereas the verbs “работать” and “to work” can be used for this situation without losing semantic field and the form.

まぶたがぴくぴく動いている。 His eyelid is twitching. - У него дергается веко. Japanese verb 動く has a connotation to mark the noticeable movement, so that to twitch and “дергаться” tends to the semantic meaning “to act, to move” can be observed and witnessed obviously.

Hereby other examples were noted during the research.

勤める - serve, work, endeavor, serve - служить, работать, прилагать усилия.

彼女は病院に看護婦として勤めている。 - She works for a hospital as a nurse. - Она работает в больнице медсестрой.

かせ

稼ぐ - earn, income, work - зарабатывать, доход, трудиться ради заработка.

稼ぐに追つく貧乏なし。 Work hard and you will never be poor. - Работай усердно, и ты никогда не будешь бедным.

**Semantic Analysis and Idioms.** The collocations of verb and particle in turn collocate with other lexical items, as just mentioned. Some of these collocations are very familiar to the speakers of a language, and attain a high degree of cohesion, while others are quite restricted in their acceptability<sup>16</sup>. Besides the factor of familiarity, contextualization also plays an important role with such restrictions. Familiar collocations, which could be called set phrases, may be semantically self-evident, such as bacon and eggs, here and there, but they may also be highly idiomatic, such as rub noses or shoot the breeze<sup>17</sup>. Hereby some idiomatic phrases of Russian language are collected through observing alive conversations and compared semantically with Japanese and English.

#### Semantic comparison Russian idioms related “Работать”

Russian	Japanese	English	Comments
Работать до поту лица	よく頑張る	To work very hard	Work until face gets sweaty
работать, как вол Мой отец день и ночь работал как вол.	ちち み こ ひる 父は身を粉にして昼 よる はたら も夜も働いた。	To work without rest, to work very hard	My father worked like an ox day and night.
Не дадут спины разогнуть	手を休めずに	I don't have time to breathe	Working hard being extremely busy
Время работает на нас	ときは我らの味方だ。	Time is on our side	Winning the time

<sup>16</sup> Cf. Greenbaum (1968), Lipka (1971c).

<sup>17</sup> Leonhard Lipka Semantic structure and word-formation verb-particle constructions in contemporary English. Munchen, 1972.

*Japanese idiomatic phrases with meaning “to work”*

Japanese idioms	Meaning
私は金ではうごかない。	<i>I will not be influenced by money</i>
彼女の新設について彼の心はうごいた。	<i>Her kindness finally touched him (won his heart)</i>
時間を稼ぐ	<i>Win the time</i>
馬車馬のように働く	work like a carriage horse Meaning: work single-mindedly. PS. Carriage horses wear blinkers, so as not to be distracted.

**CONCLUSION**

In conclusion it is identified that semantic and functional features in Japanese and Russian also English language very essential to realize the pragmatic competence to use the word with appropriate function and correct meaning. The research topic is very actual where formality, informality, semantic and functional graduonomy as well as synonyms gradual degree have been proven. This article can contribute to the educational system of Japanese or Russian language.

**LITERATURE**

1. Ярема Елена Владимировна. Функционально-семантические особенности глаголов движения. Диссертация. Армавир, Россия. 2008.
2. Ikegami, Yoshihiko. 1981. *Suru to naru no gengogaku: Gengo to bunka no taiporozii e no siron* [Linguistics of BECOME and DO: an essay in the typology of language and culture]. Tokyo: Taishukan.
3. Shibatani, Masayoshi. 1973. *Semantics of Japanese causativization. Foundations of Language* 9. 327-373.; 976a. *Causativization. In Masayoshi Shibatani (ed.), Japanese generative grammar (Syntax and semantics 5)*, 239–294. New York: Academic Press.; 1976b. *The grammar of causative construction: A conspectus. In Masayoshi Shibatani (ed.), The grammar of causative constructions (Syntax and Semantics 6)*, 1-40. New York: Academic Press.
4. Matsumoto Yo. *The semantics of Japanese verbs. Handbook of Japanese semantics and pragmatics* Publisher: De Gruyter Mouton. 2020.
5. Большой толковый словарь русского языка. Гл. ред. С. А. Кузнецов. Первое издание: СПб.: Норинт, 1998.
6. Brinton, Laurel J. (2000). *The structure of modern English: a linguistic introduction. Illustrated edition. John Benjamins Publishing Company. ISBN 9789027225672, p.112*
7. Andersen, Peter Bøgh (1990). *A theory of computer semiotics: semiotic approaches to construction and assessment of computer systems. Volume 3 of Cambridge series on human-computer interaction. Cambridge University Press. ISBN 0-521-39336-1, ISBN 978-0-521-39336-2, p.327.*
8. С. Н. Ожегов Толковый словарь русского языка Москва ООО «Бета Фрейм», 2003. — 430 с.
9. Leonhard Lipka *Semantic structure and word-formation verb-particle constructions in contemporary English. Munchen, 1972.*
10. <https://www.kensup.co.jp/1486.html>
11. <http://www.nauteh-journal.ru/files/d77fb4b8-e61e-4b66-8d69-7d57143075f5>



# QUALITY BY DESIGN APPROACH FOR ANALYTICAL METHOD DEVELOPMENT

**Kema Vijay Kumar**

## ABSTRACT

*Quality by Design (QbD) is a concept first outlined by well known quality expert Joseph M. Juran and it is a systematic approach to development that begins with predefined objectives and emphasizes product, process understanding and process control based on Echo knowledge and quality risk management. A conventional method may fail to meet the intended purpose during method development and validation. In a QbD approach, the impact and interactions between critical method variables are understood using a Design of Experiments (DOE) approach, which incorporates statistical multi-variate analysis and modeling leading to consistent quality of drug product. QbD tools like risk assessment and design of experiments, enable better quality to be incorporated into the analytical method, facilitate prior understanding and identification of variables affecting method performance. The main objective of the present review article to describe different steps involved in method development by QbD approach for an analytical method development. The QbD Approach for method development comprises of the following steps which include defining method intent, performing experimental design, evaluating experimental results and selecting final method conditions and performing risk assessment with robustness and ruggedness evaluation. The purpose of analytical QbD is to attain quality in measurement. The objective of this review article is therefore to provide a comprehensive understanding on various aspects of QbD, along with addressing the concerns related to its implementation.*

**KEY WORDS:** *Quality by design, Critical attributes, Analytical target profile, Quality risk assessment, Design of experiments*

## 1. INTRODUCTION

The concept of quality by design (QbD)[1] has been implemented in the pharmaceutical industry through several initiatives such as the FDA's cGMP for the 21st Century and Process Analytical Technology (PAT) as well as with the regulatory documents ICH Q8, Q9 and Q10 and the FDA guidance on Process Validation. The basic concept of QbD[2] is "The Quality cannot be tested into the product, but it should be built into it." The design space is defined as a manufacturing area of the product including Equipment, Material, and Operators and Manufacturing Conditions. Quality by Design(3) is the modern approach for quality of pharmaceuticals. Quality[2] is "The degree to which a set of inherent properties of a product, system or process fulfils requirements" (ICH Q9). The foundation of Quality by Design[3] is ICH Guidelines. Quality by Design (QbD) has become an significant concept for the pharmaceutical industry that is further defined in the International Conference on

Harmonisation (ICH) guidance on pharmaceutical development as "a systematic approach to development that begins with predefined objectives and emphasizes product and process understanding and process control, based on sound science and quality risk management".

The outcome of using QbD concepts is a well-understood product and process that consistently delivers its intended performance. The knowledge obtained during development may support the establishment of a design space and determines suitable process controls. During development of analytical methods, same QbD principles can be applied to the development of analytical methods.

Various quality and statistical tools and methods, such as statistical designs of experiments, multivariate statistics, statistical quality control have been comprised in QbD. The main goal for changing from quality by testing (QbT) paradigm is to accelerate the understanding of the processes and products such



that products quality, processes efficiency and regulatory flexibility can be attained. Liquid chromatography (LC) is the most commonly applied separation technique in pharmaceutical industry and High performance liquid chromatography (HPLC)[4] particularly Reversed Phase HPLC (RP HPLC), is one of the widely accepted analytical technique in the pharmaceutical industry. To accomplish the quality in HPLC methods QbD has become quite important. In HPLC methods, robustness and ruggedness should be established early in the method development stage to make certain method performance over the lifetime of the product for the implementation of QbD or else, if a non robust or non rugged method is adapted, significant time and resource may be required to redevelop, revalidate and retransfer analytical methods.

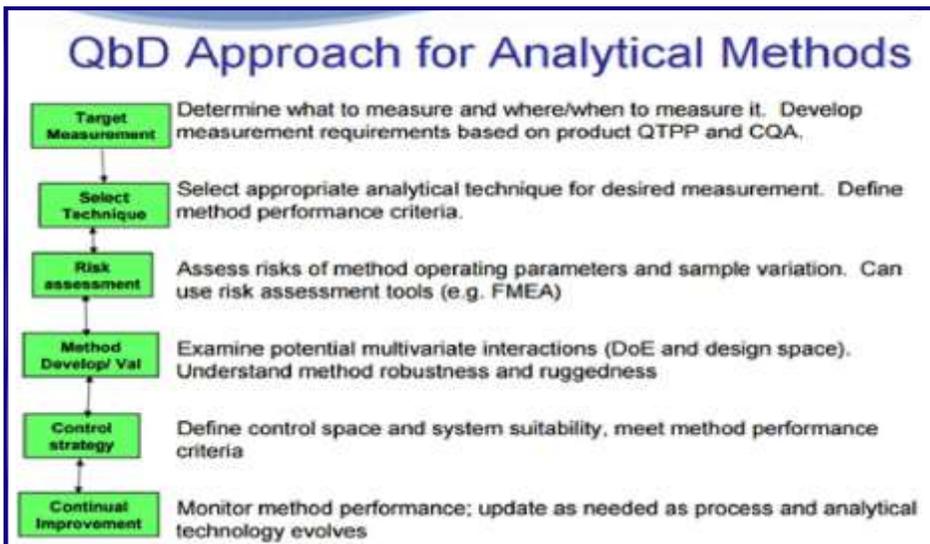
There are many tools such as ATP (Analytical Target Profile), CQA, Risk Assessment, Method Optimization and Development with DoE, MODR (method operable design region), Control Strategy and Risk Assessment, A QbD Method Validation, and Continuous Method Monitoring for QbD lifecycle.

Chemometrical tools such as design of experiments (DoE) methodology are closely related to QbD and many basic concepts are very similar. Therefore DoE methodology combined with methodologies for identification of design space provides deep understanding of analytical systems and enable the identification of experimental region where the quality will be assured. In the past, the common practice to develop an analytical method in liquid chromatography was performed by a trial and-error approach, for example by varying one-factor-at-a-time (OFAT) and examine the resolution of peaks until the best method was found. This approach was time-consuming and required a large amount of manual data interpretation. It frequently results in a non-robust performance when transferred into another lab because interactions between factors were not taken into account.

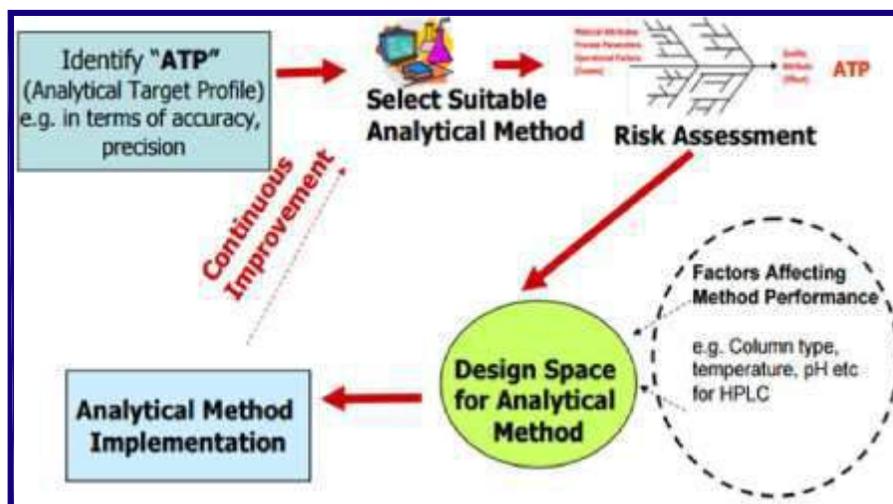
The OFAT approach can be used to understand changes in selectivity by keeping everything fixed and only varying one factor and if the factor of interest is known not to have an interactive effect with any other factor studied.

A more systematic concept uses experimental design plans as an efficient and fast tool for method development. In a full or fractional factorial design a couple of experiments are carried out in which one or more factors are changed at the same time. Using statistic tools the effect of each factor on the separation can be calculated and the data be used to find the optimum separation. Few examples are use of the Plackett–Burman design or the Monte-Carlo simulation in a multivariate data analysis software package (e.g. Fusion AE). A very smart and computer-assisted way of developing a chromatographic method is by using software modeling packages (e.g. DryLab, ChromSword, ACD/LC simulator).

Even with small number of experiments these software applications can forecast the movement of peaks in reversed-phase liquid chromatography separations due to a change in the mobile phase composition or pH, temperature, flow rate and the column dimensions and particle size. Other prevalent approaches in HPLC method development uses the molecular structure, or physicochemical properties such as logP, logD and pKa of the sample components to approximate their retention and optimal separation conditions.



Current approach	Qbd approach
1) Quality is assured by testing and inspection	1) Quality is built into product & process by design an based on scientific understanding
2) It includes only data intensive submission which includes disjointed information without big picture”	2) It includes Knowledge rich submission which shows product knowledge & process
3) It focuses on reproducibility which often avoids or ignores variation	3) It focuses on robustness which understands and control variation
4) Here there is “Frozen process,” changes design space which allows continuous	4) Here there is Flexible process within which always discourages improvement





The sequence generally recommended for method development according to QbD is

1. understanding the purpose of the study,
2. perform risk assessments to screen out factors that may or may not have an influence on the analytical method (screening variables by logic and an examination of their scientific potential for influence) and
3. characterization studies to quantify and minimize their influence on precision, accuracy and linearity.

## 2. ATP (Analytical Target Profile)[5]

Recognition of ATP comprises of the selection of method requirements which include target analytes (product and impurities), type of analytical technique, and specifications of the product. Preliminary risk assessment would be carried out for expectation of the method requirements and analytical criticalities.

ATP for analytical procedures comprises of  
**(a)** selection of target analytes (API and impurities),  
**(b)** assortment of analytical technique (HPTLC, GC, HPLC, Ion Chromatography, chiral HPLC, etc.),  
**(c)** choice of method requirements.

### Method analytical target profile[6]

Method attribute	Acceptance criteria
Specificity	No interference with the main peak
Linearity	$\geq 0.999$ ( for the known four impurities)
Relative response	Not less than 0.7
Limit of quantitation	Less than an amount corresponding to a relative peak area of 0.05%
Accuracy	Mean recovery at each level 90-110%
Precision	Absolute difference between operators $\leq 3.0\%$ (n=6 operator)

#### a) Target Analytes Selection

Many regulatory bodies and ICH Q3 enlighten the deliberation of impurities in the API synthetic route.

#### b) Technique Selection

Analytical technologies are wide and diverse, and although much overlap in applicability exists, each technique has strengths and weaknesses. Based upon the analytes nature suitable analytical technique can be selected. Need for the test are also important for selecting the technique.

Analytical test items and analytical techniques includes the following

1. Identification by IR: FT-IR spectrophotometer,
2. Impurity profile (Chromophore): HPLC with UV detector,
3. Impurity profile (non-Chromophore): HPLC with RID/ELSD
4. Assay by HPLC (Chromophore): HPLC with UV detector,
5. Assay by HPLC (non-Chromophore): HPLC with RID/ELSD

#### (c) Analytical method performance characteristics[7]

Method requirements can differ from one method to another. There are various method performance characteristics. There are two types of method

performance, that is, systematic (bias) and inherent random (variance) components. Commonly method performance is not evaluated by one but depends on both.

According to USP and ICH guidelines there are many validation parameters for chromatographic separations, which are considered as method performance characteristics which include accuracy and precision. These are quite commonly considered as method performance characteristics to quantify the substance. No method can be accurate and precise without adequate specificity, linearity, and peak resolution but these do not signify robust behavior of the method. Another vital component that one has to be establish based on acceptable behavior of both systematic and random performance characteristics is the range. Robustness defines an operational range of method factors to give defined results. Other method performance characteristics such as linearity and specificity are not needed to be incorporated in the ATP, as they are not directly linked to understand the agreement of a measurement with the true value.

**3. CQA (Critical Quality Attributes) and Initial Risk Assessment** ICH Q8(8) defines CQA as a physical, chemical, biological, or microbiological property or characteristic that should



be within an appropriate limit, range, or distribution to ensure the desired product quality.

CQA for analytical methods comprises of method attributes and method parameters. CQA can diverge from one analytical technique to another.

a) HPLC(UV or RID) CQA are buffers used in mobile phase, pH of mobile phase, diluent, column selection, organic modifier, and elution method.

b) CQA for GC methods are oven temperature and program, injection temperature, flow of gas, sample diluent, and concentration.

c) TLC plate, mobile phase, injection concentration and volume, time taken for plate development, reagent for color development, and detection methods are the CQA for HPTLC.

Physical and chemical properties of the drug substance and impurities such as polarity, charged functional groups, solubility, pH value, boiling point, and solution stability also describe CQA for analytical method development. The method performance (e.g., specificity, accuracy, precision, linearity, range, and quantitation limits for impurities) should be targeted such that the method is suitable for demonstrating measurable control of the critical quality attribute in the manufacturing process and stability testing.

#### **4. RISK MANAGEMENT<sup>[9]</sup>:**

Quality Risk Management (ICH Q9) is “a systematic process for the assessment, control, communication and review of risks to the quality

... across the ... lifecycle”. Risk assessments are an vital part of the Analytical QbD process. Risk assessments smooth the progress of recognition and ranking of parameters that could brunt method performance and conformance to the ATP. Risk assessments are often iterative throughout the lifecycle of a method, and are typically performed at the end of method development, with product changes (e.g., route, formulation or process) and as a precursor to method transfer. These RAs emphasizes on potential differences (e.g., laboratory practices, environment, testing cycle times, reagents sources). During the technique selection and method development stages major differences (e.g., availability of equipment ) should be recognized and factored.

##### **4.1 Methods of risk assessment**

Some methods of risk assessment are mentioned in ICH guideline Q9 as follows:

Failure Mode Effects Analysis (FMEA);  
Failure Mode, Effects and Criticality  
Analysis (FMECA); Fault Tree Analysis  
(FTA);

Hazard Analysis and Critical Control Points (HACCP);

Hazard Operability Analysis (HAZOP); Preliminary Hazard Analysis (PHA); Risk ranking and filtering; Supporting statistical tools.

#### **5. Method development by QbD approach**

##### **Step 1: Defining method intent**

Since pharmaceutical QbD is a systematic, scientific, holistic, menace based and practical approach that begins with predefined objectives and lay emphasis on product and process understanding and control so the goals of HPLC method development have to be clearly defined. The eventual goal of the analytical method is to separate and quantify the main compound.

##### **Step 2: Performing experimental design**

Experimental design can be efficiently used for rapid and systematic method optimization. A systematic experimental design is considered necessary to aid in obtaining profound method understanding and performing optimization.. It forms a chromatographic database that will help out with method understanding, optimization, and selection. In addition, it can be used to evaluate and implement change of the method, should it be needed in the future, for example should the chromatographic column used no longer be commercially available, or an impurity is no longer relevant.

##### **Step 3: Evaluation of experimental results and selection of final method conditions**

The conditions for the method need to be evaluated using the three tiered approach. At first the conditions should be evaluated for peaks symmetry, peaks fronting and peaks tailing. Later these conditions should be further evaluated by using more stringent criteria, such as tailing factor should be less than 1.5, etc.

##### **Step 4: Performing risk assessment with robustness and ruggedness evaluation**

Once the final method is selected against method attributes, it is highly likely that the selected method is reliable and will remain operational over the lifetime of product. The fourth step of method development is mainly for the method verification and finalization and the evaluation of method robustness and ruggedness to be carried out .

A risk based approach based on the QbD principles set out in ICH Q8 and Q9 can be applied



to the evaluation of method robustness and ruggedness. Fishbone diagram such as structured methodologies for risk assessment can be implemented to identify the potential risk of the method due to a small change of method parameters or under a variety of conditions such as different laboratories, analysts, instruments, reagents, days, etc.

## 6. Regulatory aspects to QbD<sup>[10]</sup>

### 6.1. FDA perspective

FDA's view of QbD is "QbD is a systematic approach to product and process design and development". This concept was accepted by FDA in 2004 and detailed description was given in 'pharmaceutical cGMPs for 21st century – a risk based approach'. International conference on harmonization in its Q8 pharmaceutical development, Q9 quality risk assessment and Q10 pharmaceutical quality system gives stringent requirements regarding quality of product.

FDA also states the importance of quality of pharmaceutical products by giving Process Analytical Technology (PAT) which is a Framework for Innovative Pharmaceutical Development, Manufacturing and Quality Assurance. QbD ultimately helps to implement Q8 and Q9. Risk-based regulatory approaches are for scientific understanding and control related process for product quality and performance.

### 6.2. ICH guideline and QbD

The underlying principles of QbD i.e. science- and risk-based product development, risk assessment, lifecycle approach and method design are explained in the quality guidelines of international conference on harmonization i.e. ICH Q8 *Pharmaceutical Development*, ICH Q9 *Quality Risk Management*, and ICH Q10 *Pharmaceutical Quality System*.

## 7. DESIGN OF EXPERIMENTS

Experimental design<sup>[11,12]</sup> can be efficiently used for rapid and systematic method optimization. Design of experiments (DOE) is a well proven vivid approach within process and product development and a key input of Quality by Design. Method development helps to understand what are the critical process parameters in the analytical method influencing accuracy and precision and to minimize their effects.

Typically DoE (Design of Experiment)<sup>[13,14]</sup> is used to find ranges for instrument operating parameters, to understand sample preparation

variations and variations of method precision. The ATP compiles a set of characteristics defining what analyte or analytes will be measured, in which matrix, over what concentration range(s) as well as the required performance criteria of the method together with specifications for these last ones<sup>[15-18]</sup>.

DOE for method validation seek to validate the analytical method for a range of concentrations so that any changes in formulation or concentration will not require additional validation as they are changes within a characterized design space. Recently more attention has been placed on applying DOE to analytical methods.

DOE for analytical methods has three major applications:

1. Method development for new methods or those that need improvement,
2. Method validation and
3. Quantitation of the influence of analytical methods on product and process acceptance and out-of-specification rates.

### **QbD can be applied for various analytical methods which include,**

- Chromatographic techniques like HPLC (For stability studies, method development, and determination of impurities in pharmaceuticals).
- Hyphenated technique like LC-MS
- Advanced techniques like mass spectroscopy, UHPLC, and capillary electrophoresis
- Karl Fischer titration for determination of moisture content.
- Vibrational spectroscopy for identification and quantification of compounds e.g. UV method.
- Analysis of genotoxic impurity.
- Dissolution studies
- Biopharmaceutical processes

### **Benefits of Application of QbD Approach to Analytical Methods**

- Development of a robust method
- Applicable throughout the life cycle of the product
- Regulatory flexibility
- Movements within "Design Space" are not considered a change in method

## 8. CONCLUSION

The application of QbD concept to analytical method is justifiable, because many variables significantly affect the method results which include instrument settings, sample characteristics, method parameters, and choice of calibration



models. Being chromatographic technique is the most common analytical tool in pharmaceutical quality control, and the number of variables involved in analytical method development phase is almost equivalent to the number of variables involved in formulation and development protocols for dosage form so implementation of QbD provides an opportunity to achieve regulatory flexibility but requires high degree of robustness, product quality, and analytical method understanding. Method transfer in QbD is feasible for analytical methods and will enable better, more efficient, and continuous improvements for future methods.

## REFERENCES

1. *International Conference on Harmonization (ICH) of Technical Requirements for Registration of Pharmaceuticals for Human Use, Topic Q8 (R2): Pharmaceutical Development*, Geneva, (2009)
2. Hardik Patel, Shraddha Parmar, Bhavna Patel, A Comprehensive Review on Quality by Design (QbD) in Pharmaceuticals, *International Journal of Pharmaceutical Sciences Review and Research*, August 2013
3. Vemuri Pavan Kumar N. Vishal Gupta, A Review on quality by design approach (QBD) for Pharmaceuticals, *International journal of drug development and research*, Vol. 7, Issue 1 January-March 2015.
4. Devesh a. Bhatt, Smita, Rane "Qbd approach to analytical rp- hplc method development and its validation", *International Journal of Pharmacy and Pharmaceutical Sciences*, vol1, Issue1 (2011)
5. N. V. V. S. S. Raman, Useni Reddy Mallu, and Hanimi Reddy Bapatu, *Analytical Quality by Design Approach to Test Method Development and Validation in Drug Substance Manufacturing*, *Journal of chemistry*, (2015)
6. Dennis Åsberg, Anders Karlsson, Jörgen Samuelsson, Krzysztof Kaczmarek, Torgny Fornstedt, *Analytical Method Development in the Quality by Design Framework*, American laboratories, December 16, 2014
7. Ramalingam Peraman, Kalva Bhadraya, Yiragamreddy Padmanabha Reddy, *Analytical Quality by Design: A Tool for Regulatory Flexibility and Robust Analytics*, *International Journal of Analytical Chemistry*, (2015)
8. Ramu B, Chittela KB. *High Performance Thin Layer Chromatography and Its Role Pharmaceutical Industry [Review]*. *Open Sci. J. Biosci. Bioeng.* 2018;5(3):29–34. Jaiprakash N. Sangshetti, Mrinmayee Deshpande, Zahid Zaheer, Devanand B. Shinde, *ohidas Arote ' Quality by design approach: Regulatory need*, *Arabian journal of chemistry*, February (2014)
9. Furlanetto S, Orlandini S, Pasquini B, Caprini C, Mura P, Pinzauti S, *Fast analysis of glibenclamide and its impurities: quality by design framework in capillary electrophoresis method development.*, *Anal Bioanal Chem.* Oct;407(25): 7637-46, (2015)
10. S. Karmarkar, R. Garber, Y. Genchanok, S. George, X. Yang, and R. Hammond *Quality by Design (QbD) Based Development of a Stability Indicating HPLC Method for Drug and Impurities*, *Journal of Chromatographic Science*, Vol. 49, July (2011)
11. B. Ramu, Chandrul KK, Pandiyan PS, *Bio-Analytical Method Development of Repaglinide Drug Delivery Systems*, *Journal of Drug Delivery and Therapeutics.* 2019;9(6):140-142 <http://dx.doi.org/10.22270/jddt.v9i6.3718>
12. P. Nethercote, P. Borman, T. Bennett, G. Martin, P. McGregor, *Pharm. Manufact.* April (2010) 37.
13. *International Conference on Harmonization (ICH) of Technical Requirements for Registration of Pharmaceuticals for Human Use, Topic Q9: Quality Risk Management*, Geneva, (2005).
14. *International Conference on Harmonization (ICH) of Technical Requirements for Registration of Pharmaceuticals for Human Use, Topic Q10: Pharmaceutical Quality System*, Geneva, (2008)
15. P. Borman, J. Roberts, C. Jones, M. Hanna-Brown, R. Szucs, S. Bale, *Separation Science* 2(2010)
16. E. Rozet, P. Lebrun, B. Debrus, B. Boulanger, Ph. Hubert, *Trac Trends In Analytical Chemistry*, (2013) 157.



# DEVELOPMENT OF TRANSPORT SYSTEM IN THE KHOREZM OASIS IN THE LATE XIX AND EARLY XX CENTURIES

**Jumaniyozov Fazliddin Bobojonovich**

*Lecturer in the Department of Humanities and Social Sciences of Urgench branch of Tashkent University of Information Technologies named after Muhammad al-Khwarizmi.*

## ANNOTATION

*This article deals with the development of transport in the Khorezm oasis in the late XIX and early XX centuries. By the end of the 19th century, there was a great revolution in the field of transport in the world. In the Khorezm oasis, vehicles remained in their old form. By the twentieth century, animal cocktails were mainly used for cargo transportation in Khorezm. Due to the lack of transport development in the oasis, the manufacturing and economic sectors remained in a backward state. As a result of the fact that the oasis is surrounded on all sides by the desert and it is mainly dependent on caravan routes passing by land, trade and cultural integration of the peoples living in Khorezm with the world community has been very slow.*

**KEYWORDS:** *Caravan roads, water transport, Khiva khanate, Khorezm People's Republic, automobile, camel, air transport, railway.*

## DISCUSSION

The Khorezm oasis has long been one of the centers of human civilization. Such states as "Great Khorezm", "Afrigs", "Anushtegin Khorezmshahs", "Khiva Khanate" were formed in this region. During the period up to the 16th century, the oasis existed as an important link of the Great Silk Road as a center of world trade. As a result of the "Great Geographical Discoveries" of the 16th century, the direction of world trade changed. As a result of the transportation of the main cargo by ships, the caravan routes passing through the land lost their importance. The Khorezm oasis is surrounded on four sides by the Sahara and is connected with the outside world mainly by caravan routes.

If we look at the history of the formation of vehicles in the oasis, by the Middle Ages, carts with camels were considered the main means of transportation in the steppe areas of the region. In particular, on his way from the Golden Horde to Khorezm in 1338, Ibn Battuta, a Moroccan traveler, wrote that he had crossed the Ustyurt Desert in a chariot with two camels, after which he had to rest for a year[1]. Francesco Pecholatti, a Venetian traveler, ambassador, and spy, used chariots with

oxen during his travels in Central Asia (1348-1355), then arrived in Urgench, the then capital of Khorezm, in 20 days in a chariot with two camels [Saraychik] [2]. Although the speed of the cart with which the camel was added was a bit slow, it was convenient to cross the sands in the desert and steppes [3].

The Khiva Khanate, founded by the Shaybanids in the first decade of the 16th century, was also a socio-political state under a feudal system and a khanate. The organization of the entire state administration in the khanate was based on tribal-territorial relations. During the Khiva khanate, transport services using modern means of transport were not organized in the oasis.

By the XIX century there was a process of revolutionary development in the field of world transport. On September 19, 1825, trains between Darlington and Stockton, designed by George Stephenson, began to serve passengers by rail, the London Underground ran from 1863, and on December 17, 1903, the aircraft, designed by the Wright brothers, made its maiden flight [4].

During this period, due to the lack of technical innovations in the territory of the khanate, horses, trucks and ships traveling on the Amudarya



served as the main means of transport. In winter, the river is covered with ice and shipping is suspended. If near Termez the river freezes for an average of 4 days a year, near Nukus and Turtkul it freezes for 68 days [5].

In all historical periods, the influence of the Amudarya on the formation of the transport infrastructure of the oasis was enormous. This factor can be clearly observed in the example of roads formed in the region. By the 19th century, the number of special ships, piers \* (stations) and crossings \* (crossings) carrying passengers and cargo along the river had increased in the oasis.

Carriage of goods in the Khiva khanate was almost always carried out using camels, horses, mules and donkeys. The main vehicle was a 1-2-humped camel that could lift up to 350–400 kg (16 lbs) [6] and walk on uneven roads without thirst for 1 month. As of 1909, there were 106,100,000 horses and 171,69,440 camels in the Khiva khanate, most of which were used for transportation[7]. According to the researcher A.Sadikov, in the second half of the XIX century from Bukhara in caravans of 3,000 camels belonging to Khiva traders, 1000 from Karshi, 1000 from Shakhrisabz were brought to Khiva [8]. The toll paid for each camel on a commercial caravan route was around 1-1.5 till [9].

The caravans from Khiva, Bukhara and Tashkent had a small number of donkeys. Usually a donkey is loaded with 4-5 pounds. If the caravan route was not very long, the donkeys at short distances were loaded with 8, sometimes up to 10 pounds [10]. Carrying mules were considered more powerful than camels and weighed more than 20 pounds. Another advantage of mules is that the camel covered the distance in 15 days and the mule covered the distance in 12-13 days. The wild desert species of load-bearing horses are strong and resilient, with a load of up to 10 pounds [11]. Such horses were highly valued because their speed was two to three times faster than that of a camel. The productivity of horses and carts was very low, the daily productivity did not exceed 5.3 tons per kilometer \*, the productivity of camels did not exceed , 3.2 tons per kilometer, and the productivity of donkeys did not exceed 0.8 tons per kilometer [12].

The Khiva people made car wheels big and high. On land, cargo was transported in 4- and four-wheeled carts by the end of the 2nd and 19th centuries, and their speeds did not exceed 10 km [13].

The 19th century ushered in a new era in world transport. As a result of the research of Jacques Lenaur in 1861, N.A.Otto in 1867, and O.Kostovich in 1879 on the internal combustion engine, the development of vehicles developed rapidly. As a

result of increased vehicle efficiency, new types of transport services have begun to emerge.

The development of transport services in the Khorezm oasis began much later than in other regions of the country. The development of transport in the khanate did not meet the requirements of the current period. Even in the twentieth century, when the world was dominated by technical progress in the field of transport, the use of animal labor in this area remained one of the priorities of the khanate.

As a result of the abdication of Said Khiva Khan of Khiva on February 2, 1920, the First All-Khorezm Congress was held on April 27-30, 1920, in which the government of the Khorezm People's Soviet Republic was formed and its first Constitution was adopted [14].

On February 8, 1920, according to the decision of the Revolutionary Committee, the Khorezm People's Economic Council was established. The structure of this council, which functioned until 1924, made a significant contribution to the development of transport infrastructure of the republic, as well as other sectors [15].

This council adopted 6 resolutions on the development of the transport system of the KPSR [16]. In October 1921, by the decision of the Council, the General Directorate of Local Transport was established in Khiva and 12 employees were attached to it. Due to the lack of railways and automobiles at the disposal of this department, the main cargo in the country was transported mainly by horse-drawn vehicles. At that time, the administration had 276 chariots and 299 horses at its disposal [17]. Of these, 128 were in Khiva, 25 in Shokhabod, 35 in Dashovuz, 27 in Porsu, 16 in Khojaly, 17 in Old Urgench, 11 in Khazarasp, 5 in Pitnak, and 19 in Darganota[18]. As this opportunity failed to meet the needs of the young state, the peasants' horse-drawn carts were mobilized.

According to the economic plan of the USSR for 1924-1925, it was important to bring the following products from the center [19]:

Product Name	Quantity	Amount
1. Sugar	45,000 pounds	450,000 rubles
2. Tea	10,000 kg	600,000 rubles
3. Fabric	31 meter	1,560,000 rubles
4. Dishes	-	66,000 rubles
5. Machinery, equipment and metals	-	100,000 rubles
6. Flour	-	60,000 rubles

In October and November 1924, 25,000 pounds of flour, 12,000 pounds of sugar, 4,000 pounds of tea, 20 acres of cloth, 3 wagons of dishes, 1,000 pounds of tagcharm, 5,000 rubles worth of agricultural machinery and small equipment were imported to the USSR. . These products did not meet



the needs of the KPSR. The republic's transport potential was very poor, and in 1926 there were 252 carts at the disposal of the General Directorate of Local Transport [20]. During this period, camels were widely used in the transportation of oasis. Camel-mounted carts were the main means of transportation in the agricultural sector. By 1927, 8,100 camels were involved in transportation and agriculture in the oasis [21].

The first car entered the Khorezm oasis on June 26, 1927. This car is the first vehicle in the oasis. This car was a Reno Sahari manufactured by the French company Reno and covered the distance from Chordjoi to Khiva in 3 days [22] (see Appendix 6). Since 1927, the General Directorate of Local Transport has provided services on the Urgench-Chordjuy route at a rate of 47 rubles per passenger, Urgench-Khiva - 3 rubles 92 kopecks, Urgench-Doshoguz - 8 rubles 72 kopecks [23]. In 1928, the demand for motor transport in the country was provided by 22%, while in Khorezm this figure was 6.4% [24]. Since 1929, the oasis has seen an increase in the number of vehicles needed for the agricultural system. In 1924, the US "Farmol" and "Fardzon" tractors appeared in Khorezm [25], and by 1931, the USSR's XTZ and STZ tractors began to be widely used [26].

In 1929, the Main Department of Roads and Motor Transport of Uzbekistan and its branches throughout the country were established. At the initiative of this organization, a special group was established in 1933 on the basis of the Institute of Economic Research under the Central Asian State Planning Committee to connect the Khorezm oasis with the European part of the union through the transport and communication system [27]. However, due to the complexity of local conditions, the group's activities were ineffective.

The railway to the Khorezm oasis was destroyed later than in other parts of Central Asia. In the 1920s, the Lower Amudarya region had a population of about 2 million, and their economic needs could not be met without railways.

For the Soviets, the most pressing issue was to increase the economic dependence of the colonies on the center in order to control the imperial territories and turn them into a raw material base. It was impossible to implement this policy without railways.

With the victorious end of World War II and the spiritual upheaval in the country, proposals to lay railway tracks to Khorezm were again put forward. Because the region and the entire Lower Amudarya region were almost deprived of the opportunity to receive domestic goods from the center and to transport their own raw materials. The Amudarya shipping was in crisis and was able to carry a very

small amount of cargo. For example, in 1947, when the region's demand for bread was 76,200 tons, the Central Asian shipping fleet brought 8,475 tons of grain, oil products - 17,340 tons instead of 50,000 tons. In particular, Uzcottontrans (Uzkhloptrans) cars almost stopped due to lack of gasoline. Therefore, in July 1947, only 33.4% of the planned raw cotton was exported from Khorezm region and 15.2% from Karakalpakstan [28].

On December 18, 1952, the first train was solemnly welcomed at Urgench station [29]. The TE1-198 locomotive that towed the train was driven by II Gubanov and Eshon Atamuratov, machinists of the Chorjoi depot, deputies of the Supreme Soviet of the Turkmen SSR. 400 km of the Ashgabat railway. The road between Urgench and Chorjoi will provide uninterrupted transportation of goods and passengers [30].

As a result of the railway construction, the Karakalpak ASSR, Khorezm and Dashoguz regions will be supplied with household goods, machinery, equipment, fertilizers, as well as raw materials (cotton, rice, silk, oil, melons, horticulture, livestock products, etc.). ) transportation capacity has expanded. Between 1952 and 1955, 163 dwellings were built in the city of Urgench, and 40 two-storey and 20 single-storey dwellings were built in the railway town[31].

As a result of the arrival of the railway in the oasis, the transportation of raw materials for production developed. 1958-1965 As a result of the emergence of industries such as textiles and processing of agricultural products, 70 manufacturing enterprises were launched and the volume of production increased by 3.5 times. The development process in the agricultural sector is intensifying. In 1939, 1,200 tons of fertilizer were brought to the oasis to improve the mineralogical condition of the lands, and by 1969, this figure had risen to 200,000 tons[32]. During 1958-1964, as a result of increased transportation of construction materials by rail, 2,076 km of gas pipelines, 473 km of asphalt roads, a secondary school for 23,819 places, a preschool for 29,300 places, and a hospital for 500 places were built.

The history of the Air Force dates back to the early days of the twentieth century. For the Soviet government, connecting the colonies by air was of strategic importance. In 1921 the representative of the RSFSR B.G. Gorodetsky (1896-1944) initiated the introduction of aviation in Khorezm[33]. On December 16, 1922, the Presidium of the CPC of the USSR adopted a resolution "On the establishment of an airfield in Khiva."

In 1922, the Executive Committee of the USSR adopted a resolution "On the opening of an air route between Khiva and Charjou [34]" According to



the decision of the Khorezm Economic Council of November 28, 1923, 25985 rubles 42 coins were allocated for the construction of one airfield in Khiva, and 274 rubles 30 coins for the equipment depot at the airport [35].

In 1923, a "flying" postal service was established for communication between the citizens of the KPSR and covered 450 km. Mail messages were sent to the local routes Kagan – Aktogay – Darganota – Khiva, Hazarasp, Dashovuz, Khojayli, Kungrad. At that time, the postal telegraph department began to establish a postal service by concluding contracts with private contractors [36].

October 31, 1923 in Moscow, the representative of the Turkestan ASSR M.S. Isaev, the representative of the KPSR M.A. Matchonbaev and Abdurahim Yusufzoda, a representative of the USSR, and I. Devyatovsky, a representative of the Dobrolyot [37] board of the Russian Voluntary Air Fleet. According to the agreement, from April 1, 1924, the company "Dobrolyot" was given the right to carry passengers and mail on the routes Bukhara-Khiva, Tashkent-Almaty and Bukhara-Khiva. Clause 4 of the agreement stipulates that after 10 days, temporary flights will be operated on the route Bukhara-Khiva. If the Khiva airport meets the landing requirements, it is planned to operate flights to Khiva-Tashkent twice a month. Initially, it was planned to operate flights between Tashkent-Khiva 3 times a month and Bukhara-Khiva twice a month[38].

1923 The RSFSR allocates 100 agronomists, engineers, mechanics, electricians, pressmen, and leather workers to help Khorezm. In the middle of this year, the Turkestan ASSR, Bukhara and Khorezm People's Soviet Republics formed a Central Asian branch of the Voluntary Fleet Company and purchased 6 aircraft on the Tashkent-Almaty-Bukhara, Bukhara, Khiva air routes. Specialists will be sent to set up an air station near the city of Khiva [39].

On March 30, 1924, by order boshqar54 of the Central Asian Directorate of the Dobrolet Society of the Russian Volunteer Air Fleet, the Dobrolet Society's air base in Kagan, Bukhara, was established [40]. By this time, it was designed to carry passengers from Germany and was 140 km per hour. Preparations were made for the opening of the Tashkent-Almaty, Bukhara-Khiva, Bukhara-Termez-Dushanbe air routes, bringing six six-seater Junkers-13 aircraft [41].

The establishment of an airfield in Khiva was militarily necessary for the Soviet government. By 1924, air aviation had been used to quell popular uprisings in the Lower Amudarya region and in Turkmen-populated areas. On March 8, 1924, Sergei Nikitin, commander of the 2nd Air Squadron, took to the air in a military plane from Khiva airfield,

inflicting heavy casualties on an attack on the fortress around the Balai Ishim well, 260 km from Khiva, the stronghold of Junaidkhan's rebels[42].

By 1924, the Dobrolyot Company established a 450-kilometer Bukhara-Aktogay-Darganota-Khiva route and carried out technical flights on these routes. In the same year, the first passenger flights were launched on the route Kagan-Dashovuz-Khiva [43]. In 1924, the country held national state border events, which were included in the USSR, Uzbekistan and Turkmenistan.

In 1925, the Dobrolyot Society carried out the first aerial photography in the Khorezm oasis. In 1926, he established passenger services on the routes Khiva-Kagan, Khiva-Leninsk, Khiva-Darganota, Khiva-Dashovuz [45].

Until the middle of the twentieth century, the dependence of the Khorezm oasis on a single transport system had a negative impact on its economic and social development. As a result of the one-sided policy pursued during the Soviet era, the lack of qualified personnel for the sector, and the negative impact of agricultural reforms on the environment, the oasis water transport infrastructure was in crisis.

The transition from the old, traditional means of transport to horse, donkey, camel and cart transport to road transport was a positive development in the operation of transport in the oasis, which led to the formation of modern road communication systems. Due to the lack of stones needed for road construction in the oasis and the fact that they are mainly imported from other regions, the process of construction of paved roads was slower than in other regions of the country.

The Chorjoi-Urgench-Kungrad railway, as an advanced communication network of its time, to some extent influenced the economic processes in the Khorezm oasis. In particular, domestic and foreign trade relations in the oasis have been revived, the process of attracting agricultural and livestock products to trade has accelerated due to the expansion of the village's opportunities to bring raw materials closer to the city and its consumers. As a result of the construction of railway tracks to the oasis, the volume of economic freight and passenger traffic has increased.

As a result of the construction of the Kungrad-Beynov railway and its connection with the Chorjoi-Kungrad line, it connected the Central Asian republics with the central part of Russia in a relatively close and privileged way. The construction of this road provided direct access to the Khorezm oasis with the European part of Russia and the central cities of the USSR.

As a result of the creation of railway and air transport in the oasis, Khorezm was visited by



leading specialists in the field of Russian, Ukrainian, Tatar and German nationalities. Therefore, the composition of the population of Urgench, the regional center of railway and air transport, has changed dramatically, which in turn has contributed to the strengthening of ethnocultural and ethno-economic processes.

The role of the air fleet in the development of the national economy has increased. With the help of planes, defoliation of cotton crops, chemical treatment of insects, transportation of food to shepherds, provision of ambulance sanitary services, transportation of mail, timely delivery of passengers to short and long distances were established. The work on construction of large and small runways, refueling and maintenance of aircraft, communication has been improved. With the increase in the number of modern aircraft and helicopters, a large group of pilots and ground servicemen was formed. Khorezm aviators are among the leaders in the country.

The nineteenth century marked the beginning of a period of great development in the world of science. As a result of technical progress, the development of transport infrastructure has strengthened the integration between the countries of the world. However, due to the socio-economic crisis that prevailed in the Khiva khanate, the level of vehicle development in the oasis remained the same as in ancient times.

By the twentieth century, the natural location of Khorezm led to the development of water transport in the oasis and the formation of mixed communication routes connecting the region with other regions of Central Asia by crossings. As a result of this process, various transport service professions and villages inhabiting the representatives of this profession emerged in the oasis;

Despite the development of shipping on the Amudarya to some extent, water transport during this period did not provide the oasis with the goods necessary for socio-economic development. The non-compliance of caravan and waterways with modern requirements has become a serious obstacle to the economic development of the oasis;

The construction of the Chorjoi railway junction and the opening of the steamship on the Amudarya in 1887-1888 further strengthened the economic ties of Khiva with Bukhara and Russia. As a result, the city of New Urgench, a trade and industrial center in the Khorezm oasis, has grown in stature.

By the end of the 19th century, transport opportunities, which had played an important role in the socio-economic life of the Khiva Khanate, were in crisis. As a result of the complicated political situation in the khanate, progressive ideas and

programs aimed at reforming society did not materialize.

## REFERENCES

1. Ibragimov, N. *Ibn Battuta and his journey across Central Asia*. — Tashkent: "Science", 1988. - P.72.
2. Mavlonov, O., Makhkamova D. *Cultural ties and trade routes*. - P. 94.
3. Agzamova, G.A. *Central Asian khanates and Russia: to the history of the caravan trade*. - P. 15-16.
4. Siddiqnazarov Q.M., Ahmedov, U.V. *Motor transport of Uzbekistan: in the past and in the years of independence*. — Tashkent: Islamic University, 2001. - P.42.
5. Baratov P., Umarjanov A. *Downstream Amudaryo*. - Tashkent: Fan, 1977. - P.42 ..
6. *Weight measurement equal to 1 pud-16,380 kilograms*.
7. *National Archive of Uzbekistan, Fund 125-I, List 1, Case 527, Sheet 69*.
8. Sadikov A.S. *Economic ties of Khiva with Russia in the second half of the XIX - early XX centuries*. -Tashkent,1965.P. 91.
9. *History of Khorezm in modern research. Tashkent - Urgench: "Navruz", 1977. - P. 102.*
10. Makhmudov M. *History of Uzbekistan. Materials for lectures and practical exercises*. - Urgench, 2015. -- P. 143.
11. *History of Khorezm in modern research. Tashkent - Urgench: "Navruz", 1977. - P. 102.*
12. Kuznetsov-Oranskiy N.T. *Transport issues in Central Asia. Translated to Uzbek by Ismail Jafar*. — Tashkent – Baku, 1931. - P.19.
13. Siddiqnazarov Q.M., Ahmedov. U.V. *Motor transport of Uzbekistan: in the past and in the years of independence* — Tashkent: Islamic University, 2001. - P.47.
14. Kushjonov, O. Polvonov, N. *Socio-political processes and movements in Khorezm (second half of the XIX century - the first quarter of the XX century)*. - Tashkent: "Abu Press-Consult" LLC, 2007. - P. 371
15. *History of the Khorezm People's Soviet Republic*. - Tashkent: "Fan", 1976; - P. 76.
16. Jumaniyozov F. *Khorezm transport: yesterday and today*. - P.49.
17. *National Archive of Uzbekistan, Fund 73, List 1, Case 8, Sheet 6*.
18. *National Archive of Uzbekistan, Fund 2027, List 1, Case 21, Page 33*.
19. Pardaev A. *Activity of economic councils in Bukhara and Khorezm 1920-1924*. - P. 117.
20. *History of collective and state farms of Uzbekistan*. - Tashkent. - P. 292.
21. *National Archive of Uzbekistan, Fund 93, List 1, Case 552, Page 176*
22. *National Archive of Uzbekistan, Fund 93, List 1, Case 552, Page 207*
23. *National Archive of Uzbekistan, Fund 93, List 1, Case 552, Sheet 233*



24. Siddiqnazarov Q.M., Ahmedov. U.V. *Motor transport of Uzbekistan: in the past and in the years of independence.* 52.
25. Sobirov O., Bekmetov E. *From the experience of scientific atheistic propaganda in Khorezm.* - Tashkent: Uzbekistan, 1979. - P. 15
26. *History of collective and state farms of Uzbekistan.* - Tashkent: Uzbekistan, 1972. - Volume 3. - P. 467.
27. *The problem of transport communication of the Khorezm oasis.* - Tashkent: State Planning Committee of the UzSSR, 1935. -- P. 3.
28. *Red(Кзыл) Karakalpakstan 12 February 1947 yil.*
29. Roxmonov M. *For the further development of economy and culture in Khorezm // "Khorezm Haqiqati" newspaper,*
30. *1952 18 February. №250.*
31. Karimov R. *On the steel highways of Khorezm.* Urgench: Khorezm, 1998. - p. 16.
32. Rahmonov K., Nurjonov, K., Karimov R. *The path to happiness.* - S. 30.
33. *Archive of Khorezm region, Fund 482., List 1, Case 6, Page 18.*
34. Gorodetsky, Boris Grigorevich (1896-1944) - party and statesman. Member of the New Bukhara Sovdepi (1917-18), representative of the Comintern in Turkestan (1920-21), executive secretary of the regional party committee in Ettisuv (1921-22), representative of the RSFSR-USSR (1922-01.03.1925). Then he was the head of the propaganda department of the Central Committee of the Communist Party of Turkmenistan (1925-1926), the head of the Republican Department of Water Resources (1927-28), an employee of the NKVD. He was awarded the Order of the Red Banner of Labor.
35. *Aviation of Uzbekistan — 70 years. — Tashkent, 1994. - B. 54.*
36. *National Archive of Uzbekistan, Fund 73, List 1, Case 8, Sheet 6.*
37. Ataniyazov S. *A look at the history of postal and telegraph development in Khorezm // - "Khabar" newspaper, 2012, - 12. October, 41 (1047). - P. 2.*
38. *In March 1923, the Voluntary Air Fleet Society "Dobrolyot" was established in Russia. In August of this year, the Turkestan branch of Dobrolyot was opened.*
39. *National Archive of Uzbekistan, R-73 fund., List 1, case 44, sheet 5.*
40. Sobirov, O.S., Kozakov, E.Q. *Excerpts from the history of Khorezm.* - Urgench: Coach, 1994. - P. 13-14.
41. Gazinazarov A.Yu. *Civil aviation in the economy of Uzbekistan.* - Tashkent: Uzbekistan, 1970. - P. 13
42. *History of development of ties with Uzbekistan. // http://infocom.uz .5.01.2005. - P. 17.*
43. *Archive of Khorezm region, Fund 754., List 1, Case 23, Page 4.*
44. *Aviation of Uzbekistan 70. Malaysia: Consolidated Press, 1992. - P4.*
45. *National Archive of Uzbekistan, Fund 754., List 1, Case 23, Page 31.80.*
46. *National Archive of Uzbekistan, fund 86, list 1, case 2600, page 38.*



# **BIDYO KOMPREHENSYANG APLIKASYON: BISA NG PAGGAMIT SA PAGKATUTO NG MGA MAG-AARAL SA ASIGNATURANG FILIPINO TUNGO SA AKADEMIKONG PAGGANAP**

**Jeny Ann G. Taracatac**

*Kaguruan, Lumban National High School*

## **ABSTRAK**

*Ang pananaliksik na ito ay naglalayon upang malaman na ang bidyo komprehensyang aplikasyon: bisa ng paggamit sa pagkatuto ng mga mag-aaral sa asignaturang Filipino tungo sa akademikong pagganap. Ang disenyong pamamaraan na ginamit sa pananaliksik ay Deskriptibo. Gumamit ng Purposive sampling sa pag-aaral na ito upang malaman ang bisa ng paggamit ng Bidyo Komprehensyang Aplikasyon sa piling mag-aaral ng Baitang 9-Shakepeare ng Lumban National High School. Ang istatistikal na pamamaraan ang ginamit upang kwentahin at analisahin at binigyang-interpretasyon ang mga datos na ibinigay ng mga tagatugon. Ang pag-aaral na ito ay nagkaroon ng kurukuro o haypotesis na walang makabuluhang makabuluhang epekto ang Bidyo Komprehensyang Aplikasyon: Bisa ng Paggamit sa Pagkatuto ng mga Mag-aaral sa Asignaturang Filipino tungo sa Akademikong Pagganap ng Lumban National High School ay huwag tanggapin. Ipinapakita nito na May Makabuluhan na epekto sa pagitan nila.*

**Pangunahing Salita:** *E-Learning Management System, bidyo komprehensyang aplikasyon, akademikong pagganap, pagsasaliksik at datos*

## **I.Introduksyon**

Nagkaroon ng malaking pagbabago sa pamumuhay ng mga tao at gayundin sa iba't ibang sektor ng pamahalaan na nasira ang kanilang kabuhayan ito man ay maliit o malaking kompanya maging sa mababang uri ng estado. Ito ay ang nakakapinsalang pandemya na tinatawag nating CoVid-19 na nagmula sa ibang bansa sa Huwan, China na hanggang ngayon wala pa ring nahahanap ng panlunas dito. Isa sa mga napuruhan nito ay ang Departamento ng Edukasyon.Bilyon-bilyong mag-aaral ang pumapasok maging sa publiko o pribadong sektor na naging apektado dahil sa nasabing pandemya gayundin ang mga magulang ng mga bata ay labis na nagsasakripisyo sapagkat kailangan nilang tutukan sa pag-aaral ang kanilang mga anak sa loob ng bahay.

Batay sa Departamento ng Edukasyon ang batayan para sa e-learning tulad ng blended-learning ay mahusay na isinasagawa.. Radyo, telebisyon, online and modular na pag-aaral –na kung saan ay mayroon

nang mga pamamaraan at nagamit na ng ilang dekada. Sa parehong oras, ang mga guro ay sinasanay sa paggamit ng mas makabagong mga plataporma at mga makabagong kagamitan upang matulungan ang kanilang propesyon na pag-unlad.”Ang “*E-learning o online learning* ” ay tinukoy bilang paggamit ng internet upang ma-akses ang pag-aaral ng nilalaman at mga mapagkukunang impormasyon, pakikipag-ugnayan sa guro at kapwa mag-aaral, upang makakuha ng kaalaman.

Ito ay isang kasanayan na kailangang makamit ng mga mag-aaral sa tulong ng K to 12 curriculum.Taong 2013 nang maisabatas ni Pangulong Benigno Aquino III ang K to 12 program. Bukod sa dagdag taon sa Basic Education Program sa bansa ay mapagbubuti nito ang akademikong kompetensi at oportunidad sa paggawa ng mga Filipinong magsisipagtapos. Kabilang sa kompetensi ng 21st century skills ay impormasyon, midya at pangkasanayang pang-teknolohiya ay bahagi ng 21st



century skills. Ito ay kasanayang kailangang makamit ng mga mag-aaral upang makasabay sa hamon ng buhay sa kasalukuyan. Sa Pilipinas, nang isabatas ang K to 12 curriculum, upang makasabay sa pagsulong ng teknolohiyang pang-edukasyon ipinakilala ni Martin Dougiamas ang “*Open-source internal network, Moodle*”. Ito ay ginamit sa “*blended learning, distance education, flipped classroom*” at iba pang e-learning na pampaaralan, unibersidad maging sa paggawa.

Kung saan dito ay binigyang-pansin ng mananaliksik ang Bidyo Komprehensyang Aplikasyon: Bisa ng Paggamit sa Pagkatuto ng mga Mag-aaral sa Asignaturang Filipino tungo sa Akademikong Pagganap.

Tunay sa panahon ngayon ang bawat mag-aaral ay kaakibat ng kanilang pamumuhay ang pagkahumaling sa paggamit ng teknolohiya. Sa larangan ng akademiko, maraming pamamaraan na ginagamit ng mga guro sa pagtuturo upang mas mapadali ito lalo na sa kalagayan sa kasalukuyan na laptop at cellphone ang ginagamit ng bawat mag-aaral na kung saan nagiging instrumento ito nila sa pagkatuto. Isa na rito ang pagtuturo ng asignaturang Filipino na kung saan hindi maikakaila na mahirap na maunawaan ng bawat mag-aaral ang nilalaman nito.

Ang pananaliksik na ito ay binuo upang makatulong sa mga guro sa pagbibigay sa mga mag-aaral ng iba't ibang pamamaraan sa pagtuturo ng asignaturang Filipino gamit ang E-learning. Dahil sa mapanghalinang tawag ng Daigdig ng Internet, nagkaroon ng marubdob na hangarin na maisapanahon ang pananaliksik na ito gamit ang bidyo komprehensyang aplikasyon at ang bisa nito sa paggamit sa pagkatuto ng mga mag-aaral.

Ang mga sumusunod na mga katanungan ay mabigyan ng kasagutan – (1) Ano ang antas ng Bidyo Komprehensyang Aplikasyon-bisa ng paggamit sa pagkatuto sa asignaturang Filipino ng mga mag-aaral kaugnay sa: 1.1 Internet Akses ; 1.2Google Meet o Zoom ; at 1.3 Lokasyon o Lugar; (2) Ano ang antas ng Akademikong Pagganap ng mga mag-aaral sa pauna at panapos na pagtataya?; (3) May makabuluhang pagkakaiba ba ang pauna at panapos na pagtataya sa Akademikong Pagganap ng mga mag-aaral?; (4) May makabuluhang epekto ba ang Bidyo Komprehensyang Aplikasyon: Bisa ng Paggamit sa Pagkatuto ng mga Mag-aaral sa Asignaturang Filipino tungo sa Akademikong Pagganap sa Lumban National High School?

### Materyales at Metodolohiya

Gumamit ng Purposive sampling para sa pag-aaral na ito upang malaman ang bisa ng paggamit ng

Bidyo Komprehensyang Aplikasyon sa piling mag-aaral ng Baitang 9-Shakepeare ng Lumban National High School.

Ang mananaliksik ang mismong kumalap ng mga impormasyon upang lubos na maunawaan ang mga saklaw at mga posibilidad sa pag-aaral upang matiyak ang kalidad ng ipepresentang datos.

Pagkatapos maisaayos ng mananaliksik ang mga pagbabago sa kanyang talatanungan at mga panukat na gawain, siya ay gumawa ng liham para makakuha ng pahintulot na makapagsagot ng mga talatanungan sa mga tagatugon sa punungguro upang siya ay nagsagawa ng maikling oryentasyon sa mga mag-aaral at sinisiguro ang pagiging kompidensyal ng mga nakalap na datos bago ang pamamahagi ng talatanungan upang mas makapagpapahayag ang mga sasagot sa tanong.

Ang mga naging marka sa bawat panukat na gawain at ang mga nakalap na datos mula sa talatanungan ay maingat na iniisa-isa (tally), inihanay (tabulated) at sinuri upang makuha ang katiyakang resulta. Ang “statistician” ang nagsagawa ng paglalapat ng mga angkop na istadistika.

Ang talatanungan ay ginawa upang masuri ang bisa ng paggamit ng bidyo komprehensya sa pagkatuto ng mga mag-aaral. Ito ay dalawang bahagi- ang unang bahagi ay isang Likert Scale upang masukat ang bisa ng E-learning batay sa internet akses, google meet o zoom at lokasyon o lugar gayundin ang paggamit ng Bidyo Komprehensyang Aplikasyon sa Asignaturang Filipino at kaugnayan ng Bidyo Komprehensyang Aplikasyon sa bisa ng paggamit sa pagkatuto ng mga mag-aaral sa asignaturang Filipino.

Ang ikalawang bahagi ay pagsusulit na hinati sa dalawang bahagi- ang unang bahagi ay paunang pagsusulit habang ang ikalawa ay panapos na pagsusulit upang masukat ang antas ng pagkatuto ng mga mag-aaral batay sa kanilang marka na binubuo ng apatnapu (40) aytem. Ang mga katanungan ay hinango sa PIVOT 4A Learner’s Material o Printed Modules nang Baitang 9 sa asignaturang Filipino.

Ang uri ng pagsusulit ay pamimili (multiple choice) kung saan ay may pamimilian ang mga mag-aaral sa bawat katanungan.

Ang instrumentong ginamit sa pag-aaral na ito ay idinaan sa masusing pagsisiyasat ng mananaliksik at ng eksperto sa nasabing larangan ng pag-aaral upang ang mga datos at impormasyong nakalap sa talatanungan gayundin ang mga isinagawang panukat sa gawain ay naiintindihan, naisasagawa at nasasagot nang maayos. Ang una ay ang bisa sa paggamit sa pagkatuto nang internet akses, google meet at zoom at ang lokasyon o lugar. Ang ikalawa ay ang



akademikong pagganap ng mga mag-aaral batay sa paunang pagsusulit at panapog na pagsusulit.

**Resulta at Pagtalakayan  
Antas ng Bidyo Komprehensyang  
Aplikasyon-bisa ng paggamit sa pagkatuto**

**sa asignaturang Filipino ng mga mag-aaral  
kaugnay sa Internet Akses.**

Ang Talahanayan 1 ay paglalarawan sa antas ng bisa ng paggamit ng Bidyo Komprehensyang Aplikasyon sa Pagkatuto sa asignaturang Filipino ng mga mag-aaral batay sa Internet Akses

A. Internet Akses	Mean	SD	Puna
1. Nagpapahintulot para sa paggamit ng iba't ibang mga input o output na aparato ang internet akses.	4.40	0.56	Ganap na Sumasang-ayon
2. Nagagamit ang internet akses sa pakikipag-ugnayan o interaksyon sa ibang tao.	4.53	0.82	Ganap na Sumasang-ayon
3. Nakapaglalaan ka ng sapat gamit ang internet upang matugunan ang mga pangangailangan mo sa paaralan.	4.17	0.65	Sumasang-ayon
4. Nakakatugon ang internet akses sa mga pangangailangan katulad ng pananaliksik, pag-download ng mga bidyo at iba pa.	4.80	0.48	Ganap na Sumasang-ayon
5. Nakakaapekto sa bilis ng internet ang pagkakaroon ng maraming komokonekta dito.	4.53	0.94	Ganap na Sumasang-ayon
<b>Over-all Mean = 4.49</b>			
<b>Standard Deviation = 0.730</b>			
<b>Pakahulugan = Lubhang Mataas</b>			

**Palatandaan**

Sukat	Saklaw	Puna	Literal na paliwanag
5	4.20-5.00	Ganap na sumasang-ayon	Lubhang mataas
4	3.40-4.19	Sumasang-ayon	Mataas
3	2.60-3.39	Higit na karaniwang sumasang-ayon	Medyo mataas
2	1.80-2.5	Hindi sumasang-ayon	Mababa
1	1.00-1.79	Ganap na Hindi Sumasang-ayon	Lubhang mababa

Ang Talahanayan 1 ay nagpapahayag sa bisa ng paggamit ng Bidyo Komprehensyang Aplikasyon sa pagkatuto sa asignaturang Filipino batay sa Internet Akses. Dito ipinapakita na ang mga tagatugon ay Ganap na Sumasang-ayon na ang Internet akses ay nagpapahintulot para sa paggamit ng iba't ibang mga input o output na aparato (M=4.40 : SD=0.56); nagagamit sa pakikipag-ugnayan o interaksyon sa ibang tao (M=4.53: SD=0.82); nakatugon sa mga pangangailangan katulad ng pananaliksik, pag-download ng mga bidyo at iba pa (M=4.80 : SD=0.48), at nakakaapekto sa bilis ng internet ang pagkakaroon ng maraming komokonekta dito (M=4.53 : SD=0.094).

Ipinapakita rin ng datos na ang mga tagatugon ay Sumasang-ayon na ang internet akses ay nakapaglalaan ng sapat na gamit upang matugunan ang mga pangangailangan sa paaralan (M=4.17 : SD=0.65)

Ipinapakita rin ng kabuuang mean (M= 4.49) na Lubhang Mataas ang ang pagkatuto sa asignaturang Filipino ng mga mag-aaral gamit ang internet akses. Ang mababang standard deviation (SD=0.730) sa kabuuan ay nagpapakita rin ng magkakahalintulad na persepsyon pagdating sa internet akses.



**Antas ng Bidyo Komprehensyang Aplikasyon-bisa ng paggamit sa pagkatuto sa asignaturang Filipino ng mga mag-aaral kaugnay sa Google Meet o Zoom.**

**Talahanayan 2.** Antas ng Bidyo Komprehensyang Aplikasyon-bisa ng paggamit sa pagkatuto sa asignaturang Filipino ng mga mag-aaral kaugnay sa Google Meet o Zoom.

B.Google Meet o Zoom	Mean	SD	Puna
1.Sistematiko ang paraan ng pagtuturo gamit ang google meet o zoom.	4.27	0.78	Ganap na Sumasang-ayon
2.Mas madali o magaan ang paraan ng pagtatalakay sa asignaturang Filipino.	4.03	0.61	Sumasang-ayon
3.Makikita ang lawak ng nilalaman at aytem ng pagsusuring gagawin.	4.20	0.81	Ganap na Sumasang-ayon
4.Nagkakaroon ng oras sa pagsusuri ng mga aralin.	4.23	0.77	Ganap na Sumasang-ayon
5.Madaling napoproseso ang mga itinuturo sa asignaturang Filipino.	3.87	0.73	Sumasang-ayon
<b>Over-all Mean = 4.12</b>			
<b>Standard Deviation = 0.750</b>			
<b>Pakahulugan = Mataas</b>			

**Palatandaan**

Sukatan	Saklaw	Puna	Literal na paliwanag
5	4.20-5.00	Ganap na sumasang-ayon	Lubhang mataas
4	3.40-4.19	Sumasang-ayon	Mataas
3	2.60-3.39	Higit na karaniwang sumasang-ayon	Medyo mataas
2	1.80-2.59	Hindi sumasang-ayon	Mababa
1	1.00-1.79	Ganap na Hindi Sumasang-ayon	Lubhang mababa

Ipinapakita ng talahanayan 2 ang antas ng Bidyo Komprehensyang Aplikasyon -bisa ng paggamit sa pagkatuto sa asignaturang Filipino ng mga mag-aaral kaugnay sa Google Meet o Zoom.Dito ipinapakita na ang mga tagatugon ay Ganap na Sumasang-ayon na sistematiko ang paraan ng pagtuturo gamit ang google meet o zoom (M=4.27 : SD=0.78); pagkakaroon ng oras sa pagsusuri ng aralin ay naisasagawa ng maayos (M=4.23 : SD=0.77); makikita ang lawak ng nilalaman at aytem ng pagsusuring gagawin (M=4.20:SD=0.81); mas madali o magaan ang paraan ng pagtalakay sa

asignaturang Filipino (M=4.03: SD=0.61). Ipinapakita rin ng datos na ang mga tagatugon ay Sumasang-ayon na madaling napoproseso ang mga itinuturo sa asignaturang Filipino (M=3.87 : SD=0.73).

Ipinapakita rin ng kabuuang mean (M=4.12) na Mataas sa pagkatuto sa asignaturang Filipino ng mga mag-aaral gamit ang google meet at zoom. Ang mababang standard deviation (SD= 0.750) sa kabuuan ay nagpapakita ng magkakahalintulad na persepsyon hinggil sa google meet at zoom.

**Antas ng Bidyo Komprehensyang Aplikasyon-bisa ng paggamit sa pagkatuto sa asignaturang Filipino ng mga mag-aaral kaugnay sa Lokasyon o Lugar.**

**Talahanayan 3.** Antas ng Bidyo Komprehensyang Aplikasyon-bisa ng paggamit sa pagkatuto sa asignaturang Filipino ng mga mag-aaral kaugnay sa Lokasyon o Lugar.

C.Lokasyon o Lugar	Mean	SD	Puna
1.Nagkakaroon ng mahina o malakas na pagsaganap ng signal sa kinatatayuan mong lokasyon o lugar.	4.40	0.67	Ganap na Sumasang-ayon
2.Nawawalan nang internet koneksyon (internet connection).	4.27	0.74	Ganap na Sumasang-ayon
3.Nakapipili nang maayos na lokasyon para sa malakas na internet koneksyon (internet connection).	4.07	0.91	Sumasang-ayon
4.Nakakatulong ang lokasyon o lugar sa pag-	4.33	0.76	Ganap na Sumasang-



akses ng internet sa iyong ginagamit na mga gadgets tulad ng mobile phone, kompyuters, tablets at iba pa.			ayon
5.Nakakatulong ang istrukturang katayuan ng isang bahay sa pagkakaroon ng mabilis ng internet koneksyon (internet connection).	4.27	0.74	Ganap na Sumasang-ayon
<b>Over-all Mean = 4.27</b>			
<b>Standard Deviation = 0.766</b>			
<b>Pakahulugan = Lubhang Mataas</b>			

**Palatandaan**

Sukatan	Saklaw	Puna	Literal na paliwanag
5	4.20-5.00	Ganap na sumasang-ayon	Lubhang mataas
4	3.40-4.19	Sumasang-ayon	Mataas
3	2.60-3.39	Higit na karaniwang sumasang-ayon	Medyo mataas
2	1.80-2.59	Hindi sumasang-ayon	Mababa
1	1.00-1.79	Ganap na Hindi Sumasang-ayon	Lubhang mababa

Ang Talahanayan 3 ay nagpapahayag ng antas ng Bidyo Kumprehensyang Aplikasyon -bisa ng paggamit sa pagkatuto sa asignaturang Filipino ng mga mag-aaral kaugnay sa Lokasyon o Lugar. Dito ipinapakita na ang mga tagatugon ay Ganap na Sumasang-ayon sa pagkakaroon ng mahina o malakas na pagsaganap ng signal sa kinatatayuan mong lugar o lokasyon (M=4.40 : SD=0.67); nakakatulong ang lokasyon o lugar sa pag-akses ng internet sa iyong ginagamit na mga gadgets tulad ng mobile phone, kompyuters, tablets at iba pa (M=4.33: SD=0.76); nawawalan nang internet koneksyon (internet connection)(M=4.27 : SD=0.74) Nakakatulong ang

istrukturang katayuan ng isang bahay sa pagkakaroon ng mabilis ng internet koneksyon (internet connection) (M=4.27: SD=0.74).Ipinapakita rin ng datos na ang mga tagatugon ay Sumasang-ayon sa nakapipili nang maayos na lokasyon para sa malakas na internet koneksyon (internet connection) (M=4.07 : SD=0.91).

Ipinapakita rin ng kabuuang mean (M=4.27) na Lubhang Mataas sa pagkatuto sa asignaturang Filipino ng mga mag-aaral gamit ang lokasyon o lugar. Ang mababang standard deviation (SD= 0.766) sa kabuuan ay nagpapakita ng magkakahalintulad na persepsyon hinggil sa lokasyon o lugar.

**Antas ng Akademikong Pagganap ng mga mag-aaral sa Paunang Pagtataya.****Talahanayan 4.** Antas ng Akademikong Pagganap ng mga mag-aaral sa Paunang Pagtataya.

Marka	Bilang	Bahagdan	Mapaglarawang Katumbas
33 - 40	0	0.00	Pinakamahusay
25 - 32	15	50.00	Higit na Mahusay
17 - 24	15	50.00	Mahusay
9 - 16	0	0.00	Di-gaanong Mahusay
0 - 8	0	0.00	Di-mahusay
<b>Kalahatan</b>	<b>30</b>	<b>100.00</b>	<b>Mahusay</b>
<b>Weighted Mean</b>	24.30		
<b>Pinakamababang Marka</b>	17		
<b>Pinakamataas na Marka</b>	32		
<b>Standard Deviation</b>	4.435		

**Palatandaan:**

<b>Sukatán</b>	<b>Literal na Paliwanag</b>
80% - 100%	Pinakamahusay
60% - 79%	Higit na Mahusay
40% - 59%	Mahusay
20% - 39%	Di-gaanong Mahusay
0% - 19%	Di-mahusay

Sa Talahanayan 4 ay ipinapakita nito ang antas ng Akademikong Pagganap ng mga mag-aaral sa paunang pagtataya na may kabuuang tatlung (30) tagatugon na mga mag-aaral. Ang puntos na “25 hanggang 32” ay paglalarawan sa bilang ng mga mag-aaral na may marka na nabibilang sa Higit na mahusay at ito ay may kabuuang labinlima (15) o 50.00% sa kabuuan ng bilang ng tagatugon. Ang puntos na “17 hanggang 24” na bilang ng mga mag-aaral na nakakuha ng marka ay nabibilang sa mahusay na may kabuuang

labinlima (15) o 50.00% sa kabuuan ng bilang ng tagatugon.

Ang kabuuang bigat ng marka ng mag-aaral na 24.30 at may distribusyon na marka na 4.435 sa kabuuang bilang ng tagatugon na tatlung. Ang nakuhang Pinakamababang marka ng mga mag-aaral ay 17 at ang Pinakamataas naman na marka ay 32 sa kabuuang bilang ng tagatugon na tatlung at naglalarawan ng antas ng pagkatuto ng mag-aaral sa paunang pagtataya ay Mahusay.

**Antas ng Akademikong Pagganap ng mga mag-aaral sa Panapos na pagtataya.****Talahanayan 5.** Antas ng Akademikong Pagganap ng mga mag-aaral sa Panapos na pagtataya.

Marka	Bilang	Bahagdan	Mapaglarawang Katumbas
33 - 40	14	46.67	Pinakamahusay
25 - 32	15	50.00	Higit na Mahusay
17 - 24	1	3.33	Mahusay
9 - 16		0.00	Di-gaanong Mahusay
0 - 8		0.00	Di-mahusay
<b>Kalahatan</b>	<b>30</b>	<b>100.00</b>	<b>Pinakamahusay</b>
<b>Weighted Mean</b>		32.93	
<b>Pinakamababang Marka</b>		23	
<b>Pinakamataas na Marka</b>		39	
<b>Standard Deviation</b>		4.578	

**Palatandaan:**

<b>Sukatán</b>	<b>Literal na Paliwanag</b>
80% - 100%	Pinakamahusay
60% - 79%	Higit na Mahusay
40% - 59%	Mahusay
20% - 39%	Di-gaanong Mahusay
0% - 19%	Di-mahusay

Sa Talahanayan 5 ay ipinapakita nito ang antas ng Akademikong Pagganap ng mga mag-aaral sa Panapos na pagtataya na may kabuuang tatlung (30) tagatugon na mga mag-aaral. Ang puntos na “33 hanggang 40” ay paglalarawan sa bilang ng mga mag-aaral na may marka na nabibilang sa Pinakamahusay at ito ay may kabuuang labing-apat (14) o 46.47% sa kabuuang bilang ng tagatugon. Ang puntos na “25 hanggang 32” ay paglalarawan sa bilang ng mga mag-

aaral na may marka na nabibilang sa Higit na mahusay at ito ay may kabuuang labinlima (15) o 50.00% sa kabuuan ng bilang ng tagatugon. Ang puntos na “17 hanggang 24” na bilang ng mga mag-aaral na nakakuha ng marka ay nabibilang sa mahusay na may kabuuang isa (1) o 3.33% sa kabuuan ng bilang ng tagatugon .

Ang kabuuang bigat ng marka ng mag-aaral na 32.93 at may distribusyon na marka na 4.578. Ang nakuhang Pinakamababang marka ng mga mag-aaral ay



23 at ang Pinakamataas naman na marka ay 39 sa kabuuang bilang ng tagatugon na tatlumpu. Ipinapakita na ang antas ng Akademikong Pagganap ng mga mag-

aaral sa panapos pagtataya ay naglalarawan na Pinakamahusay.

### Makabuluhang Pagkakaiba ng Pauna at Panapos na Pagtataya sa Akademikong Pagganap ng mga mag-aaral.

**Talahanayan 6.** Makabuluhang Pagkakaiba ng Pauna at Panapos na Pagtataya sa Akademikong Pagganap ng mga mag-aaral.

Test	Mean	t-value	Critical t-value	p-value	Analysis
Paunang pagtataya	24.30	12.7488	1.6991	0.0000	Makabuluhan
Panapos na pagtataya	32.93				

Ipinapakita sa Talahanayan 6 ang makabuluhang pagkakaiba ng pauna at panapos na pagtataya sa Akademikong Pagganap ng mga mag-aaral. Ang datos ay ginamitan ng istatistikong pamamaraan na nagresulta ng tinuos na halaga para sa t-value. Inilalahad dito na ang tinuos na halaga para sa pauna at panapos na pagtataya nang t-value na 12.7488 ay higit na mas mataas sa critical value na 1.6991 na mayroong pagkakaiba at suportang tinuos na p-value na 0.0000.

Base sa datos na nakalap, ipinapakita nito na “May makabuluhang pagkakaiba ang pauna at panapos na pagtataya sa Akademikong Pagganap ng mga mag-aaral” at ito ay ang 0.05 antas ng kabuluhan. Inilalarawan din nito na walang bisang palagay na “Walang Makabuluhang pagkakaiba ang pauna at panapos na pagtataya sa Akademikong Pagganap ng mga mag-aaral” ay huwag tanggapin, ipinapakita nito na “May Makabuluhan” na pagkakaiba sa pagitan nila.

### Makabuluhang Epekto ng Bidyo Komprehensyang Aplikasyon: Bisa ng Paggamit sa Pagkatuto ng mga mag-aaral sa Asignaturang Filipino sa Akademikong Pagganap.

**Talahanayan 7.** Makabuluhang Epekto ng Bidyo Komprehensyang Aplikasyon: Bisa ng Paggamit sa Pagkatuto ng mga mag-aaral sa Asignaturang Filipino sa Akademikong Pagganap.

Test	Positive Mean Difference	Pooled SD	Cohen's d	%	Aksyon/ Desisyon
Akademikong Pagganap	5.285	3.7789	1.3986	92%	Makabuluhan

#### Cohen's d

Relative size test	Effect size	% of pre-test below the mean of post-test
	0.00	50%
Small	0.20	58%
Medium	0.50	69%
Large	0.80	79%
	1.40	92%

Ang Talahanayan 7 ay nagpapakita ng makabuluhang epekto Bidyo Komprehensyang Aplikasyon: Bisa ng Paggamit sa Pagkatuto ng mga Mag-aaral sa Asignaturang Filipino tungo sa Akademikong Pagganap sa Lumban National High School. Ang datos ay ginamitan ng istatistikong pamamaraan na cohen's d. Ang resulta ng paunang pagtataya ay ipinares sa resulta ng panapos na pagtataya ng mga Mag-aaral sa Asignaturang Filipino sa Akademikong Pagganap gamit ang Bidyo Komprehensya sa pagkatuto ng mga mag-aaral.

Ang positive mean difference na 5.285 ay mayroong pooled standard deviation na 3.7789 at mayroong effect size na 1.3986. at 92% ng paunang pagtataya ay mas mababa sa mean ng panapos na pagtataya.

Ayon sa datos na nakalap, ipinapakita nito na makabuluhang epekto ang Bidyo Komprehensyang Aplikasyon: Bisa ng Paggamit sa Pagkatuto ng mga Mag-aaral sa Asignaturang Filipino tungo sa Akademikong Pagganap sa Lumban National High School at 0.05 antas ng kabuluhan. At ipinapakita din



nito na ang walang bisang palagay na “Walang makabuluhang makabuluhang epekto ang Bidyo Komprehensyang Aplikasyon: Bisa ng Paggamit sa Pagkatuto ng mga Mag-aaral sa Asignaturang Filipino tungo sa Akademikong Pagganap ng Lumban National High School” ay huwag tanggapin. Ipinapakita nito na “May Makabuluhan” na epekto sa pagitan nila.

### **Konklusyon**

Ang sumusunod na konklusyon ang ibinigay ng mananaliksik alinsunod sa naging resulta ng pag-aaral kung saan “May makabuluhang pagkakaiba ang pauna at panapos na pagtataya sa Akademikong Pagganap ng mga mag-aaral”. Inilalarawan din nito na walang bisang palagay na Walang Makabuluhang pagkakaiba ang pauna at panapos na pagtataya sa Akademikong Pagganap ng mga mag-aaral ay huwag tanggapin, ipinapakita nito na May Makabuluhan na pagkakaiba sa pagitan nila.

### **Pasasalamat**

Walang katapusang pasasalamat sa lahat ng nagbigay ng suporta at nagsilbing inspirasyon at lakas upang maisakatuparan ang pananaliksik na ito.

Sa Dakilang Lumikha, na nagsilbing sandigan, gabay at lakas upang ipagpatuloy ang pananaliksik na ito; nandoon ang kanyang presensya.

Sa Laguna State Polytechnic University, sa aming ikalawang tahanan na naging instrumento upang maisakatuparan ang pangarap na ito;

Mario R. Briones, Ed.D., Pangulo ng Laguna State Polytechnic University para sa mahusay na pamumuno at pagsuporta sa mga mag-aaral ng Panggradwadong pag-aaral, lubos na pasasalamat po;

Florhaida V. Pamatmat, Ed. D, Dekana ng Kolehiyo ng Edukasyong Pangguro at Aplayd Riserts, dakal na salamat po sa walang sawang paggabay, pagbibigay ng paalala para sa ikagaganda at ikabubuti ng pag-aaral lalo’t higit sa lahat sa walang sawang pagpapaalala sa mga teknikal maging pinansiyal na dapat naming ihanda na lubos na nakatulong para sa kahandaan ng bawat isa;

Sa tinatanging tagapayo Sierra Marie S. Aycardo, Ph.D., sa kanyang walang sawang pagbibigay ng pangaral at payo sa ikawawasto at ikalilinan ng pananaliksik na gayundin sa mga salitang nagbigay ng lakas at inspirasyon sa mananaliksik;

Kay Harold R. Origenes, Ed.D at Benjamin O. Arjona, Ed.D., na naglaan ng oras upang tumulong at maiayos na mailahad ang mga nakalap na datos ng mananaliksik. Sa kanyang paggabay at pagtulong upang lubos kong maunawaan ang naging resulta ng pag-aaral na ito;

Kay Teresita C. Elayba, Ed.D., sa kanyang paglalaan ng oras at pagbabahagi ng kaalaman lalo’t higit sa ikawawasto ng pananalita sa pananaliksik na ito;

Kay Albina S. Bunyi, Ed.D., sa kanyang masinop na paglalaan ng oras sa pagtatama ng mga usaping teknikal sa pananaliksik na ito;

Kay Eric P. Castillo, Ph.D., sa kanyang matiyagang paglalaan ng oras upang siyasatin ang pananaliksik at pagbabahagi ng kanyang dunong sa ikawawasto ng mga usaping panggramatika ng pananaliksik;

Sa kanyang mahal na paaralan Lumban National High School at sa Baitang 9-Shakespeare na nagsilbing instrumento upang maisagawa ang pag-aaral na ito.

Sa kanyang kaibigan, Cristina G. Trinidad, mga kapatid sa pinagkakadalubhasaan, Queenly B. Naquines at sa buong MAEd-Filipino sa pagbibigay ng suporta at pagbabahagi ng kaalaman;

Sa kanyang ama at ina na si Papa Romeo at Mama Josie, mga kapatid na sina Romejay, Rhozel, Romina at Jessica Taracatac gayundin sa kanyang minamahal sa buhay.

### **BIBLIOGRAPIYA**

1. *Abbott, Jahmal (2019). Episode 13 | Weekly Tech Recap | Amazon jumps into Fixed Satellite Service, Watch Communications & Microsoft Partner to Close Digital Divide. Pinagmulan 2020 Social Telecom Solutions LLC.*
2. *Adamson, K. (2013). 7 Reasons Why Your Smartphone Has Slow Internet Speeds. Pinagmulan Make Use Of*
3. *Al-Busadi, K. Stanchev (2012). Learner's Perspectives on Critical Factors to LMS Success in Blended Learning. An Empirical Investigation of the Association for Information.*
4. *Ali et. al (2013). The Role of ICT to make Teaching Learning Effective in Higher Institutions of Learning in Uganda.*
5. *Aparicio, M.; Bacao, F.; Oliveira, T. (2016). "An E-Learning Theoretical Framework" Educational Technology & Society. 19 (1): 292-307.*
6. *Araka E., Maina, E. (2020). Research Trends in Measurement and Intervention Tools*
7. *for Self-regulated Learning for E-learning Environments- Systematic Review (2008-2018). University of Nairobi, Nairobi, Kenya. Badayos, P. (2019). Metodolohiya sa Pagtuturo ng Wika: Mga Teorya, Simulain at Istratehiya.*
8. *Balaba, M. (2016). Digitilized Lesson in Filipino: Tugon sa Tawag na Pangangailangan ng ika-21 siglong Kasanayan, Pagsipat sa Epekto ng Pedagolohiya ng mga Guro at Pagkatuto ng mga Mag-aaral.*



9. Boma, P. (2019 ). *Teaching Methods As Correlate Of Student Performance In.Bussiness Studies In Selected Public Secondary Schools In Port Harcourt International Journal of Innovative Social & Science Education Research* 7(2):1-12, April-June, 2019.
10. Chen, J. (2011). *The Effect of Education Compatibility and Technological Expectancy on E-learning Acceptance. Computer & Education.*
11. Department of Education (2020). ). *Corrigendum to the Enclosures in Regional Order No.10,s.2020, Re- Guidelines on the Implementation of MELC PIVOT IV-A Budget of Work (BOW) in all Learning Areas for Ket Syages 1-4. Regional Memorandum Region IV-A CALABARZON Gate 2 Karangalan Village, 1900 Cainta, Rizal.*
12. Ellore, M. (2014). *An Investigation of Students in Academics Performance for Secondary School in Botswana.*
13. Estrellado, N. (2020). *DepEd CALABARZON naglunsad ng 'Pivot 4A QuBE' Program.*
14. Fortin, M. (2019). *Gamed-Based Learning. Estratehiya sa Pagkatuto sa Araling Pangwika. Di-Nalathalang Tesis sa Laguna State Polytechnic University Santa Cruz Campus. Edukasyon.*
15. Guererro, D. (2014). *E-Filipino: Ang Pagtuturo at Pagkatuto ng/sa Wikang Filipino Sa Sistemang Open and Distance Learning, Dalumat E- Journal Tomo 3 Bilang.1 at 2*
16. Gunigundo, M. (2020). *People's Tonight .Online learning sa New Normal ng*
17. Hidalgo, S. (2018). *Technology and Film Scholarship: Experience, Study and Theory*
18. Iranzo, R. (2019). *Bisa ng FilTech Web Apps bilang Kagamitang Panturo sa Asigna- turang Filipino ng Lungsod ng Pasig Taong Panunuran 2018 - 2019. Di-Nalathalang Tesis sa Laguna State Polytechnic University Santa Cruz Campus.*
19. Kumar, E. and Manjunath, B. (2015). *Factors affecting the speed and quality of internet connection. Finish Transport and Communications Agency.*
20. Lopus, E. (2018). *Measuring Skills for the 21st Century. Washington, DC: Education.*
21. Librero, S. (2018). *Feature: E-learning 2.0, Volume 2005, Tomo 10 (Oktubre, 2018), pahina 1.*
22. Lon, J. and Tesley C. (2019). *Introduction to Multimedia. In R.E Mayer (Ed). The Cambridge Handbook of Multimedia Learning (2nd ed.,pp.1-24) New York : Cambridge University Press.*
23. Magbanua, R. (2016). ). *Impluwensya ng Midya at ang Kahalagahan nito sa Pagsulat ng Komposisyon Filipino ng mga Mag-aaral. Di-Nalathalang Tesis sa Laguna State Polytechnic University Santa Cruz Campus.*
24. Mayo, J. (2019). *Kabisaan ng Paggamit ng E-Komiks bilang Kagamitan sa Pagtuturo ng Piling Obra sa Asignaturang Filipino. Di-Nalathalang Tesis sa Laguna State Polytechnic University Santa Cruz Campus.*
25. Meriam Webster (2015). *Overall Ideas About E-learning and Purpose of it.*
26. Misha, K. (2020). *How to Boost your Internet Speed when Everyone is Working from home. April 2, 2020.*
27. Mondude, P.(2011). *The Influence of Internet Usage on Student's Academic Performance. International Journal of Academic Research in Business and Social Sciences 2011, Volume. 7, Tomo 8.*
28. Morais, K. (2015). *An E-Learning Experience: A Written Analysis Based on my Expe-rience with Primary School Teachers in an E-Learning Pilot Project ISSN: 1492-383.*
29. Najiyah, S. (2016). *A comparison Studyof Students' Performance in Pre and Post Test Result of a Mathematics Competency Test.*
30. Pose, R. (2016). *The Impact of Internet Use for Students. 306 (1) 1:21*
31. Radyo Pilipinas Catanduanes (2020). *DepEd, Maglulunsad ng Online Learning Activities para sa mga Mag-aaral. Opisyal Facebook page ng Radyo Pilipinas Catanduanes*
32. Raja, F. (2018). *Comaparing Tradition and Experiential Methods in Teachings*
33. Roshan D., and Jenson J. (2014). *Study on Performance Measurement System. Vol.4,Issue 9.*
34. Ruiz, C. (2017). *Online learning sa New Normal ng Edukasyon (Journal Online).*
35. Schindler, M. (2020). *Opinyon: Kailangan ng mga Mag-aaral ng Suporta Online, Masyado. Pinagmulan Youth Leadership Institute Use Your Voice.*
36. Shivaraju, P. (2017). *Evaluating the Effectiveness of Pre and Post Mode of Learning in School.*
37. Shuma, Alex (2014). *Everything You Need to Know about Internet Speeds. Pinagmu-lan All connect.*
38. Siraj, D. et.al (2015). *Making the Connection: Moore's Theory of Transactional Distance and its Relevance to the Use of a Virtual Classroom in Postgraduate Online teacher Education JRTE / Vol.43, No. 3. Pp.187-209.*
39. Slovak, P. (2017). *Effect of Videoconfering Environment on Perception of Communication. Vol.1. No.1.*
40. Stern, J. Ph.D. (2018). *Introduction to Online Teaching and Learning Volume 5.*
41. Sun, R. (2018). *A Brief History of E- Learning ( Infographic).Pinagmulan E-front.*
42. Yebowaah, F. (2018). *Internet Use and its Effect on Senior High School Students in Wa Municipality of Ghana.*
43. Yesi, A. and Yuri C. et.al (2014). *The Neuropsychological Impact of E-learning on Children. Asian Journal of Psychiatry Volume 54, (June, 2014)*



# IOT BASED APPROACH FOR REMOTELY MONITORING AND ALARMING A DROWSY DRIVER

**Mr. Aniket Ashok Bhamani<sup>1</sup>, Mr. Sanyam Sanjay Mehta<sup>2</sup>**

*<sup>1,2</sup>Department of Computer Engineering, Vasantadada Patil Pratishthan's College of Engineering & Visual Arts, Mumbai, Maharashtra, India*

Article DOI: <https://doi.org/10.36713/epra7217>

DOI No: 10.36713/epra7217

## ABSTRACT

*There are a lot of road accidents that occur due to drowsy driving. Drowsy driving is when the driver of a vehicle is found to be sleepy and probable to get into a car crash because of the same. Being drowsy might cause the driver to lose concentration from the road, and also reduce the reaction time. Statistics suggest how thousands of deaths and crashes happen every year due to it. Major victims of such crashes tend to be the commercial drivers who need to drive long distances overnight. Our project intends to propose a solution to this problem by providing an Internet of Things based approach. This approach monitors the driver's face while he or she is driving the vehicle and in case if the driver is to be found falling asleep, an instant voice call is made to the driver's registered phone number. Additionally, a text message is also sent to the driver's emergency contact which will get him/her notified and provide the driver with quick assistance if needed. This approach is unique and different in its own way as it provides cross platform support and remote monitoring of the driver. Additionally, it also makes drowsy-detection 'device independent'. It offers a simplified mechanism to derive real time accurate results and readings with reduced complexities. This project does have a lot of scope, especially considering that there is a lack of methodologies currently being implemented to prevent road accidents due to drowsy driving.*

**KEYWORDS-** *Drowsy Driving, Monitoring, Machine Learning, Internet of Things, Remote, Algorithm, Eye Aspect Ratio, Python.*

## I. INTRODUCTION

In recent times, one of the leading causes of road accidents is drowsy driving. NHTSA (National Highway Safety Administration) estimates that it contributes to more than one lakh road crashes every year, having 71,000 people injured and more than 1550 deaths. It also states how about 10-20% of the road accidents are directly or indirectly a result of drowsy driving. According to the AAA Foundation of Traffic Safety Study, 2 out of every 5 drivers have admitted to falling asleep at some point while driving.

Almost all of the statistics looked at, suggest how drowsy drivers are additionally prone to encountering accidents. Additionally, some studies even suggest that the prevalence of drowsy driving fatalities is 350% greater than reported. Common victims to this are the commercial drivers who drive trucks, buses, tractors for long distances overnight,

and also several night shift workers. Governments in most countries implement fines for violating road safety protocols. Their most policies deal with checking and penalizing people on things such as over speeding, jumping signals, getting caught driving without a driver's license etc. None of these policies seem to be enough to contract accidents caused due to drowsy driving. Additionally, drivers can choose to be careful and take precautions such as- regular coffee breaks, use alerting systems, making sure to get enough sleep before driving, making sure he/she is not under the influence of alcohol while driving etc. However, these safety protocols are not being followed and the drowsy driving victim statistics serve to be evidence for it. Hence, there needs to be a better approach taken towards preventing the accidents caused due to drowsy driving. Table 1. shows the statistics of the Causes of Road Accidents.



Behaviour	Number	Percent
Driving Too Fast For Conditions or in Excess of Posted Limit or Racing	8,596	16.7%
Under the Influence of Alcohol, Drugs, or Medication	5,175	10.1
Failure to Keep in Proper Lane	3,706	7.2
Failure to Yield Right of Way	3,579	7.0
Distracted (Phone, Talking, Eating, Object, etc.)	2,688	5.2
Operating Vehicle in a Careless Manner	2,797	5.4
Failure to Obey Traffic Signs, Signals, or Officer	1,990	3.9
Operating Vehicle in Erratic, Reckless or Negligent Manner	1,955	3.8
Overcorrecting/Oversteering	1,617	3.1
Vision Obscured Rain, Snow, Glare, Lights, Building, Trees, etc.)	1,540	3.0
Driving Wrong Way on One-Way Trafficway or Wrong Side of Road	1,243	2.4
Drowsy, Asleep, Fatigued, Ill, or Blacked Out	1,221	2.4
Swerving or Avoiding Due to Wind, Slippery Surface, etc.	1,176	2.3
Making Improper Turn	635	1.2
Other Factors	5,203	10.1
None Reported	9,167	17.8
Unknown	16,012	31.1
<b>Total drivers (1)</b>	<b>51,490</b>	<b>100.0%</b>

**Table 1. Causes of Road Accidents Statistics.****A. Proposed Solution**

A real time monitoring and alerting system could possibly offer a solution to this problem. With this project, what we aim at building is a prototype that could monitor the state of the driver and potentially prevent an accident from occurring even before it does. Our project carries out an examination of the driver's face while he/she is driving the vehicle and predicts if the driver is in a sleepy or drowsy state. This is done by running algorithms to compute the aspect ratio of the eyes of the driver. If he/she is found to be drowsy, an instant voice call is placed on the registered mobile number of the user which would alert the driver and make him/her focus on the road again. This project is implemented on the concept of Internet of Things and incorporates several machine learning algorithms in order to render real time accurate results. Additionally, this project takes into consideration the chances of the driver getting into an accident and offers assistance to that as well by notifying the emergency contact of the driver. This can prove to be extremely beneficial for the emergency contact to reach out to the driver on time.

**B. Uniqueness of this Approach.***1) Cross Platform*

This project is completely based on accessing the camera of the device remotely. It is independent of the underlying platforms, such as Android, IOS etc. All of the functionalities which are provided are not platform specific and can be dispensed on any device irrespective of the operating system being used by that device.

*2) Device Independent:*

In addition to being cross platform, this project is designed in such a way that it does not matter what the monitoring device is, it can be a cell phone, a tablet etc. As long as the device supports the minimum requirements of having a camera, calling features and a stable internet connection, this project can be used to successfully alert a sleepy driver and prevent accidents.

*3) Simplicity:*

One of the major aspects of this project is that it is kept as simple as possible in terms of its requirements and implementation. All it needs is a device with an integrated camera, active internet



connection and calling features, which most of the devices these days already possess. Additionally, the algorithms are designed to be implemented using only the libraries and programming concepts that are absolutely required and relevant to alert the driver. Not only does this project successfully avoid the unwanted complexities, but also makes it simple and convenient for the user to understand and use.

#### 4) *Remote Monitoring:*

This project aims at providing remote monitoring of the driver. So, there can be someone else sitting at a different location that can monitor the driver while the driver is driving the vehicle. Since most of the drowsy driver accidents happen among youngsters, the remote interface can be used by parents to keep an eye on their kid while he/she is driving. Further, the remote access to the interface can be handed over to someone else before planning a late-night drive as in the case of commercial truck and bus drivers.

#### 5) *Victim Support:*

By messaging the emergency contact of the driver, this project makes him/ her check up on the driver by letting him/her know that the driver is not in a stable state to be driving the vehicle. In case if the driver gets into an accident, quick assistance can be provided by the emergency contact and the driver can be taken care of. Hence, this application takes into consideration the aspect of providing assistance to the victim if he/she ends up getting into an accident due to drowsy driving.

## II. LITERATURE SURVEY

Studies from several accredited sources were conducted and considerations on what the application should be focused on were derived accordingly. Analysis was done on their implementations, advantages, disadvantages and requirements. Conclusions were drawn and efforts were made to incorporate necessary features into our project that the studied implementations lacked and offered limitations to.

### A. *Government and the Road Transport Authority approach.*

Present system for Road Safety as proposed by the Government and RTA (Road Transport Authority) was studied. A study was done on their policies, the way they were implemented and a detailed research was carried out on their efficiency. The fine structure implemented by the Government on different things to ensure road safety was also studied. Analysis was done on how the system, policies and fines had an impact on the driver's behaviour and whether such a method was enough to reduce the accidents caused due to drowsy driving. Results were

drawn to conclude that the present system, present implementations and initiatives made by the RTA and the Government lacked what it takes to prevent a drowsy driver from getting into an accident.

### B. *Technical Implementations.*

Additionally, other similar technical implementations were looked at. There were quite a few implementations found which worked towards preventing a driver from falling asleep. However none were found, that were IOT based and connected with the driver personally to provide assistance. Also, applications failed to provide victim support as they failed to reach out to the emergency contact of the victim.

#### 1. *Program Scripts:*

Most of the implementations carried out were merely programmed scripts which can only run on a computer with an appropriate compiler present. Even though this does serve the purpose of monitoring the driver and alarming him/her, it is simply not feasible to be implemented in real life by a driver. An example of this would be the Deep RDD script that can be found online on different platforms including GitHub. Not only was an implementation method of this script missing, but also it was found to have a lot of interdependencies which made it computationally expensive. Overall, it was concluded that such a script could not be workable by a driver. However, using similar scripts like this one could form a base from which other practical implementations and applications could be derived.

#### 2. *Mobile Applications:*

There were mobile applications found that could detect drowsiness by monitoring a person's face. For example, the Drowsy Driver Android Application that can be found on Google Play Store. The major drawback of such applications is that they do not provide cross platform support. This limits the number of users that can have access to them. Additionally, they fail to communicate with the emergency contact of the driver and do not take into consideration the scenario of the driver needing support in case of an accident. Lastly, this application and similar ones had other hardware requirements in addition to just the camera, for example,



higher camera resolution, audio output speakers etc.

*C. Uniqueness of this Approach.*

1) *Cross Platform:*

This project is completely based on accessing the camera of the device remotely. It is independent of the underlying platforms, such as Android, IOS etc. All of the functionalities which are provided are not platform specific and can be dispensed on any device irrespective of the operating system being used by that device.

2) *Device Independent:*

In addition to being cross platform, this project is designed in such a way that it does not matter what the monitoring device is, it can be a cell phone, a tablet etc. As long as the device supports the minimum requirements of having a camera, calling features and a stable internet connection, this project can be used to successfully alert a sleepy driver and prevent accidents.

3) *Simplicity:*

One of the major aspects of this project is that it is kept as simple as possible in terms of its requirements and implementation. All it needs is a device with an integrated camera, active internet connection and calling features, which most of the devices these days already possess. Additionally, the algorithms are designed to be implemented using only the libraries and programming concepts that are absolutely required and relevant to alert the driver. Not only does this project successfully avoid the unwanted complexities, but also makes it simple and convenient for the user to understand and use.

4) *Remote Monitoring:*

This project aims at providing remote monitoring of the driver. So, there can be someone else sitting at a different location that can monitor the driver while the driver is driving the vehicle. Since most of the drowsy driver accidents happen among youngsters, the remote interface can be used by parents to keep an eye on their kid while he/she is driving. Further,

the remote access to the interface can be handed over to someone else before planning a late-night drive as in the case of commercial truck and bus drivers.

5) *Victim Support:*

By messaging the emergency contact of the driver, this project makes him/her check up on the driver by letting him/her know that the driver is not in a stable state to be driving the vehicle. In case if the driver gets into an accident, quick assistance can be provided by the emergency contact and the driver can be taken care of. Hence, this application takes into consideration the aspect of providing assistance to the victim if he/she ends up getting into an accident due to drowsy driving.

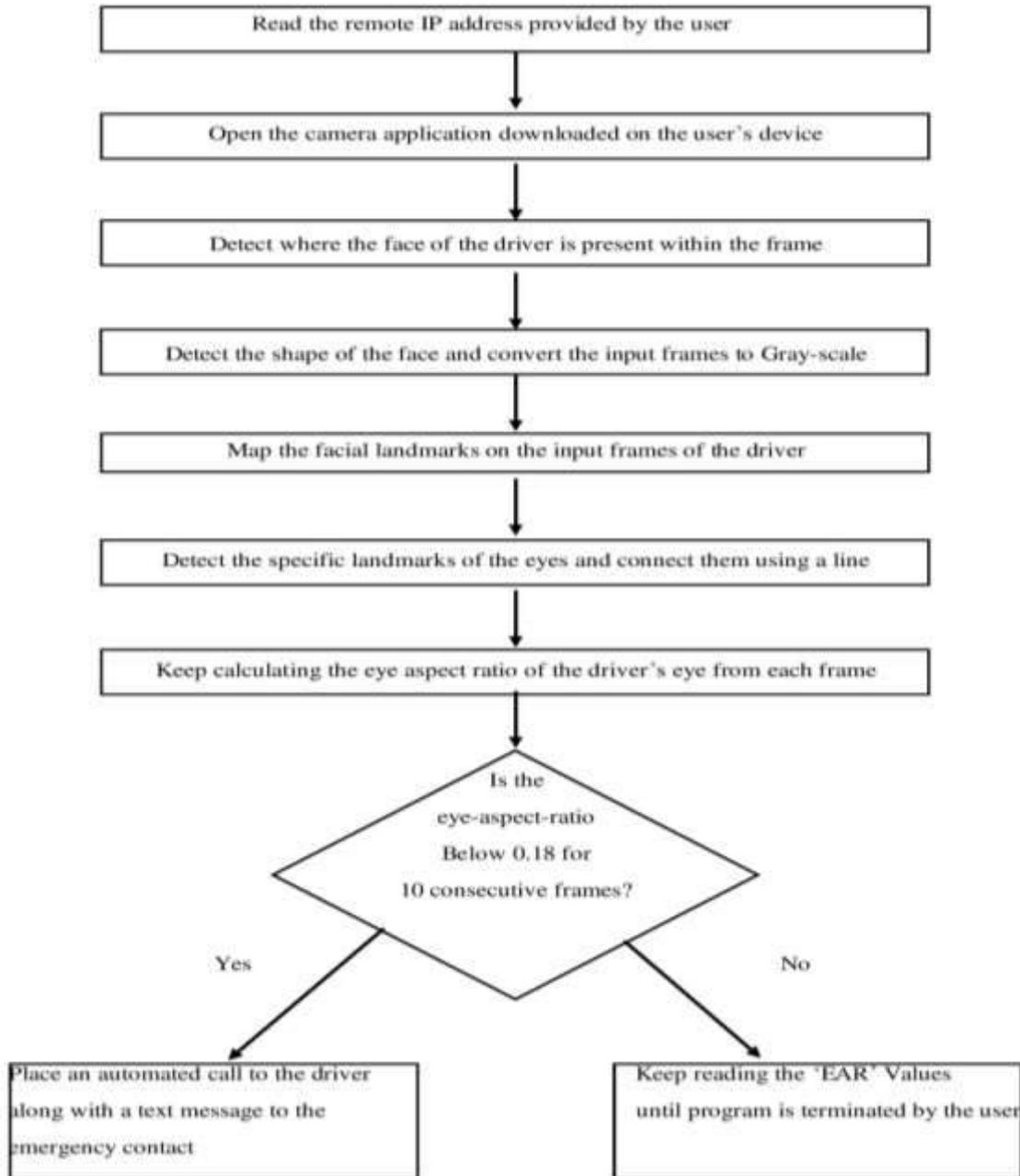
### III. AIMS AND OBJECTIVES

- A. Reduce the number of vehicle accidents that happen all around the world because of drowsy driving by keeping the driver alert and awake at all times.
- B. Assist the commercial drivers such as truck drivers or bus drivers who drive long distances overnight for hours.
- C. Examine the face of the driver at all times while he/she is driving.
- D. Monitor the driver's eyes and measure the extent to which they are open or close.
- E. To place a call on the driver's registered mobile number when the driver is found to be falling asleep.
- F. To send a text message to the driver's emergency contact when the driver is found to be sleepy, informing them to contact the driver.
- G. To render real-time accurate eye-aspect-ratio results based on the captured frames from the video.
- H. To make the project easy to understand and use for the users.
- I. To make the algorithm capable of differentiating sleepiness from just regular eye blinking.
- J. To make the algorithm as computationally cheap as possible for the devices that support them.

### IV. MECHANISM

*A. Overview.*

The project implementation can be well understood by the flowchart given below.



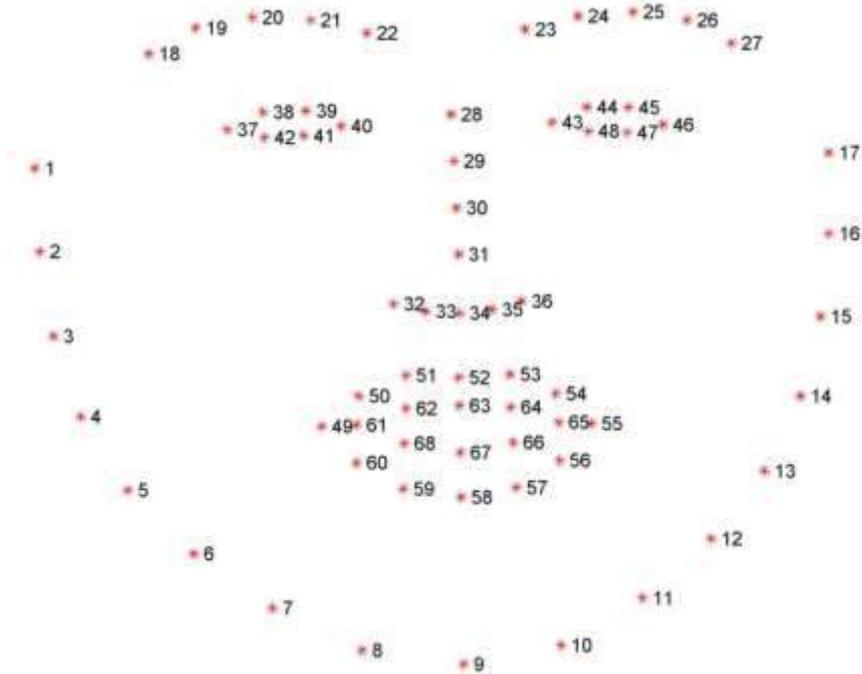
**Chart 1. Step-wise Implementation of the Project.**

As seen above, the input video stream of the driver is captured through the camera present on the device. The algorithm detects the face of the driver present in the video stream. Then different landmarks are plotted on the detected face of the driver to predict the shape of different parts of the face such as eyes, nose, lips, chin and jawline. Algorithm then computes the eye-aspect-ratio by using the landmarks plotted on the eyes.

#### *B. Technical Details.*

##### *Calculating Eye Aspect Ratio:*

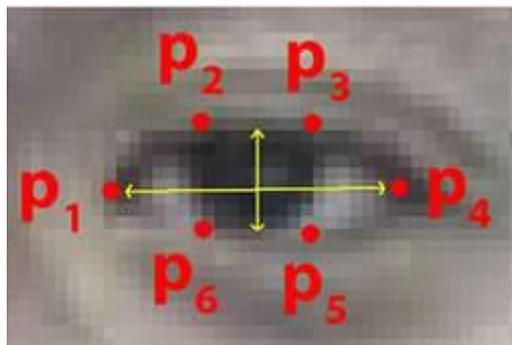
To calculate the Eye Aspect Ratio, it is important to isolate the eye portion of the face. This is made possible by importing the facial landmark detection file in our code. The file consists of predefined points for extracting essential facial features that can be worked upon by the python code. The figure shown below gives a visual representation of the predefined points in the file.



**Figure 1. Visualizing the 68 facial landmark coordinates from the iBUG 300-W dataset.**

Our project mainly focuses on the eye portion of the driver. Thus, we use points 37-48 for our

implementation. To calculate the Eye Aspect Ratio, consider figure 2 given below:



**Figure 2. A visualization of eye landmarks when the eye is open.**

- We first calculate the Euclidean distance between the points P2 and P6. Let x hold the value of Euclidean distance between points P2 and P6.
- Then we calculate the Euclidean distance between the points P3 and P5. Let y hold the value of Euclidean distance between points P3 and P5.
- Let z be the average of x and y, i.e.,  $z = (x + y) / 2$ .
- Now we calculate the Euclidean distance between the points P1 and P4. Let w hold the value of Euclidean distance between points P1 and P4.
- Finally, the Eye Aspect Ratio =  $z / w$ .

It is noticed that as the driver tends to be sleepy and his eyes close, the eye-aspect-ratio tends towards 0. As soon as the Eye Aspect Ratio falls below 0.18 for 10 consecutive frames, our algorithm alerts the driver and sends a text message to the emergency contact. Refer to figure 3 and chart 2 given below.

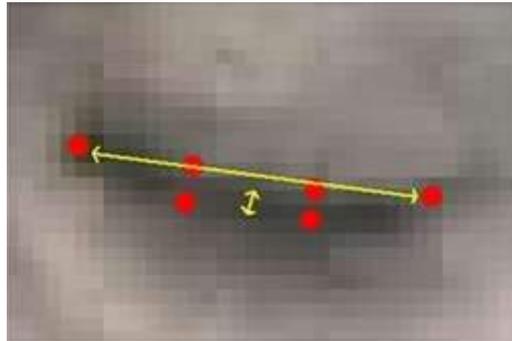


Figure 3. A visualization of eye landmarks when the eye is closed

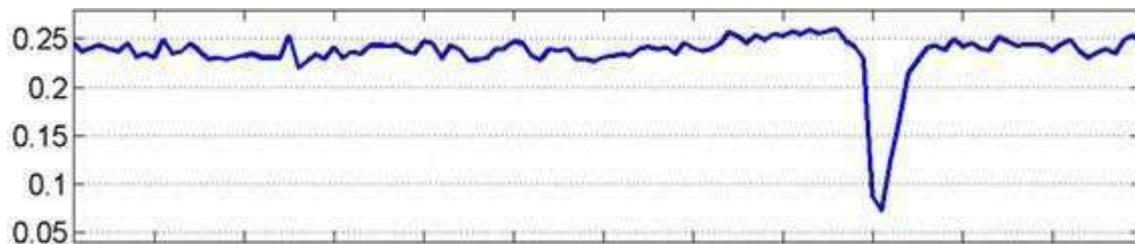


Chart 2. EAR readings for a Drowsy driver

### C. Tasks that are needed to be done before driving.

The driver needs to make sure that the python script is executed on the desktop/laptop where the code has been installed and should keep the code running throughout the travel period of the driver. The main component for implementing the project is the device camera that can be accessed from remote locations. For this purpose, the driver needs to download any camera application that provides a specific IP address for accessing the device camera. This unique IP address needs to be updated in the code as no two users can have the same IP address for a camera. The driver should make sure that the device has a stable internet connection and is not in silent mode. He/she needs to turn on the camera application and should place the device (on which the application is running) in such a way that the face of the driver is seen properly.

## V. REQUIREMENTS

### A. Hardware Requirements.

- 1) *Integrated Web Camera*: A camera having configuration of more than 2 MP would work. The camera should be kept working throughout the travel period of the driver in a way that the driver's face can easily be recognized and monitored.
- 2) *Integrated Device Speakers*: It is important for the driver to ensure that the device is not in silent mode, and that the inbuilt speakers of the device works properly. Speakers are used to

alert the driver as and when he/she would fall asleep.

- 3) *RAM*: The computer/laptop should have at least 2 GB RAM whereas the device monitoring the face of the driver should have at least 1 GB RAM. A higher RAM configuration is always preferred as it reduces the response time of the working system which would lead to a faster and a better performance of the overall system.

### B. Software Requirements.

- 1) *Operating System*: Any operating system that supports Python can be used. However, it is advisable to use Ubuntu because of the ease with which it works with python libraries like Dlib, Cmake and OpenCV.
- 2) *Programming Language*: The project is built completely on Python. Any version of Python after Python 3.8 can be used. Some of the important libraries that we have incorporated and utilized in our project are:

- *Dlib*: Dlib is a modern C++ toolkit containing machine learning algorithms and tools for creating complex software in C++ to solve real world problems.
- *OpenCV (Open-Source Computer Vision Library)*: It is a library of programming functions mainly aimed at real-time computer vision.
- *CMake*: It acts as a dependency for Dlib library. CMake is an open-source, cross-platform family of tools designed to build, test and package software.



- NumPy: It is a library that is used to compute complex mathematical operations on arrays.
  - SciPy: SciPy is a free and open-source Python library used for scientific computing and technical computing.
  - Twilio: It is a library that provides calling and messaging facilities to the Python programming language.
- 3) *Text Editor*. Any text editor that supports Python programming language can be used.

## VI. CONCLUSION

So, in this way we provided an IOT based approach for monitoring the face of the driver while he or she is driving the vehicle. This project is successfully able to run machine learning algorithms to predict if the driver is about to fall asleep or not and render real time accurate results. This project was able to further use these results to alarm the driver and prevent him/her from falling asleep by generating an instant automated voice call to the driver's registered cell phone number. Additionally, an instant text message is sent to the driver's emergency contact so as to assure that there is someone to check up on the driver in case the driver happens to run into an accident.

This project is a unique implementation towards detecting drowsy driving as it offers an approach to remotely monitor the driver. It makes the implementation not only cross platform, but also device independent. As long as any device has an integrated camera, active internet connection and calling features, it can be used to implement this approach. This allows maximum users to benefit from it since the user need not worry about the kind of devices they have and the operating software supported by the device. This approach towards drowsiness detection has a lot of scope, especially for providing assistance to the different general and commercial drivers that are required to drive long distances overnight. Also considering the statistics indicating how many accidents are caused due to drowsy driving and lack of a current good implementation to prevent accidents due drowsy-driving, this is a needed requirement for any driver who has a chance of falling asleep while driving.

### A. Future Scope.

We intend to improvise on our project by adding more functionalities to it like a GPS feature which could send the live location of the driver to the emergency contact so that if an accident occurs, the driver can be located without any hassle and can be provided with medical treatment at the earliest.

Further, this project can be tied up with different travel and transport companies that carry

people to their destination. Be it small local travel companies or even big ones like Uber or Ola can be collaborated with this project. This could be a great security feature for whoever is wanting to implement it. Additionally, the driver could be directed to nearby locations where the driver could get some rest. Also, algorithms which would detect drowsiness by considering the number of yawns of the driver while driving could be integrated with this project.

The overall motive of designing this project is to save maximum lives possible by avoiding accidents that are caused due to drivers falling asleep.

## REFERENCES

1. *dlib C++ Library*. (n.d.). <http://dlib.net/>.
2. *Drivers are Falling Asleep Behind the Wheel*. National Safety Council. (n.d.). <https://www.nsc.org/road-safety/safety-topics/fatigued-driving>.
3. *From our blog*. CMake. (n.d.). <https://cmake.org/>.
4. Hoyoung, L., Rosebrock, A., Jalil, A., Harsha, Shukla, A., Paruchurisaikrishna, N.Trevartha, Vikram, Smith, Alexon, Kenny, Hitesh, Fang, Balesh, Ss, Roy, P., Cao, G., Marco, Carlos, ... (Faster) Facial landmark detector with dlib - PyImageSearch says: (2021, April 17). *Drowsiness detection with OpenCV*. PyImageSearch. <https://www.pyimagesearch.com/2017/05/08/drowsiness-detection-opencv/>.
5. *Insurance Information Institute*. (n.d.). *Facts + Statistics: Drowsy driving*. III. <https://www.iii.org/fact-statistic/facts-statistics-drowsy-driving>.
6. Kumari, K. *Review on Drowsy Driving: Becoming Dangerous Problem*, *International Journal of Science and Research (IJSR)*, Jan. 2014, [www.ijsr.net/archive/v3i1/MDIwMTM3MjI=.pdf](http://www.ijsr.net/archive/v3i1/MDIwMTM3MjI=.pdf).
7. McClafferty, J., Perez, M., Fang, Y., Guo, F., & Dingus, T. A. (2018, June 13). *Prevalence of Drowsy Driving Crashes: Estimates from a Large-Scale Naturalistic Driving Study*. AAA Foundation. <https://aaafoundation.org/prevalence-drowsy-driving-crashes-estimates-large-scale-naturalistic-driving-study/>.
8. *National Centre for Statistics and Analysis*. (2020, December). *Overview of motor vehicle crashes in 2019*. (Traffic Safety Facts Research Note. Report No. DOT HS 813 060). National Highway Traffic Safety Administration
9. *Safety, A. A. A. F. for T*. (2020, June 23). *2019 Traffic Safety Culture Index*. AAA Foundation. <https://aaafoundation.org/2019-traffic-safety-culture-index/>.
10. *Wikipedia Foundation*. (2021, April 13). *SciPy*. Wikipedia. <https://en.wikipedia.org/wiki/SciPy>.
11. *Wikipedia Foundation*. (2021, March 14). *OpenCV*. Wikipedia. <https://en.wikipedia.org/wiki/OpenCV>.
12. *Wikipedia Foundation*. (2021, May 26). *NumPy*. Wikipedia. <https://en.wikipedia.org/wiki/NumPy>.



# CULTURAL MISFIT OF INDIAN HIGHER EDUCATION: A REVIEW

**Rakesh Pathak<sup>1</sup>, Smita<sup>2</sup>**

<sup>1</sup>PhD Research Scholar, Amity Business School, Amity University, Mumbai, India

<sup>2</sup> HR Executive, Sudarshan Foundation, Greater Noida, India

## ABSTRACT

India is one the emerging economies. The young demographic profile is an opportunity for India to accelerate the economic growth. Higher education has a crucial role to play in the development of economy by developing human capital. The Indian higher education sector has not utilised its full potential except few islands of excellence. Culture influences higher education. India inherited higher education system established before independence by a culturally different ruler. Despite several decades of independence India is still following the same pre-independence higher education system. The paper explores the cultural misfit of Indian higher education with Indian values and culture. Exploratory research design is used for the paper. It is found that cultural integration is needed to make Indian higher education inclusive and relevant for the society.

**KEYWORDS:** India, Higher Education, Culture, Values, Misfit, Inclusive

## 1. INTRODUCTION

India has the third largest higher education system in the world. But it is not reflected in innovation and entrepreneurship index. The higher education is expected to enhance critical thinking skills and promote a culture of innovation. The poor employability of graduates in India, indicate the failure of Indian higher education to fulfil basic expectation of student to get job after completing graduation. The quality of higher education has been low as compared to other countries in global rankings (Tilak, 2016). The limitation of public sector enterprises in providing jobs to a large number of aspiring youth is understood. This should have created a culture of entrepreneurship to fulfil the aspirations of youth. But the culture of exam oriented higher education has not been able to develop the ability of running an independent enterprise among the graduates. The ancient teacher based education system of *Gurukuls* was replaced by British to damage the self esteem of the society. The English speaking higher education was focussed on passing exams to become clerk, but did not provide critical thinking and life skills. Gradually the society has lost the confidence to start business ventures. Status of doing a job in a large organisation is higher than those who manage their own start ups. The poor employment and disguised unemployment has made

people slaves of government help to survive. People are just surviving biologically devoid of any enthusiasm and ambitions. Government initiatives like Make in India will be fruitful if skilled human capital is available in the country (Tiwari & Anjum, 2015). Culture not only influences education sector but also influences industry (Tiwari & Anjum, 2014a). Poor quality of higher education is reflected in large number of students going abroad for higher studies. Indian students spend US \$ 7 billion for foreign higher education (Kumar, 2015). Former Prime Minister of India, Dr. Manmohan Singh had commented that “We must recognise that too many of our higher educational institutions are simply not up to the mark” (India Today, 2013). New national education policy provides a vibrant framework for technology driven student centric learning (National Education Policy, 2020).

## 2. OBJECTIVE

Explore the cultural fit of Indian higher education with Indian culture

## 3. RESEARCH METHODOLOGY

The paper is based on exploratory research design. The paper published on influence of culture on higher education has been reviewed. Articles



available on SSRN, Research Gate, Google Scholar, and Scopus have been reviewed in addition to newspaper and other articles available on online sources.

#### 4. LANGUAGE

The language of instruction in higher education in India is English. This has made higher education elitist and restricted to a chosen few who can understand English. A large segment of population is not able to understand English and is hence excluded from the higher education. The modern higher education system was introduced by British administration to prepare English speaking clerks. Unfortunately decades after independence the same system is being allowed to exist by narrow minded shrewd politicians, who want to keep people psychological slaves by creating divide on the basis of caste in the form of reservation policy, religion by spreading hatred, regional clashes by creating hatred for Indians from other regions and operating on the wishes of wealthy and powerful foreign agencies. Indian higher education is a misfit with Indian culture. Indian culture has various regional languages as first language, whereas higher education is for those who understand English. Sustainability requires inclusion of various sections of society (Tiwari & Choudhuri, 2015).

#### 5. NEGLECTED TEACHERS

Adhoc teachers are working without any benefits of regular employment for a large part of their life. Teachers should be allowed to have alternate source of income. The eight hours office timing should be relaxed and teacher should be required to be in the institution physically present only during the class timing and for any library and research work. Development of human capital for different professions (Saravanakumar and Devi, 2020) need dedicated faculties. A holistic performance appraisal of teachers is needed (Tiwari, Anjum 2014b). The surplus time of a teacher can be invested in some other productive activities and will result in value creation for society and wealth creation for the teacher and economy. The basic needs of teachers should be taken care of by higher education system (Nigam, 2017). Indian higher education has ignored motivation of teachers (Tiwari & Anjum, 2014c). Faculties of twelve colleges have not been paid salaries for many months in Covid-19 pandemic (New Indian Express, 2020). Indian higher education is a misfit with Indian culture. Indian culture gives highest regard to a teacher (*Guru*) equivalent to God (*Brahma, Vishnu, Mahesh*). Higher education cannot be transformed if teacher issues are not resolved (Tiwari & Anjum 2014d). Ghost faculties are appointed to clear the hurdles of

regulatory inspections (Nagarajan, 2019). Unless teachers are given their due respect and dignified salary, no talented individual would be ready to accept teaching as a first choice of career. Experienced teachers are not given due recognition. Experienced teachers should be given autonomy and due recognition (Tiwari & Anjum, 2014e). Work life balance is needed to enhance satisfaction of teachers (Punia & Kamboj, 2013). Teachers should be provided growth opportunities (Bakker & Bal, 2010). Motivations needs of teachers with different skill and hierarchy are different (Tiwari & Anjum 2018). Downfall in respect for teachers is linked to dominance of western values in Lord Macaulay's education system (SatyaKumar, 2018). Teachers are not given incentives to collaborate with industry and other stakeholders (Tiwari & Anjum, 2014f). Blended learning can enhance work life balance and satisfaction of teachers (Mishra & Smita, 2021).

#### 6. CAPACITY EXPANSION

Capacity expansion has been done by privatisation of higher education. Privatisation of higher education has made it a for profit activity. Private institutions pay royalty or ransom to political bosses and ignore the needs of students and teacher. There is no significant difference in teaching effectiveness of private and public sector institutions (Tiwari & Anjum 2014g). Though private institutions are established as a trust, but it is known to all concerned that these are money minting machines not charitable institutions. The entry of private players did increase the number of seats available (Tiwari et al. 2013), but without any accountability towards students. Except a few elite private institutions, majority of them are running like extortion businesses, extorting money from students in the name of tuition fees. Private sector institutions have adopted technology. Online teaching has immense possibilities (Tiwari & Anjum, 2013b). Indian higher education sector has the potential to develop as a centre of excellence globally (Reinda et al. 2011). Technology not only enhances efficiency but also enhances transparency (Tiwari et al. 2020). Large numbers of seats are lying vacant in private institutions. It indicates failure of the inorganic growth (Tiwari et al. 2019). Just privatising higher education will not make it relevant for the society.

#### 7. DISCONNECT WITH CORPORATE

The elite institutions have become source of human capital for the developed economies, as most of the talented students leave India after passing from the elite institutions. The culture of Indian corporate does not allow people to grow and innovate. Skill enhancement is better with industry academia collaboration. Balanced score card needs to be used



just like corporate to enhance utility of education system (Umashankar & Dutta, 2007). A yes sir culture is prevalent in Indian corporate world. Submissive slaves are stable employees but energetic, critical thinking and innovative people are not given a fair treatment, so they decide to leave the country for better career opportunities. Private institutions have developed better industry academia collaborations (Tiwari & Anjum, 2014h).

## 8. GOVERNANCE

Indian higher education is based on affiliation model which focuses on uniformity. In contrast Indian culture is based on diversity and autonomy. Demographic factors play a crucial role in higher education (Tiwari & Anjum, 2014i). Culture has to be an important part of Indian higher education system in addition to curriculum, customer, creativity and collaboration (Tiwari & Anjum 2014j). Holistic approach is needed for enhancing relevance of higher education (Grunwald & Peterson, 2003).

Affiliation model restricts autonomy of institutions (Sharma et al. 2013a). Governance of Indian higher education institutions has become complex. Indian culture is focussed on simplicity. Simplicity is important for achieving the desired outcomes (Tiwari et al. 2018). Large institutions and affiliating universities should be replaced by small autonomous institutions. Small and medium size organisations make a significant contribution in Indian economy (Rana & Tiwari, 2014). Dedication is more important than size of organisation (Choudhuri et al. 2015). Better governance and autonomy will enable Indian higher education institutions to develop as a centre of excellence with global rankings. Students from across the world can come to such centres of excellence and develop foreign exchange reserves and contribute in the development of economy (Tiwari & Anjum 2016). Financing options have made higher education accessible for middle class (Tiwari & Anjum, 2013a). Demotivated teachers cannot deliver quality service (Pop et al., 2008). Transformational leaders are required in Indian higher education (Sharma et al. 2013b).

## 9. POLITICAL INTERRUPTIONS

The institutions of higher education have gradually transformed into nurseries of political ideology. Instead of investing energy in innovation and wealth creation, students are busy in fighting election in campuses of higher education institutions. Hatred against own country, violence and antisocial activities have become the identity of Indian higher education institutions. Research, innovation skill development has taken back seat and such things have become redundant in Indian higher education,

except few elite institutions. Politicians have won their personal battle by corrupting the students for their spreading political ideology, but the country has lost its precious human capital.

The appointments in higher positions are made by politicians. Every big appointment has a price tag. Vice Chancellor appointment becomes easy for candidates who are able to pay the ransom to the political bosses. In one such appointment, candidate paid INR 50 crore for the post of vice chancellor (Raghu Raman, 2020). Such paid appointments create a culture of recovery of the ransom, by asking for ransom from affiliated colleges and granting affiliation and other facilities for a price. The appointment of teachers should be made by experts who do not have any political influence (Nayyar, 2017).

Teachers and students are at the receiving end of this ransom game. They get a paper degree which can do no harm but also does not do any good to them. Dreams are shattered and they are left to live a marginalised life of somehow surviving biologically by doing some odd jobs. Skilled human capital is needed to face global competition (Tiwari et al. 2017).

Culture of a higher education system cannot be isolated from the culture of the country. Any attempt to change the culture will meet intense opposition because of malafide motives of the political class. The political class has made people submissive slaves and people have accepted the silent slavery. Every five years in elections something is offered free and people are happy with it. They do not have high aspirations. Indian higher education is a misfit with Indian culture. In Indian culture, Kings used to give highest regard to teacher (Guru) and used to consult them in important decisions. On the contrary the current Indian higher education, as political establishment treats teacher as unwanted part of society, worthy enough to be neglected.

## 10. ASSESSMENTS

The assessments are based on previous years question papers which are prepared by student just a week before exam and they pass the exams with little effort for a week. Internal assessments in most of private sector educational institutions are like a free lunch coupon. Every student gets distinction marks or even more as it does not cost much for an institution to give free marks. It lures students to take admission in such institutions. Practical assessments are an event where it is impossible to fail. A celebration for students as everybody gets at least ninety percent. A false sense of comfortable life is acceptable to student and parent but nobody asks any questions regarding quality of assessments. A strong political will is required to reform the Indian higher education



by evolving a culture of innovation and wealth creation instead of degree creation. Indian higher education is a misfit with Indian culture. In Indian culture evaluation was based on outcomes, whereas current higher education system in India considers evaluation as a means to check memory for three hours.

## 11. SPIRITUALITY

Indian culture is driven by spirituality. Spirituality enables to reach true potential (Narayanswamy, 2008). Indian higher education ignores spirituality. Spiritual well being and material well being can co-exist (Balasubramanyam, 2011). Spirituality in ancient education system in India brought students close to the teachers. But current Indian higher education system has created large power distance between students and teachers and this restricts development of critical thinking (Tiwari & Anjum 2014k). People laughed at him when Professor Narayanaswamy of IIM Bangalore started an elective course in spirituality (Prayag, 2003). Spirituality has been found to positively influence research outcomes (Upadhyay, 2017). Spirituality needs to be integrated into Indian higher education (Sengupta, 2016). Spirituality makes learning a multidimensional activity (Ricciardelli, 2016). Saudi Arabia is exploring adding Indian spiritual texts as a part of education system to enhance ability of students for peaceful co-existence (Sharma, 2021). Spirituality can add value in the learning ecosystem (Anand, 2017). Spirituality enables multidimensional transformation of a learner (Charaniya, 2012). Indian higher education system is a misfit with Indian culture as it ignores spirituality.

## CONCLUSION

Culture influences higher education. The aspirations of youth can be fulfilled by a culturally aligned higher education system. The language of instruction should change from English to mother tongue. Traditional knowledge base should be developed to convert it into patents as per modern science practices and can become a source of wealth creation. Instead of political bosses, the appointments in higher education institutions should be done by a separate panel which should have representation from academia, industry, psychology experts. It is high time for policy makers to reform higher education to integrate Indian culture and values. Assessments should be outcome based rather than a three hour exam. The synergy of cultural values and class room values will build a mentally strong, emotionally stable, innovative and happy human capital willing to take risk and develop their own ventures. The purpose of higher education should change from degree providing institution to a place to rejuvenate

self, generate new ideas, networking for building up business, developing values for peaceful coexistence in harmony with nature, relationships and materialistic achievements.

## REFERENCES

1. Anand, R. (2017). *Spirituality in management education: A game changer?*, 2017; Available: <http://www.hrkatha.com/news/1278-spirituality-in-management-education-a-gamechanger>
2. Anjum, B., & Tiwari, R. (2012). *Role of information technology in women empowerment. Excel International Journal of Multidisciplinary Management Studies*, 2, 1, 226-233. Available: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3691903](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3691903)
3. Balasubramanyam, K. (2011). *Spirituality must be an important part of education: Mata Amritanandamayi Devi*, *Business Today*. Available: <http://www.businesstoday.in/opinion/interviews/mata-amritanandamayi-devi-education/story/17974.html>
4. Bakker, A. B., & Bal, M. P. (2010). *Weekly work engagement and performance: A study among starting teachers. Journal of Occupational and Organizational Psychology*, 83(1), 189- 206.
5. Charaniya, N. (2012). *Cultural Spiritual Perspective of Transformative Learning*, in Ed Taylor, E., Cranton, P., *The Handbook of Transformative Learning: Theory, Research and Practice*. 2012. John Wiley & Sons: San Francisco.
6. Choudhuri, S., Dixit, R., & Tiwari, R. (2015). *Issues and challenges of Indian aviation industry: a case study. International Journal of Logistics & Supply Chain Management Perspectives*, 4, 1, 1557-1562. Available: [https://www.researchgate.net/publication/329072361\\_ISSUES\\_AND\\_CHALLENGES\\_OF\\_INDIA\\_N\\_AVIATION\\_INDUSTRY\\_A\\_CASE\\_STUDY](https://www.researchgate.net/publication/329072361_ISSUES_AND_CHALLENGES_OF_INDIA_N_AVIATION_INDUSTRY_A_CASE_STUDY)
7. Grunwald, H., & Peterson, M. (2003). *Factors that promote faculty involvement in and satisfaction institutional and classroom student assessment. Research in Higher Education*, 44(2), 15-31.
8. *India Today* (2013). *Our higher education has hit a low: PM Manmohan Singh*, Retrieved from <https://www.indiatoday.in/india/north/story/higher-education-in-india-has-hit-a-low-prime-minister-manmohan-singh-153337-2013-02-06>
9. Kumar, C. (2015, March 10). *Indians spend \$6-7 billion in foreign varsities annually*, *The Times of India*, Retrieved from [http://timesofindia.indiatimes.com/articleshow/46516182.cms?utm\\_source=contentofinterest&utm\\_medium=text&utm\\_campaign=cppst](http://timesofindia.indiatimes.com/articleshow/46516182.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst)
10. Mishra, P., & Smita. (2021). *Online Teaching in India during Covid 19: Opportunities and Challenges. Asian Journal of Sociological Research*, 4, 3, 20-28. Available:



- <https://globalpresshub.com/index.php/AJSR/article/view/1067>
11. Nagarajan, R. (2019, November 28). MCI database of medical college teachers a mess, *The Economic Times*, Retrieved from [http://timesofindia.indiatimes.com/articleshow/72279113.cms?utm\\_source=contentofinterest&utm\\_medium=text&utm\\_campaign=cppst](http://timesofindia.indiatimes.com/articleshow/72279113.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst)
  12. Narayanswamy, R. (2008). Why is Spirituality Integral to Management Education? My Experience of Integrating Management and Spirituality, *Journal of Human Values*, 14, 2, 115-128.
  13. National Education Policy (2020). Ministry of Human Resource Development, Government of India
  14. Nayyar, D. (2017). The degradation of Indian universities through politics. *Live Mint*, Retrieved from <https://www.livemint.com/Opinion/t7Wpt9fu57OImiSwuwVRM/The-degradation-of-Indian-universities-through-politics.html>
  15. New Indian Express (2020, November 2), Non-payment of salaries: DU teachers can't be allowed to suffer, says HC, Retrieved from <https://www.newindianexpress.com/cities/delhi/2020/nov/02/non-payment-of-salaries-du-teachers-cant-be-allowed-to-suffersays-hc-2218337.html>
  16. Nigam, S. (2017). Factors Affecting job Satisfaction an Analytical Study of Academician in Selected Private Universities of Central India.
  17. Pop, M. D., Bacila, M. F., Moisescu, O. I. & Tirca, A. M. (2008). The impact of educational experience on students' satisfaction in the Romanian higher education system, *International Journal of Business Research*, 8(3), 188-194
  18. Punia, V., & Kamboj, M. (2013). Quality of Work-life Balance Among Teachers in Higher Education Institutions. *Learning Community*, 4(3), 197-208
  19. Rana, A., & Tiwari, R. (2014). MSME sector: Challenges and potential growth strategies. *International Journal of Entrepreneurship & Business Environment Perspectives*, 3(4), 1428. Available: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3833856](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3833856)
  20. Raghu Raman, A. (2020, November 23). Charges against Surappa baseless ...politicians fear losing influence, *The Economic Times*, Retrieved from <https://timesofindia.indiatimes.com/blogs/tracking-indian-communities/charges-against-surappa-baseless-politicians-fear-losing-influence/>
  21. Ricciardelli, M. (2016). *Bhagavad Gita and Management*. 2016. Available: <https://www.shu.edu/business/news/bhagavad-gita-and-management.cfm>.
  22. Rienda, L. Claver, E., & Quer, D. (2011). Doing business in India: a review of research in leading international journals, *Journal of Indian Business Research*, 3 (3), 192-216
  23. Saravanakumar, A., & Devi, K. (2020). Indian Higher Education: Issues and Opportunities, *Journal of Critical Reviews*, 7(2), 542-545.
  24. Satya Kumar, Y. (2018), Challenges and opportunities in Indian higher education, Retrieved from <https://digitalllearning.iletsonline.com/2018/12/challenges-and-opportunities-in-indian-higher-education/>
  25. Sengupta S. (2016). *Relevance of Indian's Ancient Teachings in Modern Management*, 2016. Available: <http://www.maims.ac.in/2016/fdp2016.pdf>.
  26. Sharma, D. (2021). Saudi Arabia's new curriculum to include Ramayana, *Mahabharata*. *The Hindustan Times*. Available: <https://www.hindustantimes.com/world-news/saudi-arabia-s-new-curriculum-to-include-ramayana-mahabharata-101619174205846.html>
  27. Sharma, H., Tiwari, R., & Anjum, B., (2013a). Issues and challenges of affiliation system in Indian higher education. *EXCEL International Journal of Multidisciplinary Management Studies*, 3, 12, 232-240. Available: [https://www.researchgate.net/publication/329072292\\_ISSUES\\_AND\\_CHALLENGES\\_OF\\_AFFILIATION\\_SYSTEM\\_IN\\_INDIAN\\_HIGHER\\_EDUCATION](https://www.researchgate.net/publication/329072292_ISSUES_AND_CHALLENGES_OF_AFFILIATION_SYSTEM_IN_INDIAN_HIGHER_EDUCATION)
  28. Sharma, H., Tiwari, R., & Anjum, B. (2013b). Management of Higher Education Institutions: Issues and Challenges. *ZENITH International Journal of Business Economics & Management Research*, 3(12), 275-284., Available: <https://ssrn.com/abstract=3850525>
  29. Tilak, J. B. G. (2016). Global rankings, world-class universities and dilemma in higher education policy in India, *Higher Education for the Future*, 3(2), 126-143.
  30. Tiwari, R., & Anjum, B. (2013a). Role of Education Loan in Indian Higher Education, *GALAXY International Interdisciplinary Research Journal*, 1, 2, 89-96. Available: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3833834](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3833834)
  31. Tiwari, R., & Anjum, B. (2013b). Online Education: Opportunities and Challenges, *GALAXY International Interdisciplinary Research Journal*, 1(1), 44-50., Available: <https://ssrn.com/abstract=3834362>
  32. Tiwari R, Anjum B, & Khurana (2013). A Role of Private Sector in Indian Higher Education, *GALAXY International Interdisciplinary Research Journal*, 1, 2, 75-83. Available: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3833884](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3833884)
  33. Tiwari, R., & Anjum B. (2014a). Impact of Culture in Indian Higher Education on Entrepreneurship. *International Journal of Advance Research in Management and Social Sciences*, 3, 11, 1-10. Available: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3833373](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3833373)



34. Tiwari R., & Anjum B. (2014b). A Proposed model for Management of Higher Education Institutions. *International Journal of Science and Research*. 3, 11, 1614-1616. Available: [https://www.researchgate.net/publication/329402339\\_A\\_Proposed\\_Model\\_for\\_Management\\_of\\_Higher\\_Education\\_Institutions](https://www.researchgate.net/publication/329402339_A_Proposed_Model_for_Management_of_Higher_Education_Institutions)
35. Tiwari, R., & Anjum, B. (2014c). Motivation of University Teachers in northern India. *International Journal of Social Science & Interdisciplinary Research*, 7, 273-281. Available: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3850536](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3850536)
36. Tiwari, R., & Anjum, B. (2014d). Transformation of Higher Education in India, *GE-International Journal of Management Research*, 2, 11, 160-168., Available: <https://ssrn.com/abstract=3835079>
37. Tiwari R, & Anjum B. (2014e). Impact of Experience of Teachers on Industry Academia Interface in Indian Higher Education, *Journal of International Academic Research for Multidisciplinary*. 2, 11, 1-9. Available: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3833472](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3833472)
38. Tiwari R., & Anjum B. (2014f). Role of Higher Education Institutions and Industry Academia Collaboration for Skill Enhancement, *Journal of Business Management & Social Sciences Research*. 3, 11, 27-34.
39. Tiwari, R., & Anjum, B. (2014g). Teaching effectiveness in Indian universities: a study of north India, *ACADEMICIA: An International Multidisciplinary Research Journal*, 4, 12, 50-61. Available: <https://www.indianjournals.com/ijor.aspx?target=ijor:aca&volume=4&issue=12&article=007>
40. Tiwari R., & Anjum B. (2014h). Industry Academia Interface: A Study of North Indian Universities. *International Journal of Marketing, Financial Services & Management Research*. 3, 7, 139-146. Available: [https://www.researchgate.net/publication/329072110\\_INDUSTRIY\\_ACADEMIA\\_INTERFACE\\_A\\_STUDY\\_OF\\_NORTH\\_INDIAN\\_UNIVERSITIES](https://www.researchgate.net/publication/329072110_INDUSTRIY_ACADEMIA_INTERFACE_A_STUDY_OF_NORTH_INDIAN_UNIVERSITIES)
41. Tiwari R., & Anjum B. (2014i). Impact of Demographic Factors on Motivation of University Teachers in North India, *Paripex-Indian Journal of Research*. 3, 11, 97-99. Available: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3834203](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3834203)
42. Tiwari, R., & Anjum, B. (2014j). Five C Model of Management of Indian Higher Education Institutions, *International Journal of Social Science & Interdisciplinary Research*, 3, 11, 100-105., Available at SSRN: <https://ssrn.com/abstract=3850490>
43. Tiwari, R., & Anjum, B. (2014k). Impact of Culture in Indian Higher Education on Employability of Students. *International Journal of scientific research and management*, 2, 11, 1623-1628., Available: <https://ssrn.com/abstract=3850539>
44. Tiwari, R., Anjum, B. (2015). Industry Academia Collaboration: Relevance for Make in India, *International Journal of Business Management*. 2, 1, 840-848. Available: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3833717](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3833717)
45. Tiwari, R., & Anjum, B. (2016). Role of Tourism in Economic Growth of India, In Kaur, L., Rizwan, S. (Eds.). *Corporate Social Responsibility in the Hospitality and Tourism Industry*, 225-238. IGI Global. Available: <https://www.igi-global.com/chapter/role-of-tourism-in-economic-growth-of-india/147202>
46. Tiwari, R., & Choudhuri, S. (2015). The Relevance of Corporate Social Responsibility (CSR) Towards a Sustainable Development: A Case Study of Wipro, Paripex, *Indian Journal of Research*, 4, 10, 238-240., Available: <https://ssrn.com/abstract=3835063>
47. Tiwari R, Anjum B, Khem Chand, & Phuyal M. (2017). Role of Human Capital and Innovation in Economic Growth: Comparative Study of India and China. *International Journal for Research in Applied Science & Engineering Technology*. 5(XI), 4042-4048. Available: [https://www.researchgate.net/publication/329072523\\_Role\\_of\\_Human\\_Capital\\_and\\_Innovation\\_in\\_Economic\\_Growth\\_Comparative\\_Study\\_of\\_India\\_and\\_China](https://www.researchgate.net/publication/329072523_Role_of_Human_Capital_and_Innovation_in_Economic_Growth_Comparative_Study_of_India_and_China)
- Tiwari, R, Singh, M, & Mathur, S. (2018). Sustainability of low cost and simplicity in airline industry: a case of Indigo. *International Journal of Management, Technology and Engineering*. 8, 12, 6034-6044. Available: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3833340](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3833340)
48. Tiwari, R., Anjum, B., Chand, K., & Pathak, R. (2019). Sustainability of Inorganic Growth in Online Retail by Snapdeal: A Case Study. *International Journal of Management Studies*. VI (1 (1)). Available: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3833366](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3833366)
49. Tiwari R, Khem Chand, & Anjum B. (2020). Crop insurance in India: a review of pradhan mantri fasal bima yojana (PMFBY). *FIIB Business Review*. 9, 4, 249-255. Available: <https://journals.sagepub.com/doi/abs/10.1177/2319714520966084>
50. Umashankar, V., & Dutta, K. (2007). Balanced scorecards in managing higher education institutions: an Indian perspective, *International Journal of Educational Management*, 21 (1) (2007), 54-67.
51. Upadhyay, S. (2017). Can Spiritual Intelligence Influence Research Performance in Higher Education? *Framework for Human Resource Development in Higher Education. Administration and Public Management Review*, 28, 153-173.



# SYNTHESIS, CHARACTERIZATION AND ENZYME INHIBITORY STUDIES OF 4-THIAZOLIDONE DERIVATIVES

**M.Lalitha, M.Srikanth Goud, Y.Ashwini, S.Vijaya, P.Naresh**

*K.V.K College of Pharmacy, Affiliated to JNTUH, Surmaiguda, Hyderabad.*

## ABSTRACT

*A series of new 4-thiazolidinone derivatives was synthesized, characterized by spectral techniques, and screened for All the newly synthesized compounds were screened for in vitro  $\alpha$ -amylase inhibitory activity at 5, 10, 25, 50, 100, 200, 400, 500 $\mu$ g/ml concentration. Among the synthesized compounds, T1 and T5 showed good percentage of inhibition at all concentration (5  $\mu$ g/ml-500  $\mu$ g). The IC<sub>50</sub> values for these compounds were found to be 25  $\mu$ g/ml and 30  $\mu$ g/ml respectively which are close to IC<sub>50</sub> value of acarbose (10  $\mu$ g/ml). T3 and T4 showed moderate  $\alpha$ -amylase inhibitory activity at all concentrations. The IC<sub>50</sub> value for these compounds found to be 59  $\mu$ g/ml and 110  $\mu$ g/ml respectively. Among the test compounds, compound 2-(4-chlorophenyl)-3-(4, 6-dimethylpyrimidin-2-yl)thiazolidin-4-one (T1) was found to be the most active agent which showed 88.00  $\mu$ g/ml  $\alpha$ -amylase inhibition in the highest concentration, which have p-chloro phenyl group in the 4-thiazolidinone nucleus.*

**KEYWORDS:**  $\alpha$ -amylase, 4-thiazolidinone, IC<sub>50</sub>.

## INTRODUCTION

Diabetes mellitus is a major endocrine disorder affecting nearly 10% of the population all over the world. It is characterized by hyperglycemia and disturbances of carbohydrate, protein and fat metabolisms, secondary to an absolute or relative lack of the hormone insulin. The number of people in the world with diabetes has increased dramatically over recent years. It is also predicted that by 2030, India, China and the United States will have the largest number of people with diabetes.

Currently treatment of diabetes, in addition to insulin supplement includes many oral hypoglycemic agents along with appropriate diet and exercise. The treatment goal of diabetic patients is to maintain near normal levels of glycemic control, in both fasting and post-prandial conditions. Postprandial hyperglycemia has been proposed as an independent risk factor for diabetes mellitus. Therefore, control of postprandial hyperglycemia is suggested to be important in the treatment of diabetes.

One of the effective method to control diabetes is to inhibit the activity of  $\alpha$ -amylase enzyme which is responsible for the breakdown of starch to more simple sugars (dextrin, maltotriose, maltose, and glucose). This is contributed by  $\alpha$ -

amylase inhibitors, which delays the glucose absorption rate thereby maintaining the serum blood glucose in hyperglycemic individuals. This study is focused to investigate the inhibitory potentials of the synthesized thiazolidinone derivatives on  $\alpha$ -amylase, the key enzyme responsible for carbohydrate hydrolysis.

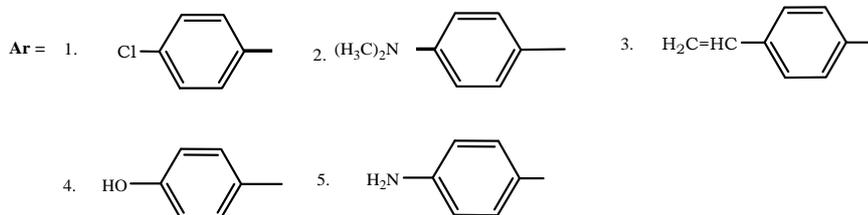
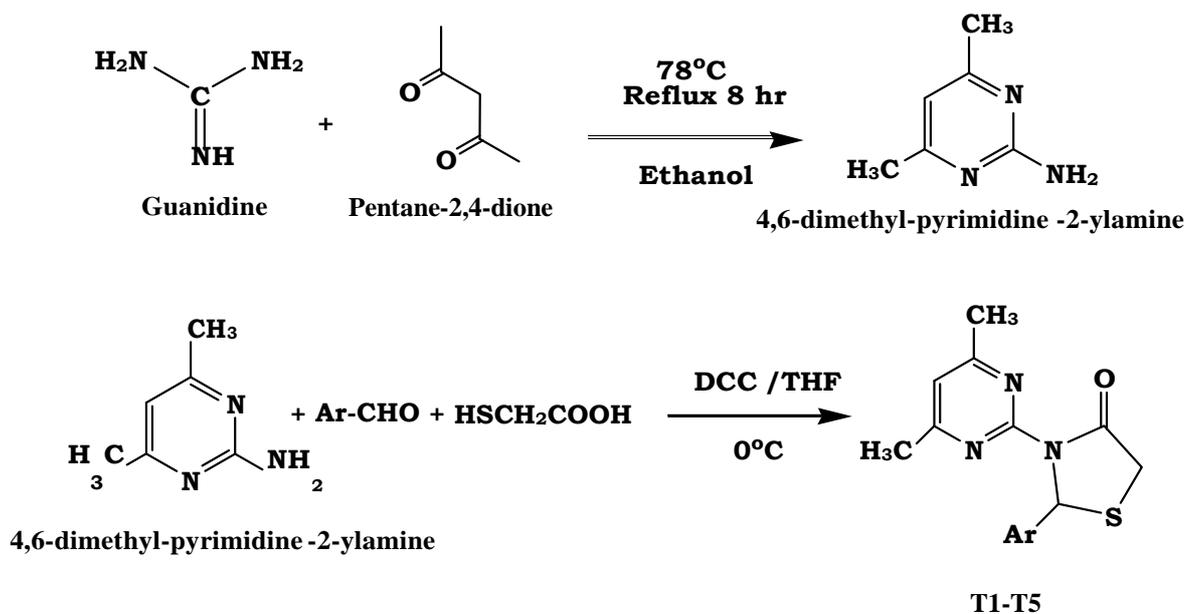
4-thiazolidinone possess a wide spectrum of biological and pharmacological activity due to the presence of nitrogen and sulfur which is considered to be responsible for the structural features to impart their activities. Despite an optimal use of available antidiabetic drugs (ADDs), many patients fail to experience therapeutic efficacy and others do so only at the expense of significant failure in reduction of elevated blood sugar level and toxic side effects. The limitations with the conventional ADDs highlighted the need for developing newer antidiabetic agents with less toxic and more effective drugs are required. Thiazolidinones are five membered ring system containing sulphur and nitrogen atom, received a much attention of medicinal chemists due to their potential biological activities. Substituent's at C-4 position of 4-thiazolidinone moiety results in potent  $\alpha$ -amylase inhibitory activity. Prompted by these reports, we



aimed to prepare the following series of novel 4-thiazolidinone derivatives as potent  $\alpha$ -amylase inhibiting agents.

**SCHEME**

Synthesis of 2-(4-substituted phenyl)-3-(4,6-dimethylpyrimidin-2-yl)thiazolidin-4-one (T1-T5).

**SCHEME**



## MATERIALS AND METHOD

Melting points (mp) were taken in open capillaries on thomas hoover melting point apparatus and are uncorrected. The IR spectra were recorded in film or in potassium bromide disks on a Perkin-Elmer 398 spectrometer. The  $^1\text{H}$  spectra were recorded on a DPX-500 MHz Bruker FT-NMR spectrometer. The chemical shifts were reported as parts per million ( $\delta$  ppm) tetramethylsilane (TMS) as an internal standard. Mass spectra were obtained on a JEOL-SX-102 instrument using fast atom bombardment (FAB positive). Elemental analysis was performed on a Perkin-Elmer 2400 C, H, N analyzer and values were within the acceptable limits of the calculated values. The progress of the reaction was monitored on readymade silica gel plates (Merck) using chloroform-methanol (9:1) as a solvent system. Iodine was used as a developing agent. Spectral data (IR, NMR and mass spectra) confirmed the structures of the synthesized compounds and the purity of these compounds was ascertained by microanalysis. Elemental (C, H, N) analysis indicated that the calculated and observed values were within the acceptable limits ( $\pm 0.4\%$ ). All chemicals and reagents were obtained from Aldrich (USA), or Spectro chem Pvt.Ltd (India) and were used without further purification.

### General procedure for synthesis of 2-(4-substituted phenyl)-3-(4,6- dimethylpyrimidin-2-yl)thiazolidin-4-one (T1-T5).

4-Thiazolidinones were synthesized in two steps. In the first step, 2- aminopyrimidine derivatives were synthesized by the reaction of 1,3-dicarbonyl compounds with guanidine. Final compounds (T1-T5) were synthesized by the reaction of compounds of step 1 with substituted aromatic aldehydes and mercaptoacetic acid, using DCC as intramolecular cyclizing agent (Figure 1).

**Step-I:** General procedure for the synthesis of 4,6-dimethyl-pyrimidin-2- ylamine. Equimolar solution of dicarbonyl compounds and guanidine in ethanol was refluxed at  $78^\circ\text{C}$  for 8 hr. The reaction mixture was then concentrated to dryness under reduced pressure and the residue was partitioned in ethyl acetate. The organic layer was successively washed with water and then finally with ether. The organic layer was dried over sodium sulphate and the solvent was removed under reduced pressure to get 4,6- dimethyl-pyrimidin-2-ylamine<sup>86</sup>. The progress of the reaction was monitored by TLC, using methanol in chloroform (2:98) ratio.

**Step-II:** General procedure for the synthesis of compounds (T1-T5). A solution of 4,6-dimethyl-pyrimidin-2-ylamine (2 mol) and various substituted aldehydes (4 mol) was stirred in THF, under ice cold conditions for 5 min, followed by the addition of mercaptoacetic acid (3 mol). After 5 min, DCC (2 mol) was added to the reaction mixture at  $0^\circ\text{C}$  and the reaction mixture stirred for an additional 5 hr at room temp and filtered. The filtrate was concentrated to dryness under reduced pressure and the residue was extracted with ethyl acetate. The organic layer was successively washed with 5% aqueous citric acid, water, and 5% aqueous sodium hydrogen carbonate and then finally with brine. The organic layer was dried over sodium sulphate and the solvent was removed under reduced pressure to get the products<sup>87</sup> (T1-T5). The progress of the reaction was monitored by TLC, using the solvent system methanol: chloroform (2:98).

### Synthesis of 2-(4-chlorophenyl)-3-(4, 6-dimethylpyrimidin-2-yl)thiazolidin-4- one (T1)

Yield	: 2.56 g; 77.0 % w/w
Melting Point	: 216-218 $^\circ\text{C}$
Rf Value	: 0.86 (methanol: chloroform (2 :98). Molecular Formula : $\text{C}_{15}\text{H}_{14}\text{ClN}_3\text{OS}$
Molecular Weight	: 319.81(M+), 321(M+2)
IR (KBr) $\text{cm}^{-1}$	: 3048 (Ar-CH), 2825 ( $\text{CH}_3$ ), 1710 (C=O), 1597 (C=N Str), 688 (C- Cl).
$^1\text{H}$ NMR ( $\text{CDCl}_3$ ) $\delta$ ppm:	2.35 (s, 3H, $\text{CH}_3$ ), 2.38 (s, 3H, $\text{CH}_3$ ), 3.38 (s, 1H, CH), 6.86
	(d, $J = 8.0$ Hz, 1H, Ar-H), 7.00 (d, $J = 8.0$ Hz, 2H, Ar-H), 7.15 (d, $J = 8.0$ Hz, 2H, Ar-H).
Elemental Analysis	
Calculated	: C, 56.33; H, 4.41; N, 13.14.
Found	: C, 56.31; H, 4.41; N, 13.12.

**Synthesis of 2-(4- (dimethylamino) phenyl)- 3- (4,6-dimethylpyrimidin-2-yl) thiazolidin-4-one (T2).**

Yield : 2.87 g; 83.4 % w/w

Melting Point : 245-247 °C

Rf Value : 0.79 (methanol: chloroform (2 :98). Molecular Formula : C<sub>17</sub>H<sub>20</sub>N<sub>4</sub>OS

Molecular Weight : 328.43(M+)

IR (KBr) cm<sup>-1</sup> : 3085 (Ar-CH), 2948 (CH<sub>3</sub>), 1712 (C=O), 1597 (C=N Str),1289(N(CH<sub>3</sub>)<sub>2</sub>), 1191 (C-S).<sup>1</sup>H NMR (CDCl<sub>3</sub>) δ ppm: 2.35 (s, 3H, CH<sub>3</sub>), 2.38 (s, 3H, CH<sub>3</sub>), 2.85(6H, CH<sub>3</sub>), 3.35(s, 1H, CH), 6.47 (s, *J* = 8.0 Hz, 2H, Ar-H), 6.88 (d, *J* = 8.0 Hz, 2H, Ar-H), 6.90 (s, *J* = 8.0 Hz, 1H, Ar-H).

Elemental Analysis

Calculated : C, 62.17; H, 6.14; N, 17.06

Found : C, 62.15; H, 6.13; N, 17.04

**Synthesis of 3-(4,6-dimethylpyrimidin-2-yl)-2-(4-vinylphenyl)thiazolidin-4- one (T3)**

Yield : 2.68 g; 77.6 % w/w

Melting Point : 238-240 °C

Rf Value : 0.72 (methanol: chloroform (2 :98). Molecular Formula : C<sub>17</sub>H<sub>17</sub>N<sub>3</sub>OS

Molecular Weight : 314.4(M+)

IR (KBr) cm<sup>-1</sup> : 3058 (Ar-CH), 2852 (CH<sub>3</sub>), 1698 (C=O), 1628 (C=N Str), (1510) (CH=CH<sub>2</sub>), 1191 (C-S).<sup>1</sup>H NMR (CDCl<sub>3</sub>) δ ppm: 2.32 (s, 3H, CH<sub>3</sub>), 2.36 (s, 3H, CH<sub>3</sub>), 3.35(s, 1H, CH),5.62(s, 2H, CH<sub>2</sub>), 5.92(s, 1H, CH<sub>2</sub>), 6.63(s, 1H, CH), 6.47 (s,*J* = 8.0 Hz, 2H, Ar-H), 6.86 (d, *J* = 8.0 Hz, 1H, Ar-H), 7.00 – 7.18 (d, *J* = 8.0 Hz, 3H, Ar-H).

Elemental Analysis

Calculated : C, 65.57; H, 5.50; N, 13.49.

Found : C, 65.55; H, 5.50; N, 13.47.

**Synthesis of 2-(4-hydroxyphenyl)-3-(4,6-dimethylpyrimidin-2-yl)thiazolidin- 4-one (T4).**

Yield : 2.66 g; 80.7 % w/w

Melting Point : 264-266 °C

Rf Value : 0.78 (methanol: chloroform (2 :98) Molecular Formula : C<sub>15</sub>H<sub>15</sub>N<sub>3</sub>O<sub>2</sub>S

Molecular Weight : 301.36(M+)

IR (KBr) cm<sup>-1</sup> : 3532 (OH, broad), 3085 (Ar-CH), 2967 (CH<sub>3</sub>), 1703

(C=O), 1585 (C=N Str), 1191(C-S-C).

<sup>1</sup>H NMR (CDCl<sub>3</sub>) δ ppm: 2.35 (s, 3H, CH<sub>3</sub>), 2.39 (s, 3H, CH<sub>3</sub>),



3.35(s,1H,CH),5.00(s,1H,OH),5.92(s,1H,CH<sub>2</sub>),

6.61(s,2H,CH),6.86 (d,*J*=8.0Hz,1H,Ar-H),

6.81- 6.89 (d, *J* =8.0Hz, 3H, Ar-H).

Elemental Analysis

Calculated : C, 59.78; H, 5.02; N, 13.94.

Found : C, 59.76; H, 5.02; N, 13.92.

### Synthesis of 2-(4-aminophenyl)-3-(4,6-dimethylpyrimidin-2-yl)thiazolidin-4- one (T5)

Yield : 2.93 g; 84.1.0 % w/w.

Melting Point : 255-257 °C

Rf Value : 0.81 (methanol: chloroform (2 :98) Molecular Formula :  
C<sub>15</sub>H<sub>16</sub>N<sub>4</sub>OS

Molecular Weight : 300.38(M+)

IR (KBr) cm<sup>-1</sup> : 3383 (NH<sub>2</sub>), 3076(Ar-CH), 2918 (CH<sub>3</sub>),

1691(C=O), 1597 (C=NStr), 1191 (C-S).

<sup>1</sup>H NMR (CDCl<sub>3</sub>) δ ppm : 2.32 (s, 3H,CH<sub>3</sub>), 2.37(s,3H,CH<sub>3</sub>), 3.33(s,1H,CH), 4.0

(s,1H,NH<sub>2</sub>),5.92(s,1H,CH<sub>2</sub>),6.34(s,2H,CH),6.86

(d,*J*=8.0Hz,1H,Ar- H),6.81-6.89 (d,*J*=8.0Hz, 3H, Ar-H).

Elemental Analysis

Calculated : C, 59.98; H, 5.37; N, 18.65.

Found : C, 59.97; H, 5.37; N, 18.63.

## CHROMATOGRAPHY STUDIES OF SYNTHESIZED COMPOUNDS

### THIN LAYER CHROMATOGRAPHY

Thin Layer Chromatography or TLC is a solid-liquid form of chromatography here the stationary phase is a polar absorbent and the mobile phase can be a single solvent or Combination of solvents. TLC is in expensive technique and quick that can be used for determine the number of components in a mixture, verify a substance's identity, monitor the process of a reaction, determine appropriate condition for column chromatography, analyze the fractions obtained from column chromatography.

## MATERIALS AND METHODS

### 1. Preparation of plates

Silicagel G was mixed in a glass mortar to smooth consistency with the requisite amount of water and slurry was quickly transferred to hespreader. The mixtures have been spread over the plates in thickness of 0.2mm and allow setting in to a suitable holder and after 30minutes; plates were dried at 120<sup>0</sup>C, for further activation of the absorbent.

### 2. Sample application

About 2 mm of absorbent from the edge of plate was removed to gives sharply defined edges. 2-5μl volumes of synthesized compounds were spotted with the help of capillary tubes, just above1cm of the bottom of coated plates.

### 3. Development chamber



The chromatographic chamber was lined with filter paper dipping in to mobile phase so as to maintain the atmospheric saturation with solvent vapors in the chamber. The solvent front was allowed to rise to distance of about 12cm from the baseline on the plate was removed from the tank and allowed to dry in the air.

#### 4. Solvent system

The choice of best developing solvent is one of the most important decisions in practical TLC by review of literature survey on by knowing nature of compounds, this solvent system used is (methanol: chloroform (2 :98).

#### 5. Detection of components

The spots were visualized under iodine chamber.

### COLUMN CHROMATOGRAPHY

Purification of synthesized compounds was done by column chromatography.

#### Materials

1. Glass column of size 45 cm x 3cm.
2. Silicagel for column chromatography 60-120 mesh size.
3. Eluting solvent system (methanol: chloroform (2 :98).

#### Preparation of column

The silica gel 60-120 mesh size was made in to slurry with the above solvent system. The bottom of the column was plugged with little glass wool. Then the slurry was poured in to the column, which is filled with solvent after two third of the column areas were filled with slurry. It was set aside for 30 minutes and eluting solvent was passed through column for several time ensure good packing of the column. After the adsorbents are settled, a filter paper was kept to prevent disturbance of the two layer of the adsorbent as fresh mobile phase to be added to column for the process of elution. The fractions were collected for every 5ml and analyzed for the presence of different of similar compound by running TLC and then allow evaporating to get the residue.

### PHARMACOLOGICAL SCREENING

#### ENZYME INHIBITION STUDIES DRUGS AND CHEMICALS

Acarbose (Bicon Ltd, Bangalore), porcine pancreatic  $\alpha$ -amylase (Sigma-Aldrich, USA), Glucose assay kits (Agappe Diagnostics, Kerala) 3, 5-dinitro salicylic acid (HiMedia, Mumbai) and potato starch and maltose (Lobachemie, Mumbai) were purchased for the study. All the other chemicals used in the study were of analytical grade and were of commercial grade and obtained from respective manufacturers.

#### IN VITRO ANTIDIABETIC STUDIES

*In vitro* anti-diabetic potential of the synthesized thiazolidinone derivatives were studied by performing the enzyme inhibition assay using carbohydrate digestive enzymes i.e.,  $\alpha$ -amylase.

#### IN VITRO INHIBITION OF $\alpha$ - AMYLASE

The study was carried out with porcine pancreatic  $\alpha$ -amylase with starch as substrate. Acarbose was selected as the standard drug for comparison of results and thiazolidinone derivatives dissolved in water.

#### PRINCIPLE<sup>87</sup>

$\alpha$ -amylase digests the starch in reaction mixture to yield maltose. The maltose produced would reduce the 3, 5-dinitrosalicylic acid in the coloring agent to 3 amino 5- nitrosalicylic acid. The reaction mixture produced a colour change from orange to red. The intensity of red colour will be directly proportional to the amount of maltose produced. When an enzyme inhibitor is present in reaction mixture digestion of starch, production of maltose and intensity of red colour produced will be less.

#### PREPARATION OF REAGENTS<sup>88-89</sup>

##### Preparation of Phosphate Buffer

Phosphate buffer (20 mM) of pH 6.9 (prepared with sodium phosphate monobasic and sodium chloride)

##### Preparation of Starch Solution

Starch solution (1.0%) prepared with phosphate buffer by boiling.

##### Preparation of Coloring Reagents

Colouring reagent is prepared by slowly adding sodium potassium tartarate solution [prepared in the ratio 12 g of solid dissolved in 8 ml of 2M sodium hydroxide] to 20 ml of 96 mM 3,5-dinitrosalicylic acid (prepared in



distilled water) and then diluting the mixture to 40 ml with distilled water.

#### Preparation of enzyme solution

Enzyme solution, alpha amylase (0.5 mg/ml) prepared with phosphate buffer pH 6.9.  
90-92

#### PROCEDURE

From 1 mg/ml stock solution different concentration (5-500 µg/ml) of 4- thiazolidinone derivatives were prepared by adding few drops of dimethyl sulfoxide and volume made up with water. About 500 µl of α-amylase (0.5 mg/ml) was added and was incubated for 10 minutes at room temperature. Then added 500µl of 1.0% starch solution and incubated for another 10 minutes. After that 1 ml of the coloring reagent was added to the reaction mixture and heated in a boiling water bath for 5 minutes. After cooling, 10 ml of distilled water was added for dilution. To measure the absorbance of the colored extracts, blank was prepared for each set of concentration of test sample by replacing the enzyme solution with buffer. Control incubations representing 100% enzyme activity was prepared by replacing the test drug with water. The absorbance was then measured at 520 nm. The α-amylase inhibition was expressed as percentage of inhibition and the IC<sub>50</sub> values determined by linear regression plots with varying concentration of synthesized thiazolidinone against percentage inhibition.

#### CALCULATION OF PERCENTAGE OF INHIBITION

$$\text{PERCENTAGE INHIBITION} = \frac{C-T}{C} \times 100$$

#### Statistical Analysis

All values are expressed as mean ± SEM. Data were analyzed by non-parametric ANOVA followed by Dunnett's multiple comparison tests, and other data was evaluated using Graph Pad PRISM software. A *p*-value < 0.05 was considered significantly different.

#### RESULTS AND DISCUSSION

##### Chemical work

The results of the present work are discussed under the following heads.

**Scheme:** 2-(4-substituted phenyl)-3-(4, 6-dimethylpyrimidin-2-yl) thiazolidin-4-one (T1- T5).

Synthesis of 2-(4-substituted phenyl)-3-(4,6-dimethylpyrimidin-2-yl)thiazolidin-4- one.

Synthetic route depicted in scheme outline the chemistry part of the present work. 2-(4-substituted phenyl)-3-(4, 6-dimethylpyrimidin-2-yl)thiazolidin-4-one (T1-T5) were obtained by the condensation of dimethylpyrimidin-2-ylamine and various substituted aldehydes were stirred in THF, followed by the addition of mercaptoacetic acid and DCC. The formation of the substituted 4-thiazolidinones were confirmed by the presence of characteristic peaks in the IR spectra. It showed characteristic peaks at around 3400 cm<sup>-1</sup> for NH<sub>2</sub> stretching and peak around 2900 cm<sup>-1</sup> due to the presence of N=CH stretching. The NMR spectrum of the compounds (T1-T5) showed the characteristic peak around δ 2.70 ppm for CH<sub>3</sub> group, δ 3.00 ppm for CH<sub>2</sub> and δ 5.70 ppm for NCH and also shows multiplet in the range of δ 6.80-8.30 ppm owing to aromatic protons. The appearance of peak due to chlorine in IR spectra around 700 -800 cm<sup>-1</sup> and formation M+2 peak in the mass spectra. Data from the elemental analyses and molecular ion recorded in the mass spectra further confirmed the assigned structure.

##### Pharmacological Investigation

##### Evaluation of α-amylase inhibitory activity

All the newly synthesized compounds were screened for *in vitro* α-amylase inhibitory activity at 5, 10, 25, 50, 100, 200, 400, 500µg/ml concentration. Acarbose was used as a standard drug in the same concentration. A graded increase in the percentage of inhibition was observed with increase in concentration.

The synthesized compounds in which IC<sub>50</sub> of compound-T1 (25 µg/ml) and other 4 compounds in which IC<sub>50</sub> of compounds-T<sub>2</sub> (35 µg/ml ) and T<sub>5</sub>(30µg/ml) showed percentage of inhibition closer to that of standard(Acarbose-12 µg/ml). The IC<sub>50</sub> values of synthesized compounds were found by plotting a graph of percentage inhibition versus concentration in µg/ml. The values were compared with that of standard.

Among the synthesized compounds, T1 and T5 showed good percentage of inhibition at all concentration (5 µg/ml-500 µg). The IC<sub>50</sub> values for these compounds were found to be 25 µg/ml and 30 µg/ml respectively which are close to IC<sub>50</sub> value of acarbose (10 µg/ml). T3 and T4 showed moderate α-amylase inhibitory activity at all concentrations. The IC<sub>50</sub> value for these compounds found to be 59 µg/ml and 110 µg/ml respectively.



T1 (*p*-chlorophenyl) produced IC<sub>50</sub> value (25 µg/ml) which is relatively less value of IC<sub>50</sub> indicates the sample has better α-amylase inhibitory activity which has significant α-amylase inhibitory activity when compared to that standard.

T2 (dimethylamino group) produced IC<sub>50</sub> value (35 µg/ml) which is relatively less value of IC<sub>50</sub> indicates the sample has more α-amylase inhibitory activity which has significant α-amylase inhibitory activity when compared to that standard.

T3 (dimethylamino cinnamaldehyde group) produced IC<sub>50</sub> value (110 µg/ml) which is least value of IC<sub>50</sub> indicates the sample has less α-amylase inhibitory activity when compared to that standard. T4 (*p*-hydroxyl group) produced IC<sub>50</sub> value (59 µg/ml) which is least value of IC<sub>50</sub> indicates the sample has less α-amylase inhibitory activity when compared to that standard. T5 (*p*-amino group) produced IC<sub>50</sub> value (30 µg/ml) which is relatively less value of IC<sub>50</sub> indicates the sample has more α-amylase inhibitory activity when compared to that standard. The best mean IC<sub>50</sub> values were achieved with compound (T1, T2, and T5) with slight difference among them.

Among the test compounds, compound 2-(4-chlorophenyl)-3-(4, 6-dimethylpyrimidin-2-yl)thiazolidin-4-one (T1) was found to be the most active agent which showed 88.00 µg/ml α-amylase inhibition in the highest concentration, which have *p*-chloro phenyl group in the 4-thiazolidinone nucleus.

### PERCENTAGE OF α-AMYLASE INHIBITORY POTENTIAL OF SYNTHESISED COMPOUNDS IN VITRO α-AMYLASE INHIBITORY ACTIVITY

Compound code	5 µg/ml	10 µg/ml	25 µg/ml	50 µg/ml	100 µg/ml	200 µg/ml	400 µg/ml	500 µg/ml	IC <sub>50</sub> µg/ml
T1	33.75	41.25	54.50	60.41	65.00	75.00	85.00	88.00	25
T2	29.16	40.46	44.83	49.25	64.16	67.33	78.75	81.58	35
T3	19.16	28.83	42.79	42.75	49.85	58.75	73.58	79.00	110
T4	24.54	30.58	35.75	42.16	57.67	60.46	71.16	79.06	59
T5	30.69	35.47	46.81	56.25	68.75	77.50	80.16	85.40	30

### CONCLUSION

In summary, a new series of 2-(4-substituted phenyl)-3-(4, 6-dimethylpyrimidin-2-yl) thiazolidin-4-one (T1-T5) were synthesized. These title compounds containing five different substituent's at C-4 position were screened for their α-amylase inhibitory activity. Most of the test compounds were found to exhibit significant α-amylase inhibitory activity in the lowest concentration. Among the substituent's at C-4, *p*-chloro phenyl substituent shows maximum α-amylase enzyme inhibitory potency, while 4-aminophenyl and 4-dimethylaminophenyl substituent showed equipotent or has little less α-amylase inhibitory activity when compared to compound T1, but the dimethylamino cinnamaldehyde and 4-hydroxy phenyl substituent exhibited least α-amylase inhibitory activity when compare to other substituents. The order of activity at C-4 is *p*-chloro phenyl ≥ *p*-amino phenyl ≥ *p*-dimethylaminophenyl ≥ 4-hydroxyl phenyl ≥ *p*-dimethylamino cinnamaldehyde substituents.

Among the test compounds, compound 2-(4-chlorophenyl)-3-(4, 6-dimethylpyrimidin-2-yl)thiazolidin-4-one (T1) was found to be the most active agent which showed 88.00 µg/ml α-amylase inhibition in the highest concentration, which have *p*-chloro group in the thiazolidinone nucleus.

Hence this molecule can be selected as a lead molecule of the present study for further exploitation.

### REFERENCES

1. Rogawski MA, Loscher W, *The neurobiology of antiepileptic drugs, Nat Rev Neurosci*, 5(7), 2004, 553-564.
2. Akerblom E, 2-aminothiazolin-4-one and 2-iminothiazolidin-4-one derivatives part II tautomerism, *Acta Chemica Scandinavica*, 21, 1967, 1437-1442.
3. Lesyk RB, Zimenkovsky BS, *Curr Org Chem*, 8, 2004, 1547
4. Fuschigami T, Narizuka S, Konno A, *J. Org.Chem*, 57, 1992, 3755
5. Nishimoto SI, Hatta H, Ueshima H, Kagiya TL, *J. Med Chem*, 35, 1992, 2712.
6. SubbaRao YV, Choudary BM, *Synth. Commun*, 21, 1991, 1163.
7. Ramu B, Chittela KB. *High Performance Thin Layer Chromatography and Its Role Pharmaceutical Industry [Review]. Open Sci. J. Biosci. Bioeng.* 2018;5(3):29-34.
8. Cava MP, Levinson MI, *Tetrahedron*, 41, 1985, 5061.
9. Souza MV, Ferreira SB, Mendonca JS, Costa M, Rebello FR, *Quim. Nova*, 28, 2005, 77.
10. Berseneva VS, Tkachev AV, Morzherin YY, Dehaen W, Luyten I, Toppet S, Bakulev VA, *J. Chem. Soc.*, 1, 1998, 2133.
11. Tenorio RP, Carvalho CS, Pessanha CS, Lima JG, de Faria AR, Alves AJ, Melo EJ, Goes AJS, *Bioorg. Med Chem. Lett*, 15, 2005, 2575.
12. Cunico W, Gomes C R B, Ferreira M, Capri LR, Soares M, Wardell SM, SV, *Tetrahedron Lett*, 48, 2007, 6217.



13. Neuenfeldt PD, Drawanz BB, Siqueira GM, Gomes CR, Wardell SNS, Flores AF C, Cunico W, *Tetrahedron Lett*, 51, 2010, 3106.
14. Pratap UR, Jawale DV, Bhosle MR, Mane RA, *Tetrahedron Lett*, 52, 2011, 1689.
15. Mali JR, Pratap UR, Netankar PD, Mane RA, *Tetrahedron Lett*, 50, 2009, 5027.
16. Bolli MH, Abele S, Binkert C, Bravo R, Buchmann S, Bur D, Gatfield J, Hess P, Kohl C, Mangold C, Mathys B, Menyhart M, Meuller C, Nayler O, Scherz M, *J. Med. Chem*, 53, 2010, 4198.
17. Moghaddam FM, Hojabri LJ, *Heterocycl. Chem*, 44, 2007, 35.
18. Lidstrom P, Tierney J, Wathey B and Westman J, *Tetrahedron*, 56, 2001, 55-60.
19. Tej Rakish Singh, Pramod Kumar Sharma, Preet Kanwal Kaur, Sombhu Charan Mondal and Amit Gupta, *Der Pharm Chem*, 3(1), 2011, 194-206.
20. Saibaba, S.V.; Kumar, M.S.; Ramu, B. *Pharmaceutical impurities and their characterization. European J Pharm Med Res* 2016, 3(5), 190-196.
21. Cunico W, *One pot synthesis of 2-isopropyl-3-benzyl-1,3-thiazolidin-4-ones and 2-phenyl-3-isobutyl-1,3-thiazolidin-4-ones from valine, arylaldehydes and mercaptoacetic acid, Tetrahedron Letters*, 48, 2007, 6217-6220.
22. Chizhevskaya II, Khovratovich NN and Kharchenko RS, *Investigation of the mobility of methylene group hydrogen atoms in some derivatives of 2-iminothiazolidin-4-one, Khimiya Geterotsiklicheskikh Soedinenii*, 3(4), 1967, 642-646.



## STUDENT FRIENDLY CHATBOT- ANDREA

<sup>1</sup>Sparsh Wadhwa, <sup>2</sup>Tanya Yadav, <sup>3</sup>Mr. Antim Dev Mishra

<sup>1,2,3</sup>Ansai University, Gurugram

### ABSTRACT

*A chatbot is an artificial intelligence (AI) software that can simulate a conversation with a user in natural language through messaging applications, websites, mobile apps or through the telephone. A chatbot is often described as one of the most advanced and promising expressions of interaction between humans and machines. However, from a technological point of view, a chatbot only represents the natural evolution of a Question Answering system leveraging Natural Language Processing.*

### I. INTRODUCTION

A chatbot is an intelligent piece of software that can communicate and performing actions like a human. Chatbots are used a lot in customer interaction, marketing on social network sites and instantly messaging the client. There are two basic types of chatbot models based on how they are built; Retrieval based and Generative based models.

### II. RELATED WORK

In the world of machine learning and AI there are many kinds of chat bots. Some chat bots are virtual assistants, others are just there to talk to, and some are customer support agents. Here we are classifying them in 2 different types namely: -

- Retrieval based Chatbots
- Generative based Chatbots

**Retrieval based Chatbots-** A retrieval-based chatbot uses predefined input patterns and responses. It then uses some type of heuristic approach to select the appropriate response. It is widely used in the industry to make goal-oriented chatbots where we can customize the tone and flow of the chatbot to drive our customers with the best experience.

**Generative based Chatbots-** Generative models are not based on some predefined responses. They are based on sequence 2 sequence neural networks. It is the same idea as machine translation. In machine translation, we translate the source code from one language to another language but here, we are going to transform input into an output.

### III. METHODOLOGY

In this project we have built a chatbot using Neural Networks. The chatbot is trained on the dataset which contains categories, pattern, and responses. We have used a special recurrent neural network to classify which category the user's message belongs to and then the program will give a random response from the list of responses.

**Technologies Used**

This project is a retrieval based chatbot using: -

**Dialog flow-** Dialog flow is a natural language understanding platform used to design and integrate a conversational user interface into mobile apps, web applications, devices, bots, interactive voice response systems and related uses.

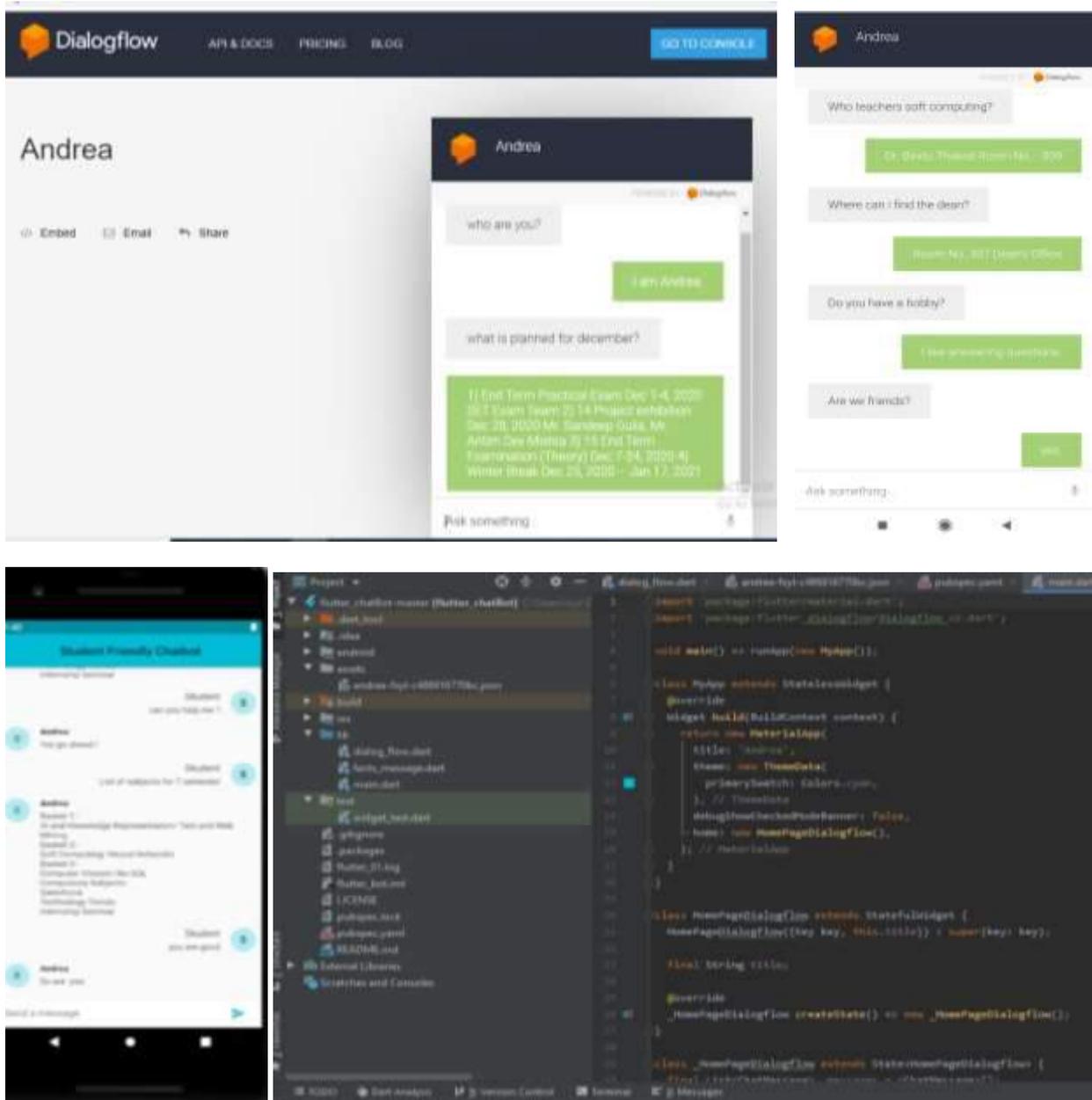
**Flutter-** Flutter is an open-source UI software development kit created by Google. It is used to develop applications for Android, iOS, Linux, Mac, Windows, Google Fuchsia, and the web from a single codebase. The first version of Flutter was known as codename "Sky" and ran on the Android operating system.

**Dart-** Dart is a client-optimized programming language for apps on multiple platforms. It is developed by Google and is used to build mobile, desktop, server, and web applications. Dart is an object-oriented, class-based, garbage-collected language with C-style syntax. Dart can compile to either native code or JavaScript.



Google cloud console- Google *Cloud* Platform lets you build, deploy, and scale applications, websites, and services on the same infrastructure as Google.

#### IV. FIGURES AND TABLES





## VI. CONCLUSION AND FUTURE SCOPE

From my perspective, chatbots or smart assistants with artificial intelligence are dramatically changing businesses. There is a wide range of chatbot building platforms that are available for various enterprises, such as e-commerce, retail, banking, leisure, travel, healthcare, and so on. Chatbots can reach out to a large audience on messaging apps and be more effective than humans. They may develop into a capable information-gathering tool soon.

## VII. ACKNOWLEDGMENT

We would like to express our special thanks of gratitude to our teacher Dr. Bindu Thakral who gave us the golden opportunity to do this wonderful project on the topic STUDENT FRIENDLY CHATBOT - ANDREA, which also helped us in doing a lot of Research and we came to know about so many new things.

## VIII. REFERENCES

1. Alepis, E., & Virvou, M. (2011). Automatic generation of emotions in tutoring agents for affective e-learning in medical education. *Expert Systems with Applications*, 38(8): 9840–9847.
2. Ashok, G., Brian, C., Mithun, K., Shanu, S., Abhinaya, S., & Bryan, W. (2015). Using Watson for Enhancing Human-Computer Co-Creativity. *AAAI Symposium*: 22–29.
3. Avalverde, D. (2019). A Brief History of Chatbots. *Perception, Control, Cognition*. Retrieved March 9, 2019 from: <https://pcc.cs.byu.edu/2018/03/26/a-brief-history-of-chatbots/>
4. Ayedoun, E., Hayashi, Y., & Seta, K. (2015). A Conversational Agent to Encourage Willingness to Communicate in the Context of English as a Foreign Language. *Procedia Computer Science*, 60(1): 1433–1442.



# A STUDY THE CUSTOMER SATISFACTION TOWARDS MRF TYRES IN KARUMATHAMPATTI CITY

**Mr. P. Vimal Kumar<sup>1</sup>, Mr. R. Yuvan prasath<sup>2</sup>**

<sup>1</sup>Assistant Professor, Department of Commerce, Dr. N.G.P Arts and Science College, Coimbatore

<sup>2</sup>Student of III B.com, Department of Commerce, Dr. N.G.P Arts and Science College, Coimbatore

## ABSTRACT

This project report is the result of customer behavior of MRF tyres in Coimbatore. The objective of the study to find out the behavior of customer towards MRF tyres in Coimbatore, and offer some valuable suggestion on the basis of the study. This study has covered the consumer of MRF tyres. The research design adopted for this study was descriptive research design. The sample size is 120. the sampling technique used for this purpose was simple random sampling. For conducting survey a questionnaire was prepared. for this study purpose two types of data were collected, the data collected through questionnaire forms the primary data, the data collected journals, website and records of the forms this secondary data. The data so collected is then classified and tabulated for the purpose of analysis and then percentage analysis was used as statistical tools for analysis purpose.

**KEYWORDS:** Brand, Customer, Market, Preference, Satisfaction.

## INTRODUCTION

The main object of every organisation is to earn profit, to achieve this object the organisation should increase its sales by getting more customer and the only way to get more customer is that the organisation should provide expected satisfaction to the customers.

Here the word customer satisfaction means "the utility which customer expect from the product" and when a customer get expected utilities it is called as customer satisfaction.

MRF manufactures the largest range of tyres in India and enjoys the highest brand preference for superior quality, company manufactures the largest range of tyres in India and is the market leader with the largest market share it tyre industry.

## STATEMENT OF PROBLEMS

Profit earning has become one of the important objectives of each and every company.

It is very easy to attract new customers but retaining old customer is too difficulty only the satisfied customer will remain loyal to the firm brands.

A person enters a showroom when he wants to purchase tyres, but before purchasing tyres he consults

so many persons about tyre. Like about price, quality, service etc, and then he make decision to purchase.

If he finds any problem with tyres, he may change his positive attitude into negative attitude towards tyres given by the showroom.

Considering, all above points, I have decided "To study the customer satisfaction towards MRF tyres in karumathampatti city".

## OBJECTIVES OF STUDY

1. To know the customer satisfaction towards MRF tyres in karumathampatti city.
2. To know the attributes which creates customer satisfaction among MRF tyres users in karumathampatti.
3. To identify the factors influencing the purchase of MRF tyres.
4. To know the satisfaction level of the customer with the MRF tyres.
5. To know valuable suggestion from the customer.



## SCOPE OF STUDY

The study is purely based on the survey conducted in karumathampatti city and has focused on customers. The study covers the information about the mind set which may varies from situation and where the respondents may not be able to give required and accurate information.

## METHODOLOGY OF STUDY

To achieve the stated objective a survey was conducted at Karumathampatty city regarding customer "satisfaction towards MRF tyres" provided by Selvanayagi amman tyres showroom in karumathampatty.

## PRIMARY DATA

Primary data is collected by the random sampling method. Hence we have interviewed 100 customers through Questionnaire and personal interview and collected the primary data.

## SECONDARY DATA

Secondary data are generally published sources which have been collected originally for some other purpose, they are not gathered specially to achieve the objectives for some other purpose, they are not gathered specially to achieve the objectives of the particular research projects hands but already assembled.

## SURVEY TECHNIQUES

Once the researcher has decided to use survey method for collecting data he has to make a decision to adopt any one of the following survey techniques

1. Personal interview
2. Telephone survey

## TOOLS USED FOR STUDY

- Simple percentage analysis
- Correlation coefficient
- Weighted average analysis
- Chi-square analysis

## LIMITATIONS OF STUDY

- Due to respondents busy schedules, the interests shown by respondents to answer the questionnaire may be less. This may have resulted in collecting inaccurate information.
- Due to time and cost constraint the sample size selected is 100.

- The selected sample size is small as compared to the total number of customers. Hence the obtained result may not be accurate as it may not represent the whole population.
- The project is open for further improvement of the work.
- Less time available or an interview or conversation with the workers.
- The workers were busy with their work.

## LITERATURE REVIEW

1] Kaur,( 2010) analysed that The last two years have been the toughest for the Indian tyre industry with continuing slump in the market of commercial vehicles which sustains the domestic tyre industry and the spurt in the prices of Raw materials. As a result, India' tyre industry is re industry not likely to lift itself out of its recession for some more time as the market shows no signs of any dramatic recovery. The recession seems there to stay for a period of time and to ensure the domestic tyre industry does not succumb under the pressure it is important for the government to take immediate effective steps will the economy is back on the road of recovery.

2] (S MohanaKumar & TharianGeroge K , 2001) come to conclusion that, The emerging trends in production, export and imports of major categories of tyre in the post reforms phase till 1996- 97 . The analysis indicate that there are well defined limitations in sustaining the domestic demand driven export growth to reap the advantages of scale economies. Despite the boom in the exports in the initial phase the exports of truck and bus tyres has a percentage of its production has declined from its pick level of 33.87 % in 1994- 95 to 21.49 % in 1996 -97.

## DATA ANALYSIS AND INTERPRETATION

The term analysis refers to the computation of certain measures along with searching of patterns or relationship that exist among data groups. After collection of data, the data has to be processed and analyzed in accordance with the outline laid down for the purpose at the time of developing the research plan.

Section A: deals with,

- Simple percentage analysis of collected data.

Section B: deals with application of statistical tool such as,

- Correlation and co-efficient analysis
- Weighted average analysis



- Chi-square analysis

**SIMPLE PERCENTAGE ANALYSIS**

**TABLE 1**  
**AGE OF THE RESPONDENTS**

AGE GROUP	NO.OF RESPONDENTS	PERCENTAGE
BELOW 20 YEARS	41	32.8%
21 TO 35 YEARS	79	63.2%
36 TO 50 YEARS	4	2.8%
ABOVE 50 YEARS	1	1.2%
TOTAL	125	100%

**INTERPRETATION**

The above table shows that 32.8% of respondents are in the age group of below 20 years, 63.2% are 21 to 35 years, 2.8% are 36 to 50 years, 1.2% are above 50 years.

Majority of the respondents belong to the age group between 21 to 35 years (63.2%).

**CORRELATION CO-EFFICIENT ANALYSIS**

**TABLE 2**  
**MONTHLY INCOME AND KINDS OF VEHICLE**

S.NO	MONTHLY INCOME	KINDS OF VEHICLE
1	46	58
2	24	40
3	23	17
4	32	10
<b>TOTAL</b>	<b>125</b>	<b>125</b>

**CORRELATION CO-EFFICIENT VALUE: 0.61816****INTERPRETATION**

The above table shows the correlation co-efficient values of two variables. It indicates that there

is positive relationship between the **monthly income and the kinds of vehicles**. The correlation value is 0.61816

**WEIGHTED AVERAGE ANALYSIS**

**TABLE 3**  
**CHARACTERISTICS OF MRF TYRES**

FACTORS	1(4)	2(3)	3(2)	4(1)	TOTAL	MEAN SCORE
PRICE	38	39	33	15	125	2.8
	152	117	66	15	350	
QUALITY	30	58	32	5	125	2.904
	120	174	64	5	363	
DURABLE	20	45	54	6	125	2.632
	80	135	108	6	329	
PERFORMANCE	25	53	32	15	125	2.704
	100	159	64	15	338	
MILEAGE	32	40	38	15	125	2.712
	128	120	76	15	339	



**INTERPRETATION :** The above table indicates the characteristics of MRF tyres. Quality scores the highest mean score 2.904.

### CHI- SQUARE ANALYSIS

**TABLE 4**  
**REALATIONSHIP BETWEEN AGE AND INFLUENCING FACTOR**

S.NO	AGE IN YEARS	INFLUENCING FACTOR				TOTAL
		PRICE	DURABILITY	BRAND IMAGE	AVAILABILITY	
1	Below 20 years	11	19	6	5	41
2	20 to 35 years	12	32	29	6	79
3	35 to 50 years	0	2	2	0	4
4	Above 50 years	0	1	0	0	1
	<b>TOTAL</b>	<b>23</b>	<b>54</b>	<b>37</b>	<b>11</b>	<b>125</b>

To find out the association between age and influencing factor of respondents to purchase it, chi square test is used and result is given below.

### HYPOTHESIS

There is significant relationship between age of the respondents and influencing factor given by them to purchase it.

### CHI-SQUARE TEST

Factor	Calculation value	Df	Table value	Remarks
Overall percentage	10.379	9	16.919	Accepted

### INTERPRETATION

It is clear from the above table show that, the calculated value of chi-square at 0.05% level is more than the

table value. Hence the hypothesis is accepted. So there is a relationship between age and satisfaction level of respondents on price stability.

**TABLE 5**  
**REALATIONSHIP BETWEEN MONTHLY INCOME AND KINDS OF VEHICLE**

S.NO	MONTHLY INCOME	KINDS OF VEHICLE				TOTAL
		MOTOR CYCLE	SCOOTER	MOPED	HEAVY VEHICLE	
1	Below 5000	29	5	5	3	42
2	5000 to 10000	15	14	4	0	33
3	10000 to 15000	6	10	5	0	21
4	Above 15000	8	11	3	7	29
	<b>TOTAL</b>	<b>58</b>	<b>40</b>	<b>17</b>	<b>10</b>	<b>125</b>



To find out the association between monthly income and kinds of vehicle of respondents, chi square test is used and result is given below.

### HYPOTHESIS

There is significant relationship between monthly income of the respondents and kinds of vehicle.

### CHI-SQUARE TEST

Factor	Calculation value	Df	Table value	Remarks
Overall percentage	32.417	9	16.919	Rejected

### INTERPRETATION

It is clear from the above table show that, the calculated value of chi-square at 0.05% level is more than the table value. Hence the hypothesis is accepted. So there is a relationship between monthly income and kinds of vehicle of respondents.

### FINDINGS

#### SIMPLE PRECENTAGE

- Majority of the respondents belong to the age group between 21 to 35 years (63.2%).
- Majority of the respondents are Male (69.6%).
- Majority of the respondents are unmarried(80.8%).
- Majority of the respondents educational qualification is under graduate(69.6%).
- Majority of the respondents are student (60.8%)
- Majority of the respondents income was below 5000(36.8%).
- Majority (46.4%) of the respondents are having motor cycle.
- Majority (30.9%) of the respondents are buy by their friends suggestion.
- Majority (43.2%) of the respondents are influence by durability of the product.
- Majority(53.2%) of the respondents are respondent that the tyre getting repair rarely.
- Majority(51.2%) of the respondents said good about the services of the dealer.
- Majority(46%) of the respondents chose the second position
- Majority(46.3%) of the respondents are not faced any problem while purchasing MRF tyres.
- Majority(36.6%) of the respondents chose CEAT is the main competitor for MRF tyres in market
- Majority(51.2%) of the respondents said that the service charges are reasonable.

### CORRELATION CO-EFFICIENT ANALYSIS

The above table shows the correlation co-efficient values of two variables. It indicates that there is positive relationship between the **monthly income and the kinds of vehicles**. The correlation value is 0.61816

The above table shows the correlation co-efficient values of two variables. It indicates that there is positive relationship between the **age of the respondents and suggested to buy MRF tyres**. The correlation value is 0.352622.

### WEIGHTED AVERAGE ANALYSIS

The above table indicates the characteristics of MRF tyres. Quality scores the highest mean score **2.904**.

### CHI- SQUARE ANALYSIS

It is clear from the above table show that, the calculated value of chi-square at 0.05% level is more than the table value. Hence the hypothesis is accepted. So there is a relationship between age and satisfaction level of respondents on price stability.

It is clear from the above table show that, the calculated value of chi-square at 0.05% level is more than the table value. Hence the hypothesis is accepted. So there is a relationship between monthly income and kinds of vehicle of respondents.

### SUGGESTIONS

#### SUGGESTONS TO SHOWROOM

- Showroom must recruit well qualified and skilled labours that care about the customer.
- It will abolish the problem of unskilled and poor quality service.
- Showroom employees and workers should maintain friendly relation with every customers.
- Showroom should provide the remolding system to the existing customers.



- Showroom should maintain tyres, tube, air compression machines etc., which are needed to the customer at any time.
- Always adopt the improvement of servicing system and keep the showroom in good conditions.

3. *"Using thematic analysis in psychology"*; *Qualitative research in psychology*"- BRAUN V AND CLARKE V
4. *"Strategies behind the successful industrial product launch"* – CHOFFRAY J.M AND LILLIEN

### SUGGESTIONS TO COMPANY

- The company should reduce the price of there products.
- Improve the distribution network and make available the products in needed time of customers.
- Company always keeps some prizes and gifts to attract the customers.
- The products should advertised in the Regional TV channels and in leading newspaper must.

### CONCLUSION

According to the study I conclude that the MRF TYRES company satisfies the customer need and the purpose, but only problem is with the service given to the customers by the showroom. So, as per study in my opinion based on project I can say that MRF TYRES should think about the service provided by showrooms in order to capture the maximum market segment.

According to karumathampatti city the market is vast almost the whole district customers and other new people purchase the MRF Tyres because it is old brand running tyres in market. Almost people demands the MRF Tyres comparing to other company tyres.

Company provide more advertisement and always keep customers need with development of MRF Tyres.

### REFERENCES

1. *Veena Bansal, Indian Institute of Technology Knpur/ IIT Kanpur*
2. *Somanth Bhattacharya Ph.d Scholar, Department of IME, IIT Kanpur*
3. *Jashireh Department of management and accounting, college of humanities.*

### BIBLIOGRAPHY

1. *"New product launch: marketing action and launch tactics for the high technology products"*- BEARD, C AND EASINGWOOD C
2. *"An investigation into the new product process: steps, deficits and impact"*, *journal of product innovation and management*- COPPER, R AND KLEINSCHMIDR E



# A STUDY ON CUSTOMER SATISFACTION OF FURNITURE AND FITTINGS PRODUCTS SPECIAL REFERENCE WITH COIMBATORE DISTRICT

DRNGPASC 2020-21 COM118

**\*Niswar ushen. S , \*\*Mr. K. Ponnurani**

*\*Student, Department of Commerce , Dr. N.G.P Arts and Science College, Coimbatore - 48*

*\*\*Assistant Professor, Department of Commerce , Dr. N.G.P Arts and Science College, Coimbatore - 48*

## ABSTRACT

Furniture are considered as movable assets and it is devised for the purpose to support various activities of the people. The purpose for the usage of the furniture is as follows; ie, chairs for seating, tables for eating and beds for sleeping etc. It also includes desks, cupboards and benches etc. The usage of furniture starts from home and find its place everywhere including offices, industries, commercial space like banks, malls etc. Earlier furniture are non-branded products. But nowadays people are looking for branded items. So we can understand people's desire for quality furniture. Wood and steel furniture are finding their space everywhere and those who are looking for low price furniture are met with PVC furniture. Based on the requirement of the furniture by the consumers more companies are entering into the market of furniture with specific brands along with the factors such as price, style, colour, comfort and durability etc and they attract the customers through various advertisements. So it tends the customers to go for a particular brand. This study indicates that, most of the customer were satisfied towards branded furniture.

**KEYWORDS:** Furniture, Manufacturing, Marketing, Consumer behaviour towards the furniture.

## INTRODUCTION

As we know that the requirement of the furniture is important for the people as it is designed for supporting their various activities such as seating, eating, sleeping etc. The consumer plays a vital role in the searching, purchasing, using and evaluating of various furniture according to their choice, taste and preference. The consumer behaviour towards the furniture are good due to its brand, quality, durability, style, colour, price and comfort etc and it also satisfies the consumers through the payment method and discount while they purchase the furniture directly from the furniture stores. It has been observed that the consumers are satisfied through the purchase of furniture in the basis of wood like ply wood, teak wood and rosewood etc.

## STATEMENT OF THE PROBLEM

Furniture designs are one of the most trending one in the market, which makes our home,

office and every place more beautiful. Going beyond the basics, it also there to express our sense of style. And as our needs and life circumstances change, so does our furniture. The presents study aims at

- To know the consumer behaviour on furniture and fittings products.
- To analyse the customer satisfaction towards furniture and fittings products.

## OBJECTIVES OF THE STUDY

- To analyze the marketing mix of furniture industry.
- To know about the consumer behaviour towards furniture and fittings products.

## RESEARCH DESIGN

Information has been gathered from both primary and secondary sources.

- Primary data was collected through a structured questionnaire filled up by the respondents.



- Secondary data sources include websites, journals, and research papers.

### **SAMPLE DESIGN**

Convenience Sampling was carried out for the study. The sample consisted of consumers who had bought products from the furniture industry. The sample size is 135.

### **SAMPLING TECHNIQUES**

Convenience sampling technique is used for the study.

### **METHODS OF DATA COLLECTION**

Questionnaire method is used to collect the data from the respondents.

### **SOURCES OF DATA**

Both the primary and secondary data are used for the study. The primary data has been collected from the respondents through questionnaire and secondary data has been collected from articles, books, magazines and newspaper.

### **TOOLS USED IN THE STUDY**

The following tools were employed in tune with the objectives of the study.

- a. simple percentage analysis.
- b. chi-square test
- c. Average rank analysis.
- d. weighted average

### **LIMITATIONS OF THE STUDY**

- The study confined to coimbatore city only and hence the results cannot be generated to other areas.
- Internal prejudice of the respondents serves as a limitation of the study.

### **REVIEW AND LITERATURE**

Chen et al. (2016) With the blend of present day furniture plan and Hui-style architecture, the traditional for particular architecture social components are brought into the furniture outline in parts of shaping, surface, and development. The smooth and adaptable plan are introduced through Hui-style corbie-step type sofa backrest and therefore

the carved window with Jiangnan style, which may be viewed because the synopsis of the advancement outline of Chinese customary furniture and therefore the demand of the time.

### **CONSUMER CHARACTERISTICS**

Consumer characteristics is the major factor which affects the consumers perception and react to the stimuli. Consumers are shaped to some extent by the environment during which consumers live and consumers influence environments through consumer behaviors successively.

1. Culture
2. Social
3. Personal
4. Psychological

### **CONSUMER DECISION- MAKING PROCESS**

In consumer decision-making process, consumers undergo all five stages with every purchase. But in routine purchases consumers often reverse or skip some of these stages. By understanding these stages the companies can learn why individuals are buying or are not buying products or services. Companies can also learn through these stages that what can be done to get people to buy more or buy specific product or service.

### **FURNITURE PURCHASING DECISION PROCESS**

1. Planning and research
2. Shopping
3. Item selection
4. Store experience

### **DATA ANALYSIS AND INTERPRETATION**

The analysis and interpretation of the study is based on the information applied by a sample of 135 respondents.

- Simple percentage
- Ranking Analysis
- Weighted Average Analysis
- Chi-square Analysis

**SIMPLE PERCENTAGE ANALYSIS****TABLE 1 BUYING THE FURNITURE BY THE RESPONDENTS**

S NO	BUY FURNITURE FROM	NO OF RESPONDENTS	PERCENTAGE
1	Showroom	74	54.8%
2	Small workshop	32	23.7%
3	Road side furniture shop	19	14.1%
4	Direct from manufacturer	10	7.4%
	<b>TOTAL</b>	<b>135</b>	<b>100</b>

*Source: Questionnaire***INTERPRETATION**

The above table reveals the place of buying furniture by the respondents. It is clear that 54.8% are purchase from showrooms, 23.7% are purchase from small workshop, 14.1% are purchase from roadside furniture shop and 7.4% are purchase direct from manufacturer.

**RANKING ANALYSIS**

Under this method the respondents are asked to rank the choices. This method is easier and faster. In this study the respondents are asked to rank the various factors which influence to select the primary health care centres and the respondents are used to rank as 1,2,3,4, and 5. It does not matter which way the items are ranked, item number one may be the largest or it may be the smallest.

**PURCHASE FURNITURE ON THE BASIS OF WOOD**

WOOD	1(5)	2(4)	3(3)	4(2)	5(1)	TOTAL	RANK
<b>Teak wood</b>	45	14	29	23	24	135	II
	225	56	87	46	24	438	
<b>Plywood</b>	19	44	43	19	9	135	I
	95	176	129	38	9	447	
<b>Imported wood</b>	16	26	51	30	12	135	III
	80	104	153	60	12	409	
<b>Rose wood</b>	21	21	35	40	18	135	IV
	105	84	105	80	18	392	
<b>Mahogany</b>	21	14	50	30	20	135	V
	105	56	150	60	20	391	

**INTERPRETATION**

The above table shows the purchase furniture on the basis of wood that are ranked based on the return by the respondents.

Ply wood are ranked I by the respondents.

Teak wood are ranked II by the respondents.

Imported wood are ranked III by the respondents.

Rosewood are ranked IV by the respondents.

Mahogany are ranked V by the respondents.

**WEIGHTED AVERAGE ANALYSIS**

Under this method, the respondents are asked to rank their choices. This method involves ranking of the items given. To secure a ranking of all the items involved, the researchers total the weights which are given to each item. The highest weighted score is ranked first. Correspondingly the other ranks are assigned.

$$\text{Weighted Average} = \frac{\sum f(x)}{N}$$

N

**FACTORS DECIDING PURCHASE OF FURNITURE DIRECTLY FROM FURNITURE STORES**

FACTORS	1(5)	2(4)	3(3)	4(2)	5(1)	TOTAL	MEAN SCORE
PRICE	54 270	48 192	23 69	5 10	5 5	135 546	4.044
BRAND NAME	27 135	74 296	28 84	4 8	2 2	135 525	3.889
QUALITY	45 225	43 172	38 114	7 14	2 2	135 527	3.904
PAYMENT METHOD	22 110	51 204	45 135	15 30	2 2	135 481	3.563
DISCOUNT	31 155	52 208	31 93	14 28	7 7	135 491	3.637

**INTERPRETATION**

The above table shows the factors deciding purchase of furniture directly from furniture stores. The highest mean score is 4.044 for the price of the furniture.

**CHI SQUARE ANALYSIS**

A Chi-square is a statistical significance test based on frequency of occurrence. It is applicable

both to qualitative and quantitative variables. Among its many uses, the most common are tests of hypothesized probabilities or probability distributions, statistical dependence or independence and common population. A Chi-square test is any statistical hypothesis test in which the test statistic has a Chi-square distribution if the null hypothesis is true.

**RELATIONSHIP BETWEEN MARITAL STATUS AND PURCHASING PLACE OF FURNITURE**

S NO	MARITAL STATUS	PURCHASING PLACE OF FURNITURE				TOTAL
		SHOWROOM	SMALL WORKSHOP	ROAD SIDE FURNITURE SHOP	DIRECT FROM MANUFACTURER	
1	MARRIED	3	3	2	0	8
2	UN-MARRIED	70	29	18	10	117
	<b>TOTAL</b>	73	32	20	10	<b>125</b>

To find out the association between marital status and purchasing place of furniture of respondents, chi-square test is used and result is given below.

**HYPOTHESIS**

There is no significant relationship between marital status and purchasing place of furniture of respondents

**CHI-SQUARE**

Factor	Calculation value	Df	Table value	Remarks
Marital status	2.304 <sup>a</sup>	3	7.82	Accepted

**INTERPRETATION**

It is clear from the above table show that, the calculated value of chi-square at 0.05% level is more than the table value. Hence the hypothesis is accepted. So there is no relationship between marital status and purchasing place of the furniture.

**FINDINGS****SIMPLE PERCENTAGE ANALYSIS**

> Majority (54.8%) of the respondents are purchase from showroom.



### **RANKING ANALYSIS**

- From the above ranking analysis purchase of furniture on the basis of woods, it was found that plywood ranks 1, teak wood ranks 2, imported wood ranks 3, rosewood ranks 4 and mahogany ranks 5.

### **WEIGHTED AVERAGE ANALYSIS**

- From the above table shows the factors deciding purchase of furniture directly from furniture stores. The highest mean score is 4.044 for the price of furniture.

### **CHI-SQUARE ANALYSIS**

- There is no significant relationship between marital status and purchasing place of furniture of respondents

### **SUGGESTIONS**

- Most people will research a company online before they shop in-store. This means that it's more important than ever for your furniture ecommerce website to be attractive, optimized, and user-friendly.
- Customer retention is critical for furniture store marketing. The cost of acquiring new customers far exceeds keeping current customers, so it's important to keep your customers engaged with your brand.
- One of the most important keys of furniture store marketing is identifying your audience and engaging them where they are. You need to be able to reach out to them instead of trying to get them to reach you — because most likely, they won't. Not on their own.

### **CONCLUSION**

This research would be beneficial for furniture manufacturing and retailing companies in Coimbatore to understand process of customer decision making. Customers behaviour, and factors that have impact on customers decision. This study will help the companies to be more competitive in a furniture market. Once the products are produce based on the customers wants,the sale volume will growth its finally will trigger the country GDP.



## VILLAGE DEVELOPMENT – A CASE STUDY ON NGO IN UKHRUL DISTRICT, MANIPUR, INDIA

**Ungshunghui Rephung<sup>1\*</sup>, A. Balakrishnan<sup>2</sup>**

*<sup>1</sup>M.Phil Scholar, Centre for Applied Research Gandhigram Rural Institute  
(Deemed to be University), Dindigul, India*

*<sup>2</sup>Professor, Centre for Applied Research Gandhigram Rural Institute (Deemed to be University),  
Dindigul, India*

**\*Corresponding Author**

### ABSTRACT

*The NGO's play a significant role within the development of villages in Manipur. The village development committee get supported by the non-governmental organization by providing them the various programs and training programs. The purpose of this study is to investigate how the NGOs support sustainable livelihood for the villagers to become self-sufficient, analyse community capacitation and women economic empowerment through SHGs created a positive impact on their standing and relationship within the family whereas the efforts at grass root level and also been to vary the gender bias mind-set by involving them in project connected establishments and influencing acceptance of women's participation altogether traditional institutions. It's also necessary to show that there's a vacuum created by rebellion and ethnic conflicts within the State. Hence, it's essential to look at the chance of strengthening NGOs. I even have targeted to review those NGOs that genuinely work for the poor. This analysis focuses on the role of NGOs in Ukhrul district. Basically, this study tries to analyse whether or not NGOs act as effective agents of change. However, there's the requirement for integrated rural development and development ought to conjointly not be left within the hand of state alone but also different development agent should return on board to support.*

**KEYWORDS:** *Village development, Community capacitation, Women empowerment, Sustainable livelihood*

### INTRODUCTION

There is a wave of Non-Governmental Organizations (NGOs) in Manipur nowadays and it's not solely a social employment however NGOs became a path of career trajectory. NGOs attract students of assorted disciplines like Management, social science, economics and sociology. In Manipur, the quantum jump within the variety of NGOs is principally due to unemployment. In recent years, people particularly educated youths be after to affix NGOs not solely to avail employment and financial advantages however also to serve the poor and bring regarding transformation within the society. It's also necessary to show that there's a vacuum created by rebellion and ethnic conflicts within the State. In such a context, there's an area for NGOs to emerge during a powerful manner in spite of the actual fact that there also are fake NGOs in state. Hence, it's essential to look at the chance of strengthening NGOs. I even have targeted to review those NGOs that genuinely work for the poor. This analysis

focuses on the role of NGOs in Ukhrul district. Basically, this study tries to analyse whether or not NGOs act as effective agents of change. Here, it's essential to examine the thought of NGOs vis-a-vis voluntary organizations. In its broadest sense, the term Non-Governmental Organizations (NGOs) refers to organizations that are sometimes got wind of by a gaggle of individuals out of their own initiative or part influenced by external forces just like the state, donor agencies. NGOs also are non-profit organizations and may be organized on a neighborhood, regional, national or international level. The term 'NGO' may embrace personal foundations, academic establishments, religious organizations, missions, trade unions, skilled organizations, business and commercial associations, cooperatives, cultural teams, pressure teams and peasant organizations.



### Statement of the problem

Non-Government Organization plays a vital role in the shaping and implementation of participatory democracy. Their credibility lies in the responsible and constructive role they play in a society. They work at grassroots level even in remote areas and, therefore, their reach is much wider. Some of the reason put forward for increase in the number and activities of NGOs are the decline of socialism and an increased national and international funding for voluntary sector. In a number of development activities, NGOs are working as supplements of complements to the government efforts. So, this study deals with village development – a case study on NGO in Ukhrul district, Manipur.

### Objectives of the study

1. To examine the role of NGO's that uplift women empowerment through NGO in Ukhrul district of Manipur.
2. To analysis about livelihood activities in Ukhrul.
3. To analyse the community capacitation in Ukhrul district.
4. To know the role of NGO in rural development activities in Ukhrul district.

### METHODOLOGY

The study is conducted through Case study method

### TOOL USED FOR DATA COLLECTION

An appropriate personal interview schedule incorporating the objective was constructed for the purpose of collecting primary data from the respondents. In addition, the personal observation was also made by the researcher.

A pilot study is a preliminary which help to plan clearly and get specific idea on the subject of study. For researcher study a pilot study is very essential. It simplified the task of framing a schedule or questionnaire.

The constructive interview schedule was pre-testing among respondent and modified based on their reply. The modified interview schedule was administered to collect data from the respondents.

### SOURCES OF DATA

The study has relied on both the primary and secondary data, the primary data will be obtained through interview schedule. Secondary data was obtained from the published document possessed by NGO and library sources. To some extend primary data also collected from the staff of NGOs and member of the NGOs at the time of conducting the present study

### SCOPE OF THE STUDY

The present study was aimed at understanding the structure and functions of NGOs besides highlighting its role for the development of the village and women empowerment.

### LIMITATIONS OF THE STUDY

Since the time which was allotted for this study was very limited and limitation was also barrier since the study required man-hour to complete, the investigator as a student was confronted with many limitations. The financial constraint also stood in the way of preparing large number of scheduled that rendered the investigator not to conduct a detailed study about it.

### VILLAGE DEVELOPMENT IN UKRUL DISTRICT – A CASE STUDY CASE-I COMMUNITY CAPACITATION (GROUP)

Tribal system of oral tradition of governance in the village is headed by a hereditary Headman along with village elders representing from each clan in the village. This system lacks transparency, awareness, skills, gender balance and is corrupted by State party politics and its welfare schemes. This necessitated the project intervention to organize the community at three levels viz; Self Help Groups (SHGs) at group level, Village Development Committee (VDC) at every village level they consist of four institution's Kingship, women institution, youth institution and church institution, and Area Development Coordination Committee (ADCC) at area level. Capacitation of these organized groups in terms of awareness on issues concerning their lives and skills in terms of analysing their situation and planning of relevant development programs are facilitated by this project. Most importantly influencing change of gender bias mind-set through gender balanced composition in formation of VDC and ADCCs at grass root and ensuring transparency in the village system though people's participation thereby enabling redefining their own concept of development based on their own situation.

A profile of each village is developed in a process of participatory rural appraisal and based on the facts and figures of which analysis of local situation is facilitated by the project and relevant development program is planned. The profile is updated every year for a comparative study of change. This intervention is to strengthen the traditional system of village governance headed by the headman and is now adopted by even non-project neighbouring village.



## **RESPONSIBILITIES OF VDC MEMBERS**

- VDC is basically an agency for change in the village. It shall acquire capacity to analyses local situation and plan relevant development programs in consultation with the village authority.
- VDC shall plan sustainable use of natural resources- land, water, forest, and wild lives by promoting use of bio fertilizers, enhancing production and productivity by changing traditional practice of cultivation, prevent poisoning of river for fishing prevent burning of forest for hunting, regulate fishing and hunting during breeding season, plan annual tree plantation and by regulating season for cutting trees.

## **RESPONSIBILITIES OF ADC**

- Organizing seminars/workshop in the area on issues related to their own situation.
- Share understanding of development to deal with issues common to the area.
- Empowering the women.

## **LIVELIHOOD SUPPORT FOR PEOPLES THROUGH VDC**

This committee focus on promoting the people on their own to meet their needs. Which has also provided the adequate knowledge and training program for the people in this particular area. The village development committee also get supported by the NGO by providing them the different programs and training programs.

## **Impact of the Village Development Committee Program**

Village development program focus on the providing the support for the people in the village in order to provide guidelines for their betterment of their life. Thus this program has brought adequate support to form committee in this village. This committee provides a common conceptual approach to promote people's standard of living. Through this program the people are able to meet their own needs.

## **CASE- II LIVELIHOOD (VILLAGERS)**

In the absence of institutional credit facilities in the District, NGOs initiated interest free micro credit service for income generation activities. In agriculture, apart from land development for enhancing food security, they have introduced orchards as an alternative to shifting cultivation. This also helps farmers to increase their sources of income by introducing new crops. Skill trainings are given to young entrepreneurs in food processing, solar technology, making washing powder, dish wash making, carpentry, wood craft, cane and bamboo architect, weaving, tailoring and bee keeping.

## **LIVELIHOOD SUPPORT**

As a farmer in the village, they were growing of fruit trees as a family asset like planting lemon, orange, banana, avocado which he get supported by the NGO by providing him the saplings with free of cost and Planting of Mulberry, Lemon, Orange, Avocado and castor plants was introduced by NGO as a pilot sericulture activity to him also getting helps from the NGO to increase his sources of income by introducing new crops, villager started farming for the past years for the survival and fulfilment of aspiration in their family and it was the main source of income, with farming income has supported their children for basic needs and for their education purposes. They produced their own commodity and sale the fruit in the village as well as Town, Ukhrul district and sometimes export in the capital city of Manipur, Imphal city.

## **IMPACT OF THE LIVELIHOOD PROGRAM**

Livelihood program focus on the providing the support for the people in the village in order to provide the materials to start their business. Thus, this program has brought adequate support to do his farming. This livelihood framework provides a common conceptual approach to promote people's standard of living. Through this program he got benefited in economic aspect which has been his barrier on his farming.

## **CASE III WOMEN EMPOWERMENT (GROUP)**

NGOs has always been sensitive to the issue of gender equity both in the organizational structure and its intervention as well, women economic empowerment through SHGs created a positive impact on their status and relationship in the family while the efforts at grass root level has also been to change the gender bias mind-set by involving them in project related institutions and influencing acceptance of women's participation in all traditional institutions.

## **WOMEN EMPOWERMENT (HOOMI VILLAGE)**

Women empowerment in self-help group Hoomi in Hoomi village Ukhrul district Manipur, old days are gone people became aware of their surrounding and situation in which they live in. women acquire their freedom to do everything that matter to them, as a apart and along with their daily activity, they spend some time for their own earning. In Hoomi village women plan and nature a kitchen garden and it becomes their survival. The culminated into formation of SHGs which created an impact



Hoomi village, Ukhrul district in terms of reducing the interest rate of private loans and hence reducing land alienation by money lenders. And through NGO credit the introduction of Burmese Loom in the hoomi village to protect the only surviving traditional skill. This contributed in reducing the migration of young girls to cities in search of job opportunities.

### FINDING OF SHG

- 33 percentage of respondents are having income from below Rs. 10,000.
- 33% percentage of the respondent's purpose is starting group business.

### IMPACTS OF NGOS IN VILLAGE DEVELOPMENT IN UKHRUL DISTRICT MANIPUR

Greater participation of women in public life-Women have stayed away from public life traditionally. Village authority comprised of only men and thus there was no platforms for political participation of women. Through NGOs initiative there is marked increase in women's participation now. They attend SHG and VDC meetings and manage IGA activities. There is a scope for improving their participation at APMC level also improving their negotiation skills at the household level as well as in public decision making. Increase in community owned initiatives. The community has not relied upon the IGA initiative by NGOs like volunteer for village Development alone but has planned its own initiatives. Rice mill as owned by women's society and saving bank created at wunghon are an example.

### FINDINGS, SUGGESTIONS AND CONCLUSION

- NGOs has created skill development opportunities for self-employment generation to prevent youth migration in search of livelihood
- Assisted in obtaining disability certificates & aid & appliances, social security schemes, admission in special school and vocational training.
- Local initiative for managing and facilitating conflict and peace building programme are being done and community members trained on micro credit management
- NGOs has given 63 villages awareness on the disease and reducing social stigma in Ukhrul district.
- Women member are educated on gender and their rights
- Villages are supported for agriculture development

- Farmers are trained on agriculture and crop management
- NGOs has created employment and livelihood support to the villages
- It has improved the living standard through poverty alleviation
- Networking meeting on common vision and perspective building (issue based) with social and local based organization of area and district.
- NGOs has campaign on Tribal Forest rights, displaced families and conflict affected family and person with disabilities.
- Effort initiated in 2 blocks in alliance with people organization to strengthen transparency and accountability in district governance.
- Vocational training 53 girls has trained on loom weaving 19 youth trained on wood craft 3 youth trained on automobile 20 girls trained on tailoring and embroidery.

### SUGGESTIONS

- NGOs has to increase its more collaboration partnership villages.
- Committee members should put in measure on how to sustain and maintain those development strategies or project for the development of the village areas for present and future use.
- The needed skill should be given to the local people who see to the monitoring of project and also even through NGOs involve beneficiaries in planning for development, more can be done to increase participation to authenticate the real needs of the people.
- Despite the failure, plantation on private program must continue. However concentration for quality work may be suggested rather than numerical achievement of coverage of villages. Awareness campaign should be reinforced and strengthened to motivate the people
- To reach the cooperative education at grass root level, concerned NGOs should organised workshop on cooperative education in villages.

### CONCLUSION

NGOs act as a planner and implementers of development plans. They help in mobilizing the local resources to be used for development in the village. NGOs help in building a self-reliant and sustainable society. These agency play the role of mediator between people and government. Reviewing the



various rural development policies of the various government provides the platform for instituting policies that are likely to be resourceful and advantageous to the rural communities. There is the need for integrated rural development and development should also not be left in the hand of state alone but other development agent must come on board to support.

## REFERENCES

1. Aryeetey, Ernest, "Decentralization for Rural Development: Exogenous Factors and Semi-Autonomous Programme Units in Ghana", *Community Development Journal*, Volume 25, Number 3, 1990, pp.206-213
2. Ayodhya, P. and K. Papa, "People-Centred Development through Educational Intervention", *Journal of Rural Development*, Vol. 12, No. 6, 1993, pp.617- 632.
3. Chander, Mahesh, "Farmers' Participation in Rural Development Programmes: Case Studies of some local NGOs in Central Himalayan Region", *Journal of Rural Development*, Volume 15, Number 3, July - September 1996, pp.393-408.
4. Gangrade, K.D., (1997), "Two Models of NGOs in Development at Work", in Noor-jahan Bava, (ed), *Non-Governmental Organizations in Development - Theory and Practice*, Kanishka Publishers, New Delhi, 1997, pp.101-124.
5. Gutkind, Peter C.W. "The Language of Development: Underclass Perspective", *The Indian Journal of Social Science*, 3:3, July-September 1990, pp.383-393
6. Howes, Mick and M.G. Sattur, (1993), *Bigger and Better? Scaling-up Strategies pursued by BRAC 1972 - 1991*, in Michael Edwards and David Hulme (ed.), *Making a difference - NGOs and Development in a Changing World*, Earthsan, London, pp. 99-110).
7. Mehta, Ajay S., "Micro Politics of Voluntary Action: An Anatomy of Change in Two Villages", *Renewal*, Volume 3, Number 2, November 1996, pp.31-39.
8. Murthy, Nirmla, (1988), *Two Approaches to Rural Development: Case Study of Sewa and Mahiti*, in M.L. Danhvala, et al, (ed), *Asian Seminar on Rural Development - The Indian Experience*, Oxford & IBH Publishing Co. Pvt.Ltd, New Delhi, 1988, pp.283-309.
9. Padron, Mario, (1987), "Non-Governmental Development Organisations; From Development Aid to Development Cooperation", *World Development*, No. 15, Supplement, 1987, pp.69-77.
10. Powell, Sandra, *Partners in Dialogue*, in John Burbidge, (ed.), (1988), *Approaches that work in Rural Development - Emerging Trends, Participatory Methods and Local Initiatives*, Institute of Cultural Affairs International, K.G. Saur, Munchen, 1988, pp.51-66.



# THE CONTENT AND STRUCTURE OF THE EDUCATIONAL AND COGNITIVE COMPETENCE OF UNIVERSITY STUDENTS

<sup>1</sup>**Avezmuratova D.A.**

<sup>1</sup>*Avezmuratova Diyora Allayarovna - Independent researcher at Urgench State University*

## ABSTRACT

*This article examines the process of developing the educational and cognitive competence of university students (language and non-language profile), the author defines educational and cognitive competence, develops the content of teaching educational and cognitive competence, analyzes the problems that prevent its formation in different categories of students, and also gives options for solving these problems, in particular, increasing the effectiveness of independent educational and cognitive work.*

**KEYWORDS:** *key competencies, educational and cognitive competence, foreign language communicative competence.*

## DISCUSSION

The problem of enhancing the cognitive activity of students is relevant not only in pedagogy, but is also a serious social task. The problem lies in the fact that in the process of professional training, the student learns only the knowledge that aroused his interest, and in the process of mastering it, intellectual tension took place. A student is a future society, a representative of a new generation of professionals. Therefore, great importance is attached to its cognitive activity in the educational process.

The formation of the personality of a university graduate is inseparable from the development of modern higher education. As a result of this formation, the graduates learn independently to cognize the activity and transform the professional sphere, where the focus on competence in the field of independent educational and cognitive activity acquires the main meaning and significance.

The concept of "educational and cognitive competence" is an important component of an integral system of lifelong education and is gaining special relevance. The concept of the competence-based approach is aimed at the future development, but today, especially in connection with the development of the third generation of educational standards of higher education, this approach is being implemented in educational activities. Through this prism, the study and building of educational and cognitive competence becomes more relevant.

Since educational and cognitive competence is a combination of established requirements for the educational training of a student in the field of independent cognitive activity, the concept of "educational and cognitive competence" is inextricably linked with the concept of "cognitive competence (competence)". Cognitive competence is considered a personality characteristic that implements the knowledge gained, the student's skills in organizing this type of activity, the ability to apply skills, techniques, algorithms, techniques, tools, etc. in order to obtain answers to educational and cognitive questions, to gain experience of independent cognitive activity. The main components of this concept determine the formation of cognitive competence, taking into account its content and composition.

The competence-based approach is due to the transition:

- From subject teaching and learning to integrative learning, holistic educational activities and continuous self-education;

- From consolidating "residual" knowledge to determining the level of qualifications, readiness for future continuing education, the level of professionalism, readiness for activity (value-orientational, psychological, practical), to self-realization, competitiveness in the professional environment, the degree of social and professional preparedness [1].



The problem of studying cognitive competence has been attractive for pedagogical science for a long time. The available scientific data prove that cognitive competence is a personality quality that is complex in its structure and functions, which has not formed into a clearly described and developed system [2]. In a number of studies, scientists note that cognitive competence indicates a close connection between the internal readiness of a person for mental work and an intensive indicator of such readiness (L.P. Aristova, L.I.Bozhovich, N.F. Dobrynin, A.N. , A.A. Smirnov, etc.)

Scientists like I.L.Bim, O.I. Guseva, L.V. Tokareva, A. Den, E.G. Azimov, A.N.Shchukin in their definitions say that the main focus of educational it is the preparation of students for independent educational work or independent educational activities in the field of learning a foreign language outside the educational institution. Also, in each of the definitions, the researchers paid attention to the structure of this type of competence - knowledge, skills, skills and abilities. In this study, we also adhere to the general definition according to which educational and cognitive competence represents knowledge, skills and abilities to carry out independent cognitive and educational activities in the field of studying a foreign language and culture.

In our opinion, the most important pedagogical conditions for the development of educational and cognitive competence of students are positive motivation for learning and for future professional activity, as well as the effectiveness of independent educational and cognitive activity, i.e. the ratio of the result obtained (in the form of knowledge, abilities, skills, experience, etc.) to the time spent on its acquisition. The more and better the result obtained in the same time, or the less time spent on obtaining the same result, the more effective educational and cognitive activity [3].

If the latter turns out to be ineffective, and the assigned tasks remain unsolved, the student's motivation for learning activities, for the profession and this subject may decrease. With sufficiently high motivation, he will look for new ways to solve educational and cognitive tasks until the goal is achieved. Moreover, the more difficult this process is for him, the less likely it is that after achieving the set goal, the new goal will be associated with educational and cognitive activities in this area. However, in some cases, the development of educational and cognitive competence in this way leads to intellectual satisfaction and increased motivation. This result can also be considered positive. It will be negative when the student did not find a way to solve the educational and cognitive task and found it impossible for himself, which can lead to the cessation of educational and cognitive activity

and the rejection of the set goal or attempts to achieve it, avoiding the solution of educational and cognitive tasks (imitation of educational -cognitive activity, for example).

To prevent a negative result, students should be taught (especially those with a low level of subject competences, insufficiently formed educational and cognitive competence and insufficient motivation) the most effective techniques and methods for solving educational and cognitive tasks in the process of independent work. Students with a high level of educational and cognitive and subject competences who are inclined to terminate educational and cognitive activities in a given subject area can be motivated to set new goals related to this subject, for example, emphasizing its need for a future profession. The educational content plays a huge role in raising the motivation of students in this category.

Since the development of competence is cyclical, then for its development, transition to a qualitatively new level, effective independent work is needed, which, in turn, requires competence formed up to the previous level.

The reasons that hinder the effectiveness of students' independent work can be subdivided into those depending on the student himself (lack of hard work, will, perseverance, general preparedness, abilities, lack of ability to work independently, etc.), and depending on the organization of the educational process at the university (overload with classroom studies, weakness or lack of current control, lack of necessary training tools, etc.).

Students of a non-linguistic university develop both foreign language communicative and educational and cognitive competence in the subject area of the "foreign language" very unevenly, which is due to the difference in their pre-university training, attitude to the subject, different levels of abilities, the type of intelligence and other conditions that do not depend on from the organization of the educational process at the university. Such differences are inevitable, and they must be taken into account when organizing the educational activities of students.

In addition to individual characteristics, the effectiveness of independent work is also influenced by organizational and pedagogical conditions, such as properly organized control, methodological support of the educational process, and the content of training that corresponds to the interests and goals of students.

Usually, in the educational process, each teacher uses an arsenal of techniques and methods of work, taken from various methods, combining them and applying them depending on the situation. Most often, preference is given to communicative and intensive methods, innovative ones are combined



with elements of the classical methodology, which have proven to be the most effective. As a rule, the methodological level of university teachers is quite high, and the work of students in the classroom is effective.

However, the curriculum of the university does not have the number of classroom practical lessons, which is necessary for intensive methods of teaching foreign languages, therefore, the importance of independent extracurricular work of students is so great.

**Table 1**

<b>Components of educational and cognitive competence</b>	<b>Content of the components of educational and cognitive competence</b>
Knowledge	<ul style="list-style-type: none"> <li>- the nature of cognition and the learning process;</li> <li>- individual characteristics of a person in the study of foreign languages;</li> <li>- the specifics of the studied language and culture;</li> <li>- modern approaches and methods of learning foreign languages, modern technologies of teaching languages</li> </ul>
Skills / Abilities:	<ul style="list-style-type: none"> <li>- goal setting;</li> <li>- to formulate the achieved result of educational and cognitive activity;</li> <li>- plan your independent educational and cognitive activities;</li> <li>- choose an individual trajectory to achieve the educational goal (development of speech skills, formation of language skills, study of the culture of the country of the target language);</li> <li>- define and select approaches and methods to achieve the goal;</li> <li>- select the necessary funds to achieve the goal;</li> <li>- carry out the selection of training content;</li> <li>- make adjustments to the chosen trajectory of learning and / or the result of educational and cognitive activity;</li> <li>- to carry out a self-assessment of the intermediate and final results of their independent educational and cognitive activities in the study of a foreign language and culture;</li> <li>- to reflect on their educational and cognitive activities;</li> <li>- self-improvement and take into account the previous positive and negative experience in subsequent educational and cognitive activities</li> </ul>

The materials of Table 1 indicate that many of the skills included in the list of educational and cognitive competence are the skills of independent educational activity [4] and learning along an individual trajectory [5], which is quite natural. The competence-based model of education implies the formation of a number of competencies in students, which they can further use and improve throughout their lives. The development of the above-mentioned educational and cognitive skills of students during their studies at the university will allow them to use them after graduation to further satisfy personal and professional interests and needs in the field of linguistic education.

2. *Abulkhanova-Slavskaya K.A. Activity and consciousness of the individual as a subject of activity. Personality psychology in a socialist society: Activity and personality development. Moscow: Nauka, 1989.183 p.*
3. *Nechaeva T.A. Organizational and pedagogical factors of activating students' independent work: dis. ... Cand. ped. sciences. SPb., 1992.*
4. *Koryakovtseva N.F. Modern methods of organizing independent work of foreign language learners: a guide for teachers. M.: ARKTI, 2002.16.*
5. *Sysoev P.V. Individual trajectory of learning: what is it? // Foreign languages at school. 2014. No. 3. p. 2-12.*

**REFERENCES**

1. *Тоджибаева К. С. К. Профессиональная педагогическая компетентность учителя: феноменология понятия //Вопросы науки и образования. – 2018. – №. 27 (39).*



## YOUTH - OBJECT OF MASS CULTURE IDEOLOGY

**Tashmatov Ibragimjan**

*Associate Professor, department of History, Uzbek State World Languages University, Tashkent, Republic of Uzbekista*

### ABSTRACT

*The intensifying ideological struggle in the modern world to master the minds and hearts of the younger generation requires us to be vigilant and able to deal with destructive ideas. Popular culture participates in this struggle on the side of the reactionary forces. With its tested methods, it seeks to perpetuate values that are not characteristic of the millennial traditions of peoples. The study of "Mass culture" sets the task of examining the essence and its role in the modern ideological struggle, to show its destructive power in the life of society.*

**KEYWORDS-** *Cultural adaptation, Underground, Westernization, Globalization, Dehumanization, Inculturation.*

### DISCUSSION

The years of adolescence are considered the time of the formation of the inner world of a person, the norms of worldview and morality. In other words, youth asks a person the questions "Who am I?", "Why do I live?", "What needs to be done to improve the world?" - these are eternal questions that always face young people. If the answers to these questions are not found, this is fraught with violation of the norms and rules of a creative life. Some young people are not ready for this and make hasty conclusions, making mistakes. Young people, as a rule, are looking for answers to questions about the truth and pressing life questions, they direct their feelings towards the comprehension of the truth and the feeling of the spiritual perfection of the world.

The concept of youth as a socio-demographic group entered scientific circulation in the late 18th and early 19th centuries. Since the XIX century the public's attention to the problems of young people is increasing, especially to such issues as personal development, the problems of educating citizens of the corresponding society. We find these questions in philosophy, pedagogy, psychology, especially these questions are scientifically substantiated in the philosophy of modern times. People from 14-16 to 25-30 years old are young people. "Youth, as a special socio-psychological type, is determined by a special status in society, the

laws of socialization, opportunities for education and upbringing."<sup>1</sup>

Young people are considered the main social group for the normal life of society. The relevance and increasing attention to the study of youth problems are associated with the issues of the continuity of generations and the reproduction of society. The life of society is largely connected with the positions of young people, their worldview, modern appearance, health, attitude to modern life.

The study of the influence of "mass culture" on young people from the point of view of socialization in society is relevant today. Socialization begins in childhood. This process especially plays a significant role in the upbringing of children and adolescents, since the basic moral norms are formed at this time. In a traditional society, eternal values were passed down from generation to generation. Undoubtedly, the life of young people, their socialization are associated with the traditions and way of life of society. On the other hand, at the present stage, the role of innovations is increasing. These two opposite tendencies today coexist in one social space, which leads to objective contradictions. That is, in the new socio-economic conditions, finding one's place, advancement in the social space, adaptation, inability to socially adapt, determines the culture of youth behavior today.

<sup>1</sup> Philosophy-encyclopedic dictionary - T Shark. 2004. 121 pages



Today, the culture of self-expression, youth identification is associated with growing socio-economic inequality in society, its change, the crisis of the main institutions of socialization - family, school, army, labor collectives, replacement of the basic models of socialization, and an increase in the role of the media.

In these conditions, in the West, in some CIS countries, significant problems arose among young people associated with an increase in crime, drug addiction, alcoholism, suicide, unemployment, moral decline, remoteness from spirituality, breaking of stereotypes of thinking, attitudes towards work. For example, there have been many reports of suicide among young people recently in the media. Recent studies show that the Internet today has a strong psychological impact on people, in which pressing the "Escape" button forms the idea and fear of the end of life. Or the growing number of children and adolescents who want to change their sex, which is often supported by parents and doctors. Today, these issues cause heated debate among politicians and statesmen in the United States and Europe. The youth environment has a certain strength, therefore it is considered the main link in the socialization of society. If this activity is uncontrolled, it will usually be directed in a different direction.

According to psychologists, the concept of "ideal" appears mainly as a community of moral norms, becomes significant in life, is a model that personifies the best human qualities. The moral ideal in secondary socialization plays a major role in society.

The problem of modern society is that its ideals are formed under the influence of mass culture. Today, the concept of the ideal in society is being replaced by the concept of "idol". All this is an object of imitation for young people, which does not correspond to objectivity.

What kind of heroes does the mass culture of today's youth cultivate? Popular culture today has its heroes. In particular, the heroes of "mass culture" live in an environment where the manifestation of heroism is not required, they live in conditions where there is no room for heroism. These are, as a rule, gangsters, devoid of moral standards, police detectives, murderers, skillful demagogues or mastering the "Wild West" white people, comics or fantastic characters in "soap operas". Their names are constantly repeated in advertisements. Among them are Billy the Kid, the strongest of the scouts James Bond, the romantic gangsters Bonnie and Clyde, capable of everything Superman, Spiderman, Catwoman and others. The mass character of "mass culture" does not last long. In "popular culture" heroes are quickly replaced by new heroes known to the audience. As a rule, well-known heroes are

created by advertising and mass media, directors and image makers using mass media create false ideas about personalities, politicians, movie stars, writers, etc.

In this regard, the heroes of mass culture are introduced to the consumer without obstacles through the image, taking advantage of the modesty of youth. Discussing the lives of the heroes in a childish way unites the interests of young people, which creates a special emotional environment, separate from the parents. It is known that high school students spend 30% of their time discussing the problem of "heroes" with their peers. Thus, the connection from parents directly passes to peers, traditional family ties of mutual understanding and faith are violated, relations between children and parents are aggravated, which leads to the undermining of family relations.

Researchers and specialists distinguish among the many problems of young people the "narcotic subculture" formed in the 20th century, more precisely, the traditions of consuming active psychotropic drugs, systems and methods of their distribution, searching for various psychotropic means of experimenting with them, protecting it from the encroachment of ill-wishers.

According to official data, there are 70 million drug addicts in the world. Most of them are people from 12 to 25 years old. This is a specially prepared audience for the distribution of drugs. This activity for profit is similar in nature to crimes, murder of adolescents, mass pogroms, wars, slavery, concentration camps. Such an attitude directed at children is contrary to morality. Various social studies have shown that the media plays an important role in the dissemination of information about drugs, 56.6% of young people receive information about drugs from the media.

All information received by young people from the media can be systematized into groups:

1. Promotion of sex. Sex associated with personal love and sexual intercourse is replaced by sex deviation: promiscuous sex, paraphilia, homosexuality, propaganda of open mass sexual intercourse, as a manifestation of supersensitivity).

2. Youth fashion. Promotion of clothing without distinction of gender (unisex). Disco fashion - consisting of elements of different cultures, that is, shameless clothing that is contrary to the modern accepted fashion.

3. Deviation - deviation from the accepted norms of morality of society and crime.

4. Mythology - extreme, oversensitive, drug propaganda under the guise of devilish temptation, astrology, UFOs, aliens from other worlds, etc.

5. Rock stars, rock music. Advertising of popular stars, royalties, distribution of information about fans, coverage of wealth of successes, personal



dramas. Spreading news about deviant behavior as a main part of their life.

6. Venues (entertainment of the soul) - clubs, rock concerts, discos, mass celebrations in entertainment establishments.

Ideological colors are clearly visible here. This ideology destroys social norms, this is the ideology of withdrawal from society, the ideology of crime. It leads young people to create small groups with their own norms of behavior, leads to drug use.

Thus, popular culture denies the laws and norms of society, poses a threat to millennial prohibitions, calls into question the basic value of a person - his life. Its goal is to oppose young people to society, deviate from the right path, use the mechanism of self-destruction of the individual, open access to the consciousness of young people with myths about drugs.

Today, most people, especially young people, get ideas about the necessary style of behavior, lifestyle, career, relations between people precisely through mass culture. Food, clothing, housing, household appliances, household items, education also come to a person through the mechanisms of mass culture. Today, a product is considered prestigious and valuable when it becomes an object of mass demand. We can say that popular culture is becoming a means of stimulating consumption, for which advertising is actively used.

Popular culture is becoming the foundation of world culture, erasing and eliminating national boundaries. The works of mass culture are based on universal psychological (psychophysiological) characteristics and mechanisms of perception, which work regardless of the level of education and the degree of preparedness of the audience. Moreover, education is even harmful for her, since it interferes with the direct emotional perception that popular culture is aimed at. The main characteristics of mass culture can be formulated:

- focus on a homogeneous audience: reliance on the emotional, irrational, collective unconscious;
- fast availability and fast forgetting; tradition and conservatism;
- operating with an average linguistic semiotic norm; entertaining.

Popular culture surrounds the modern student at every step. Popular culture products play an important and sometimes a decisive role in the socialization of adolescents and young people. Hence the need for a serious study of mass culture, the ways of its influence on human consciousness. Who, no matter how a social science teacher, should show a teenager the difference between works of high culture and products of mass culture, interaction, interpenetration of mass, elite, folk cultures, teach

him to make a choice? Popular culture is inseparable from the media of communication. Channels for the dissemination of mass culture: radio, television, video, sound recording, cinema, Internet, etc. Thanks to them, the systematic distribution of cultural products through the press, radio, television, cinema, global computer networks is ensured.

It is known that the Internet today is the main and guiding force in the information space, an integral part of people's lives.

There are 1.5 billion Internet users in the world today.

In Uzbekistan, 8 million citizens use the services of this network.

On the Internet there are 10,000 negative and harmful sites promoting suicide, and even more terrorist and extremist sites that are contrary to the upbringing of children. The Internet today is skillfully used by political forces for their own selfish purposes.

Whoever owns information today rules the world, this thought is the leading one among the people of the planet today. Today, the activities of the Western media are associated with destructive processes that form negative emotions in a person of severe stress, fear, horror, immoral sexual feelings, pornography, the use of suspicious facts and events that negatively affect people's behavior. As a result, a rich, aggressive, false virtual world of threats and dangers is created that leads people to stress. A person creates a whole emotional spectrum of threats, fear, horror, hopelessness, disbelief, apathy. All this leads to inhibition, suspension of intellectual and moral activity of people, slows down or destroys the formation of a person as a person, thereby a person gradually breaks away from real life, the processes of personality development are disrupted.

## REFERENCES

1. Ionin L.G. *Sociology of culture*. - M. "Logos", 1998
2. Moth A. *Sociodynamics of culture*. - M. "Progress", 1973.
3. Muscovites S. *The Age of the Crowd*. - M. Center PP. 1996
4. Ortega and Gasset H. *Dehumanization of art*, - M. 1991.
5. Radugin A.A. *Culturology*. - M, Center, 2001.
6. Тоджибаева К. С. К. Педагогические и психологические особенности обучения взрослых // *Academy*. – 2018. – №. 1 (28).



## A REVIEW OF DUAL-MOTOR SYSTEM AND METHODS FOR CHARGING BATTERIES OF AN E-VEHICLE

Lokesh M. Giripunje<sup>1</sup>, Vipul Kumar Singh<sup>2</sup>, Govind Suryakant Kendre<sup>3</sup>

<sup>1</sup>Assistant Professor, <sup>2,3</sup> Students

Article DOI: <https://doi.org/10.36713/epra7181>

DOI No: 10.36713/epra7181

### ABSTRACT

*The use of electric cars has the potential to reduce transportation-related pollution. Their adoption has been hampered by the lack of and/or high cost of charging facilities. As a result, small on-board chargers are often used as the main charging system in cars. We know that batteries can be charged in two ways: conductive and inductive. Here we are proposing a dual motor based charging. We know that when we power a motor with electricity, the electrical energy is converted into mechanical energy and vice versa. Here we are using rear motors for the movement of our car. This movement is used by front motors for producing electrical signals again. Of course the power used by the rear motor and the power generated by the front motor is not the same. There is a significant difference; if we assume that the power used by the rear motor is 100%, the power generated by the front motor is between 30 and 60 percent. This generated power is now being used to charge the battery, and the battery will charge while driving the car. This is the main idea behind this technology.*

**KEYWORDS**— *E-vehicle, Efficiency of E-vehicle, Dual motor system, Efficient Charging, & EV*

### 1.1 PROBLEM STATEMENT

There're so many e-vehicle manufacturers like Tesla, Tata, etc. The issue with every e-vehicle is that the output on a single charge is insufficient. Charging stations are the most problematic issue in developing countries such as India. The charging time is a major issue with Li-ion batteries and all other batteries. The charging time for batteries is much longer than the output time. A large amount of electricity is required at the charging point, which is generated by coal. This is the most significant disadvantage because coal emits more pollution than diesel or gasoline-powered vehicles.

### 1.2 INTRODUCTION

Concerns over carbon dioxide emissions, greenhouse gas emissions, and the rapid depletion of fossil fuels have heightened the need to develop and

implement modern eco-friendly, long-term alternatives to internal combustion engine (ICE) vehicles. The issue with every e-vehicle is that the output on a single charge is insufficient. The most pressing issue in developing countries such as India is the lack of charging stations or charging points. Another issue with using a Lithium-ion (Li-ion) battery or any other battery is that they take an inordinate amount of time to charge. The charging time for batteries is significantly longer than the output or operating hours provided by the e-vehicle. Furthermore, the e-vehicle consumes a large amount of electricity, and the charging point typically uses coal to produce electricity, which is another disadvantage because using coal causes excessive pollution when compared to diesel or petrol engine vehicles. This is where papers suggesting a dual-inverter drive to charge directly from a single-phase AC grid at power levels higher than current on-board chargers may fail to make an impact. Integrating



local power production, such as renewable energy sources (RESs), into the EV charging grid is one effective way to mitigate the impact. Currently, e-vehicle motors are underutilized for a variety of reasons, including low efficiency of the motor and batteries; a significant amount of time is required for charging batteries; and a scarcity of battery charging stations. As a result, e-vehicles can only be driven for short distances, indicating that there is room for improvement in the operation and manufacturing of e-vehicles.

As a result, there is a need in the art to develop an efficient, simple, and cost-effective system and method for e-vehicles to efficiently charge e-vehicle batteries while driving, thereby reducing the frequency of charging required as well as the charging time of the e-vehicle batteries.

## LITERATURE REVIEW

Lithium-ion batteries have a few advantages over other types of energy storage systems, such as high energy and power efficiency, reduced memory effect and resulting performance loss, this type of battery is the ideal candidate for the field of electric vehicles.

1. The main charging methods are as follows:

Constant Current- Constant Voltage(CC-CV) approach employs both an initial constant current and a final constant voltage. The charging phase begins with a steady current and continues until the cut-off voltage, is achieved. When the current drops to between 3 and 5% of the rated current, the battery is fully charged.

An alternative approach to the above method, i.e., the charging time is broken down into five stages. The charging current is set to a constant threshold value at each stage has also been proposed. During charging, the battery's voltage rises, and as it exceeds the pre-defined maximum voltage, the stage number rises, and a new charging current set value is added.

In pulse charging method technique, the charging current is pumped into the battery in the form of pulses, allowing the ions to disperse and neutralise. The charging rate is determined by the average current. It can be adjusted by changing the pulse duration.

The problem with these procedures is that they do not account for the ageing mechanism and the side reactions that occur inside the battery over a period of time. Considering this, in order to minimise the ageing in a given charge period it has been proposed to measure the volume of battery ageing. The problem with the mentioned approach is that the model would become complex and almost impossible to implement.

2. Besides this, an integrated charging concept has also been proposed to overcome the disadvantages of on-

board chargers. The suggested method for storing energy is to use a traditional single inverter and motor drivetrain. The network can be linked between the two neutral points of the motor in the case of a split-phase drive-train. The planned topology includes a dual-inverter drivetrain for traction, as well as an external passive filter stage. If necessary, the rectifier may be attached directly or with an external isolation transformer to isolate it from the power source for safety reasons.

As KVL is applied through the dual-inverter and the grid (losses excluded), there is a higher grid voltage compatibility which is due to the fact that the voltage provided by the converter is the sum of all the half bridges as is the proposed topology of the grid.

3. To address the above problems, an EV technology battery management system (BMS) has also been proposed, which includes a data acquisition unit, a contact unit, battery location estimation model, thermal control and high voltage management which helps in battery life improvement.

4. Charging using solar energy has also been proposed. There are two Photo-voltaic charging models, namely the PV-grid and PV-standalone. The MPPT dc-dc converter, which is usually built on the buck-boost or boost topology, is used to extract as much power as possible from the PV series. The problem with PV grid is that with there are a lot of power conversion stages because the energy harvested by the solar panels is primarily direct current (DC). This must be changed to AC current before it can be used to charge electric vehicles or other automotive equipment.

In order to solve the problem PV-standalone model has been proposed where the EV would be charged exclusively with PV power, i.e. without using the electric grid. With PV-standalone model as well there comes a problem of overloading. To overcome this an adaptive PV-standalone device can be used to make the most use of usable solar energy.

## PROPOSED SYSTEM

The proposed system tries to fulfill the following objectives:

- A dual-motor system and method for charging an e-vehicle's batteries with an efficient charging mechanism that charges the batteries even while the e-vehicle is in motion.
- Reduce the frequency of external charging requirements as well as the charging time of the battery.
- Dual-motor system and method for charging batteries of an e-vehicle that is environmentally friendly and does not contribute to pollution.



- Dual-motor system and method for charging batteries of an e-vehicle that implements a cost and time effective mechanism. Dual-motor system and method for charging batteries of an e-vehicle with a satisfactory output which includes better options for charging the battery of the e- vehicle.

## METHODOLOGY

When both batteries are externally charged, the connection of the front motors is automatically switched to the main motor controller unit. This means we're sending the generated voltage directly to the main motor, but the main motor's power consumption is high and the output from the front motors is low. As a result, the remaining power requirement is met by the first battery in this condition. As a result of these findings, the first battery consumption is significantly lower than that of other e-vehicle technologies.

Let's move on to the next condition. In the second condition, the first battery has been completely discharged; we're switching the battery connection, and now the second battery will provide power to the main motor and the front motor connection has also been switched to the charge controller of the first battery, and the first battery is charging while we're driving our vehicle. This occurs when the second battery is completely discharged; the first battery is charged to a maximum of 40-50 percent. This cycle will be repeated until both batteries have completely discharged. Then only we would require external charging. Under 2<sup>nd</sup> condition when 1<sup>st</sup> battery is charging, the motor uses 2<sup>nd</sup> battery power for running.

In the 1<sup>st</sup> condition when front motor output is given to rear and remaining power requirement is fulfilled by using 1<sup>st</sup> battery. In the 2<sup>nd</sup> condition when 1<sup>st</sup> battery is discharged the front motor will charge the 1<sup>st</sup> battery and rear motor is running on 2<sup>nd</sup> battery.

This cycle will be continued until both batteries discharged completely. Then only we required external charging.

## CONCLUSION

The output can be increased by 25% to 50%. Because of the increased output on a single external charge, the distance between two charging stations will grow. As a result, the total number of charging points required will be reduced. Money will be saved, and the pollution at the charging station will be reduced. The charging speed of batteries will not change as a result of this, but batteries will charge while driving, saving time. When compared to a standard e-vehicle, this technique requires less external charging.

## REFERENCES

1. Brenna, M., Foadelli, F., Leone, C. et al. *Electric Vehicles Charging Technology Review and Optimal Size Estimation*. *J. Electr. Eng. Technol.* **15**, 2539–2552 (2020). <https://doi.org/10.1007/s42835-020-00547-x>
2. Ali Jokar, Barzin Rajabloo, Martin Désilets, Marcel Lacroix, *Review of simplified Pseudo-two-Dimensional models of lithium-ion batteries*, *Journal of Power Sources*, Volume 327, 2016, Pages 44-55, ISSN 0378-7753, <https://doi.org/10.1016/j.jpowsour.2016.07.036>. (<https://www.sciencedirect.com/science/article/pii/S0378775316308916>)
3. Y. Liu, C. Hsieh and Y. Luo, "Search for an Optimal Five-Step Charging Pattern for Li-Ion Batteries Using Consecutive Orthogonal Arrays," in *IEEE Transactions on Energy Conversion*, vol. 26, no. 2, pp. 654-661, June 2011, doi: 10.1109/TEC.2010.2103077
4. Castello CC, LaClair TJ, Maxey LC (2014) *Control strategies for electric vehicle (EV) charging using renewables and local storage*. In: *Presented at the IEEE Transportation Electrification Conference and Expo (ITEC)*, Dearborn, MI, USA, Jun 18–15, 2014
5. Shiramagond T, Lee W (2018) *Integration of renewable energy into electric vehicle charging infrastructure*. In: *Presented at the 2018 IEEE International Smart Cities Conference (ISC2)*, Kansas City, MO, USA, Sept. 16–19, 2018, pp. 1–7. <https://doi.org/10.1109/ISC2.2018.8656981>
6. Rivera, Sebastian, et al. "Electric vehicle charging station using a neutral point clamped converter with bipolar DC bus." *IEEE transactions on Industrial Electronics* 62.4 (2014): 1999-2009.
7. Feizi M, Beiranvand R (2020) *An improved phase-shifted full-bridge converter with extended ZVS operation range for EV battery charger applications*. In: *2020 11th Power Electronics, Drive Systems, and Technologies Conference (PEDSTC)*, Tehran, Iran, 2020, pp. 1–6. <https://doi.org/10.1109/PEDSTC49159.2020.9088444>
8. Zhao, Hong, et al. "Challenges of fast charging for electric vehicles and the role of red phosphorous as anode material." *Energies* 12.20 (2019): 3897.
9. Mortezaei A, Abdul-Hak M, Simoes MG (2018) *A Bidirectional NPC-based level 3 EV charging system with added active filter functionality in smart grid applications*. In: *2018 IEEE Transportation Electrification Conference and Expo (ITEC)*, Long Beach, CA, 2018, pp. 201–206. <https://doi.org/10.1109/ITEC.2018.8450196>
10. Tu H, Feng H, Srdic S, Lukic S (2019) *Extreme fast charging of electric vehicles: a technology overview*. *IEEE Trans Transport Electrific* 5(4):861–878. <https://doi.org/10.1109/TTE.2019.2958709>



# **INFLUENCE OF UNIVERSITY ADMINISTRATION ON HUMAN RESOURCE UTILIZATION AND QUALITY EDUCATION DELIVERY IN STATE UNIVERSITIES IN NORTH EASTERN NIGERIA**

<sup>1</sup>Prof. (Mrs.) C. E. Edemenang, <sup>2</sup>DR. Muhammad Adam,  
<sup>3</sup>Dr. S. S. Sara, Salisu, <sup>4</sup>Salome Audu

## **ABSTRACT**

*This paper examined the Influence of University Administration on Human Resource Utilization and Quality Education Delivery in State Universities in North Eastern Nigeria. Two purposes of the study and corresponding research questions and hypotheses guided the study. The population of the study comprised of 30 academic staff working in the State Universities in the North Central. Proportionate stratified random sampling technique was used in selecting the sample of the study. The instrument used for data collection was “Influence of University Administration on Human Resource Utilization and Quality Education Delivery Questionnaire for Academic Staff” (IUAHRUQED). The reliability of the instrument was 0.791. The findings of the study revealed that there was high positive relationship between improving quality education delivery with low level of human utilization in administration among State Universities. Conclusions and recommendations were made among which are there is need for the Federal, State and local government to provide adequate class size in order to avoid class over load and excessive assignment for lecturers in order to enhance effectiveness in teaching and learning in the state universities.*

## **INTRODUCTION**

Education is the greatest force that can be used to bring about change in all spheres of human development. It is the greatest investment that a nation like Nigeria can make for the quick development of its economic, political, sociological and human resources, as well as being able to meet all odds and challenges in the 21st century (Ezeocha, 2010). Emphasizing the relevance of education in life and living, (Tobaojo, 2011) states that “education has been identified as a tool for achieving natural and global development and that the teacher is at the center of focus in all plans for improvement of instruction and the implementation of educational programs.

The quality of every society is largely predicted on the quality of its educational system in the light of the apparent constraint on educational resources their efficient utilization for maximum results need not be over emphasis. (Adebayo, 2002) posit, that there must be administration in any

organization as long as an organization consist of people brought together in hierarchical set up making use of tools, equipment, human and material resources all in the quest for attaining the goal for which the organization is established. The utilization of teachers to achieve maximum results is dependent on availability and accessibility of school materials (Agabi, 2012). For this study, the teaching staffs in the university is considered as the human resource.

Utilization is the primary technique wherein success and performance efficiency are determined, it is the action of making practical and effective use of teachers (Ayanka-Imalele, 2012). Human resource utilization is the usage of teachers with regards to their job performance, when teachers are utilized effectively, it will inform effective teaching and learning into the classroom setting which will later result into high academic output in the education sector (Ololube, 2014). The issue of human resource utilization in school has been receiving attention globally (STRB, 2017). It has been assumed that



inappropriate teacher usage could lead to wastage, given a teacher a class size that is too large for him or her to handle effectively. Apart from allocating too much class period outside the stipulated standard, wastage also refers to the fall out of teaching staff from the teaching profession. Over utilization may occur when teachers are being used more than required. (Agabi, 2010).

Human Resource Utilization is defined as a strategic and coherent approach to the utilization of an organization's most valued assets (the people working there who individually and collectively contribute to the achievement of its objective). The overall purpose of human resource utilization is to ensure that the organization can achieve success through people. Specifically, Human Resources Utilization is concerned with achieving objectives in areas such as organizational effectiveness, human capital utilization, knowledge utilization, reward utilization, employee relations, meeting diverse needs, bridging the gap between rhetoric and reality (Armstrong, 2013). Precisely, human resource utilization is concern with the process of motivating workers in the organization to obtain maximum outputs. Getting an individual to cooperate and function effectively towards the achievement of organizational goals requires that the individual worker is seen as a human being, an individual and as a member of a group.

An understanding of the basic nature of man, how he behaves and what makes him behave the way he behaves all help in controlling him and his behaviour and channelling such towards positive performances (Chike-Okoli, 2013). This makes motivation imperative. Individual differences and consequently individual needs should be identified, recognized and considered to enjoy the cooperation of all members of the organization. According to Armstrong, (2013) organizational environment should be conducive for improved positive relationship between superior and subordinate and among subordinates, adequate motivational strategies; communication, logical decision-making process and good human relations are some of the essential tools for administrative effectiveness.

Quality human resources utilization constitute an essential ingredient for harmonizing and seeking to match the expectations, needs and objectives of the employees, with those of the organization on a continuous basis. Educational institutions are expected to produce highly educated and highly skilled manpower needed by a nation for its economic and social development. Quality manpower is dependent on good quality education which in turn depends on effective leadership in the institution that produce them (Chike – Okoli, 2007). Quality education service delivery is one of the key building blocks in any education system. Only if

services are delivered with certain quality, will learners access and use them and ultimately improve their knowledge and skills status. In simple terms, quality means performance according to standard or doing the right thing in the right way and at the right time. In education delivery, quality is considered as a degree of performance in relation to a defined standard of intervention known to be safe and have the capacity to enhance quality education within available resources (Nkusi, 2018). Quality education can be said to be a well-planned, systematic training programs acquired by man to enable him function effectively in the society in which he finds himself. Such quality education could be achieved or marred by the administrative style adopted by the administrators.

Therefore, quality human resource utilization can be said to be the skills, knowledge and potentials of workers (teachers) and adopts administrative style that will help utilize the organization's human resource for the achievement of expected organizational goals and personal outcomes (Chike-Okoli, 2013). It is important that administrators have a highly developed sense of people perception and understand the feelings of staff, their needs and expectations. It is people who are being administered and people should be considered in human terms. A genuine concern for people and for their welfare goes a long way in encouraging them to perform well. People generally respond according to the way they are being treated. If you give a little, you will invariably get back a little. Make people feel important when you give them a sense of personal worth. Most staff will respond constructively if treated with consideration and respect, and as responsible individuals who wish to serve the organization well (Fasasi, 2009). People can be praised to success. Give full recognition and credit when it is due and let people know you appreciate them.

Often administrators are unresponsive to good performance, (which may occur most Administrative behaviour implies the way the head of an organization behaves towards others in the working environment. It is a combination of administrative functions and administrative styles. In an organization, the actions of the administrator would bring reactions from subordinates. Conversely, actions of subordinates will trigger reactions from the administrator. Thus, actions of subordinates on the other hand, constitute different aspects of administrative behaviour (Chike-Okoli, 2013). A good administrator's success depends on the ability to develop and motivate others. An essential ingredient of any successful administrator is the ability to handle people effectively. People respond according to the manner in which they are treated. The behaviour of administrators and their style of



administration will influence the effort and level of performance achieved by subordinate staff. Better educated and more independent people expect to be consulted rather than to be told what to do. Today, teachers are better trained and are qualified professionals in their own fields, thus the need for administrative style that is positive, democratic, cooperative, participatory, active and dynamic (Chike-Okoli, 2005). Administration has become more about managing people than managing operations; unless we have harnessed the full potential of people even the best plans are likely to be less than successful. Furthermore, it has also become evident that releasing the potential of people involves more than simply providing them with their support and commitment by providing an environment in which they thrive as individuals.

Nigerian University system refers to the third tier of educational level, it offers higher education after secondary education. University according to Ogonnaya (2010) is a learning organization. The education offered in the university is regarded as higher education covers the post-secondary section of the nation's education system which is given in Universities and other tertiary institutions. As the 21st century world is undergoing rapid social, political and economic changes, there is the urgency for a work force/manpower that is dependable and diligent and which can inspire the young citizens and prepared them for the life in the changing world. Education has since been believed to be the only instrument for this. Perhaps this is why Bosah (2005), posited that the driving force behind development or improvement in all nations of the world and in all field of human endeavour has been traced to education at the center of which the teacher is the formation, development and the interaction of persons and ideas are all aspect of education. Attempt to improve performance in schools will never succeed if teachers' job satisfaction/motivation is ignored. Based on this, the researcher intend to study the relationship between human resource utilization and quality education delivery in the administration of universities.

### **STATEMENT OF THE PROBLEM**

Nigerian university system has suffered greatly from poor quality educational facilities, lack of teachers and teachers' motivation, it also suffers from lack of adequate provision of educational resources. Teacher's attrition is one of the driving contributors to the shortages of effective teachers internationally. The common factors that spur teachers worldwide to leave the profession include low salaries, overwhelming workload and poor working conditions (Cheryl, 2017). Cheryl, argued that, is not out of way if staff expected to be paid financial rewards commensurate with the services performed,

a good remuneration tends to reduce inequalities between staff earning, raise their individual morale and motivate them to work. Cheryl, also emphases, there are problems in the quality and number of staff recruited for the education of our citizens due to political influence and God fathers taken the upper hand and overwhelming workload allocated to the teachers in university system due to shortage of human resources.

Nigerian Government has not been able to provide the financial resources necessary to maintained educational quality in university amidst of expansion (FRN, 2013). Ekpo, (2014) asserted that there has never been a time that adequate money is sent to match the wage bill of educational institutions. Education is not given top priority in Nigeria, learning facilities are not available and lecturers are most of the time on strike as a result of inadequate funding, it is an indication that the products of such academic programs may not meet the standard required. The low quality of education delivery is evident from the poor job performance of the typical contemporary graduate (Okoroma, 2006). The emphasis seems to be much on certification and less on competency of the product of university education. The quality of education delivery is measured in terms of the ability of the graduate to meet the goals of the programs, quality is expressed as the functional attribute of the entire components of university education including curriculum, teachers, facilities, instructional methods and students (Ojebiyi and Adediran, 2012).

Literature provide information on improving quality education delivery in universities in Nigeria. Ojo (2016) conducted a study titled Teaching Workload and Performance: An Empirical Analysis on Some Selected Private Universities of Bangladesh. The relationship between workload and performance for Bangladeshi university teachers. Workload has been assumed to be independent factor having three sub-categories: time spent in teaching, administrative activities and co-curricular responsibilities. Teaching performance was the dependent variable having three sub-categories: quality of teaching delivery, quality & quantity of research & training and implementation of new technology in teaching. 250 teachers from different categories of fifteen universities were chosen as participants through convenience sampling. Pearson's correlation and regression analysis had been carried out to find the relationship between the variables. It was revealed that most independent variables are positively and strongly correlated with the dependent variables except time spent on teaching & implementation of new technology and administrative activities& implementation of new technology which are negatively correlated. The



study indicates that to perform better, workload management should be appropriate and adjusted.

Hence, the study by Ojo (2016), differs to this study in terms of methodology used in the study, population sample size and sampling techniques used, the variable used in the study, and location/area or country where the research was carried out and where this study will be carried out. In another development, Jurs (2019) conducted study titled: Relationship between Job Demand, Workload and Job Satisfaction among Teachers in Public Secondary Schools in Kaduna Metropolis, Nigeria. The study aimed at investigating the relationship between job demands, workloads and job satisfaction among teachers in public secondary schools in Kaduna metropolis, Nigeria.

Specifically, the study had three objectives and three null hypotheses. Survey design was used in the study. The population was made of 307 teachers in public secondary schools in Kaduna metropolis, Nigeria. The sample of the study stood at 154 teachers drawn from 131 public secondary schools in the nine educational zones in the state. The instruments tagged Job Demand, Workload and Job Satisfaction Questionnaire (JDWJS) developed by the researcher was used to elicit data from respondents. Four experts validated the instrument. Direct contact was used for data collection. Data collected were analyzed using descriptive statistics of mean and standard deviation to answer the two research questions. In the rest of hypotheses, Pearson Product Moment Correlation was employed at 5% level of significance. Results indicated that significant relationship exist between job demand, workload and job satisfaction of teachers in public secondary schools in Kaduna metropolis, Nigeria. By implication, since stress is the most hindering factors affecting the job contentment and commitment of teachers, it can be concluded that best expected from teachers in terms of delivery of quality teaching, quality products, and quality outcomes may be hard due to the high stress level and reduced level of job satisfaction.

Thus, the study by Jurs (2019), recommended that both local and state government should be conscious of the class size and teachers' work-load to enhance effectiveness. Therefore, it is similar to this study in that it tries to establish relationship between teachers work-load and quality delivery. The major differences with this study is in terms of the method of validation of the instruments, the number of research questions and hypothesis used, the variables in the study and the type of school or educational institutions.

Similarly, Mustafa and Othman (2010) in a study titled "Teachers' motivation and its influence on quality assurance in the Nigerian educational system" discussed extensively Teachers' Motivation

and its influence on Quality Assurance in the Nigerian Educational System. The Nigerian educational system likewise the school is an arena which accommodates various resources (both human and material). These human resources including students, teaching and non-teaching staff are inputs that operate within the whims and caprice of this arena. Most essential of these inputs are the teachers that facilitate the teaching – learning process for the achievement of educational goals and outcomes. Given adequate teachers' motivation will enhance quality instructional delivery, quality output and quality assurance in the school system.

Highlighted in the paper are definitions of some terms and the significance of teachers' motivation and quality assurance to the Nigerian educational system. Different motivational theories were also highlighted in the paper in order to show the nexus between teacher motivation and quality assurance. The study also analyzed the educational implications of motivational theories and proffers motivational strategies that guarantee quality assurance in the educational system. Motivational strategies like staff training and development, promotion, salary, remuneration, working conditions, status and participatory decision making, acted as a barrier towards achieving quality assurance in the educational system.

In the same vein, Madubueze, Anati, Onyekwelu and Okpalibekwe (2015), conducted a study: Manpower Development and Utilization in Nigeria's Local Government System: A Study of Ayamelum Local Government Area, Anambra State". It's aimed at examining the manpower development and its utilization, whether or not the selection of staff for training are based on merit and the effectiveness of the trained manpower towards enhancing the organizational performance of Local Government System in Nigeria vis-à-vis the Ayamelum Local Government. It is a quantitative research therefore; a descriptive survey research design was adopted and four hypotheses were formulated to guide the research objectives and questions. A Likert scale structured questionnaire was used and analyzed with the simple percentage data analysis method. The hypotheses were tested using the chi-square statistical tool. Findings showed that, there is manpower development programmes in the local government council, -that selection of staff for training are not the true reflection of actual manpower training needs of the council, that the selection of staff for training are not based on merit and -that the trained manpower are not properly placed in areas that will enhance their acquired skill. Thus, the study by Madubueze, Anati, Onyekwelu and Okpalibekwe (2015), recommended that manpower selection should be based on merit and staff should be properly place in areas that will



enhance their acquired skill. It is different from this study in terms of variable used in the studies and method of data analysis. Though, it is similar to this study in terms of instruments used since both studies use questionnaire as instrument of data collection.

## **METHODOLOGY**

### **Research Design**

The study employed two types of research design method as thus; descriptive survey design and correlation design. It is descriptive because the study involved large population and sought their opinion on influence of university administration on human resource utilization and quality education delivery. The outcome of the study is expected to form the basis of generalization because the study focuses on investigating the influence of university administration on human resource utilization and quality education delivery in state universities in north eastern Nigeria. Sambo (2005) supports descriptive design in the light of the population size and opinions or views determined using questionnaire. Similarly, Armstrong (2013), posited that descriptive design involves the collection of data within a short span of time from a random sample of the target population in order to describe the population. The study is also correlation in nature in that it seeks to establish relationship between university administration, human resource utilization and quality education deliver.

According to Kalusi (2015), Correlation is a mutual, a relationship between two or more variables. This design established opinions and knowledge about human resource utilization in relation to quality education delivery. It is considered appropriate for this study in that it seek to report phenomenon the way they are without bias. The independent variable of the study is university administration and human resource utilization while the dependent variables is quality education delivery. The study would try to establish relationship between the three variables; University administration, human resource utilization and quality education delivery. Thus, correlation design and descriptive survey design is considered appropriate for this study.

### **Population of the Study**

The target population of this study consist of all the academic staff in all faculties and departments in state universities in the north-east geo-political zone of the Nigeria. The target population for the pilot study is 30 academic staff working in the state universities in North Central Nigeria.

### **Sample and Sampling Techniques**

A sample size of 30 lecturers were selected as sample size. However, Proportionate stratified random sampling technique was employed to select

lecturers from the five (5) State Universities in the zone.

### **Instrumentation**

A self-designed instrument was used for collecting data in this study. A questionnaire titled Influence of University Administration on Human Resource Utilization and Quality Education Delivery Questionnaires for academic staff (IUAHRUQED). The instrument was developed as a result of literature review, consultation with the researcher's supervisors and other experts in the field, reading of educational journal interaction with teaching staff of universities. The instrument consists of two sections: section 'A' and section 'B'. Section 'A' consists of bio-data of the respondents while section 'B' consists of 79-items divided into eight dimension which constitute statements on University Administration on Human Resource Utilization and Quality Education Delivery which is scaled using a modified 4-point Likert scale of strongly agree, to strongly disagree. For every positive response, strongly agreed = 4; agree = 3; disagree = 2 and strongly disagree = 1 and the reverse is the case for every negative response strongly disagree =4; disagree =3; agree =2 and strongly agree =1.

### **Validity of the Instrument**

Validity refers to the extent to which an empirical measure adequately reflects the real meaning of the concept under consideration (Babbie & Mouton, 2017). Validity is thus an indication of the extent to which results obtained in a study are a true reflection of what is real and whether the findings can be generalized beyond the sample used.

### **Pilot Testing**

According to Jurs (2005), it is necessary that research instruments be piloted as a way of determining validity and reliability. A stable research tool gives the same result if it is used again under the same circumstances. (Brinberg, McGrath, 1985). In order to achieve the above, the draft of the instrument was pre-tested in the field before the actual data collection starts.

The reliability of this instrument has been trail tested in a pilot study in north central states universities. The test-re-test reliability method was used with an interval of two weeks. The instrument was administered to thirty lecturers from five universities in the zone. Six lecturers were selected from each university for this purpose. The two results obtained were compared and compute using Pearson Products Moment Correlation Coefficient (PPMCC) to ascertain the reliability index.

**Reliability**

The reliability of IUAHRUQED was established using retest and Pearson Product Moment Correlation Coefficient Methods. SPSS was used in computing the reliability index. This was found to be 0.791 for University Administration on Human Resource Utilization and Quality Education Delivery Questionnaire for academic staff. This indicated that IUAHRUQED is reliable to be used for this study.

**RESULTS OF THE STUDY**

Ho1: There is no significant relationship between teachers' motivation and quality education delivery in the administration of state universities.

The hypothesis was tested using PPMC and the result is presented in table 1. The descriptive information result for the hypothesis was analysed using PPMC and the mean scores were one: (N=30 100%), M=69.83, SD=5.74) and (N=30 (00%) M=62.77, SD=7.87).

**Table 1: PPMC analysis of relationship between teachers' motivation and quality education delivery in the administration of state universities.**

Variables		Teachers' motivation	Quality education delivery
<b>Teachers' motivation</b>	Pearson correlation	1	.946**
	Sig (2-tailed)		.000
	N	30	30
<b>Quality education delivery</b>	Pearson correlation	-.946**	1
	Sig (2-tailed)	.000	
	N	30	30

Correlation is significant at 0.05 level (2-tailed)

There was high positive relationship between the two variables ( $r = -.946^{**}$ ,  $n = 30$ ,  $p < 0.05$ ) with teachers' motivation associated with low level of quality education delivery in administration among state universities in north eastern Nigeria. This indicates that there is a high positive relationship between teachers' motivation with low level of in administration among state universities. It means lack of motivation influences low level quality education delivery in administration among state universities in north eastern Nigeria.

Ho2: There is no significant relationship between mean rating of teachers with long term experience

and those with short term experience on challenges of human resource utilization and quality education delivery in the administration of state universities.

The hypothesis was tested using regression and the result is presented in table 4.

Table 2: regression analysis of the relationship between mean rating of teachers with long term experience and those with short term experience on challenges of human resource utilization and quality education delivery in the administration of state universities.

Model	Sum of square	Df	Mean square	F	Sig
1 Regression	197.598	3	65.866	9.232	.001
Residual	114.152	16	7.134		
Total	311.750	19			

The low P-value indicates that both teachers with long term experience and those with short experience are statistically significant. The coefficient for long term experience indicates that each additional years put increases your human resource and quality education by approximately 114.152 while controlling everything else in the model. Furthermore, an additional years of experience increases average human utilization and quality education by 311.750 while holding the other variables constant. This indicates that null hypothesis is rejected and alternative hypothesis was retained

that there is significant influence between long term experience and human resources and quality education delivery among administrators in state universities.

**CONCLUSION**

Based on the results that were found in the pilot study, it was concluded that IUAHRUQED consists of 79-items divided into eight dimension which constitute statements on University Administration on Human Resource Utilization and Quality Education Delivery. Each item has the minimum requirement for being acceptable for



research assessment according to the research findings of the pilot study. Therefore, the reliability and validity of the instrument is good, hence the instrument obtained 0.791 which signify good reliability. This was found to be effective for University Administration on Human Resource Utilization and Quality Education Delivery Questionnaire for academic staff. This indicated that IUAHRUQED is reliable to be used for this study.

### Recommendations

Based on the findings of this study the following recommendations were made

1. The government at various levels, educational administrators and planners should mount special campaigns presumably through special appeal or the use of press to create awareness of the importance and the need for proper utilization and maintenance of school resources.
2. There is also need for the Federal, State and local government to provide adequate quantity and quality of classroom communication materials, physical facilities and personnel for effective teaching and learning.
3. There should be regular attendance to seminars, workshop and conferences which should be sponsored by university management as this will help lecturers to upgrade and update their skills, knowledge and ideas. Secondly, policy makers should make it mandatory for all lecturers to be computer literate to enable them compete in this modern world of globalization and technological advancement. Both the government and the institutions should make available ICT facilities to both the lecturers and the students.
4. State Universities should be properly funded by the government as this serves as the underlying factor to major constraints to quality university education in Nigeria, not only that lecturers should be properly remunerated, special grants should also be given to every university in Nigeria for strategic planning.

### REFERENCES

1. Adebayo, A. (2002). *Planning and Educational Development in Nigeria Lagos: The Academic Press*, 24-129.
2. Agabi, C. O. (2010). *Prudential Approach to Resource Management in Nigerian Education: A Theoretical Perspective. International Journal of Scientific Research in Education*, 3(2): 94-106.
3. Agabi, C. O. (2012). *Education as an Economic Investment. International Journal of Scientific Research in Education*, 5(1): 1-11.

4. Armstrong, M. (2013). *Armstrong's Handbook of Human Resource Management Practice (13th ed.) London: Kogan page.*
5. Ayanka-Imalele, D. O. (2012). *Higher Education, Research and Development vol. 32, 2013-issue 5*
6. Babbie, E. & Mouton, J. (2017). *The Practice of Social Research. Cape Town: Oxford University Press.*
7. Bosah, H. O. (2005). *Education Theory and Policies. Awka: Meks Publishers Ltd.*
8. Cheryl, J. C. (2017). *Teachers and Teaching: Theory and Practice, 2017 23(8): 859-862.*
9. Chike-Okoli, A. N. (2005). *A Handbook on Supervision of Instruction: A Guide to Modern Supervision in Schools. Minna: Mairo Press and Computer*
10. Chike-Okoli, A. N. (2007). *Issues in School Administration. Minna: Alanza International Books.*
11. Chike-Okoli, A. N. (2013). *Fundamentals of Human Resource Management. Minna: Succeed and Prosper Books.*
12. Ekpo, A. H. (2014). *Health and Education Sector in Nigeria's National Development. International Journal of Social Science*, 3(1); 124-135.
13. Ezeocha, P. A. (2010). *Educational Administration and Planning. Nuka: Optimal Computer Solution.*
14. Fasasi, Y. A. (2009). *Administratorial Behavior in Educational Organizations. In J.B Babalola & A. O Ayeni, (Eds.) Educational Management: Theories and Tasks 183-194. Lagos: Macmillan Nigeria.*
15. *Federal Republic of Nigeria (2013). National Policy on Education (Revised). Lagos: Federal Government Press.*
16. Jurs, H. (2019). *The Idea of the University in the Contemporary World Education 39 (1); 20-29*
17. Kalusi, J. I. (2015). *Teacher quality for quality education. Nigerian Journal of educational philosophy*, 8 (2): 62-72.
18. Madubueze, C. U., Anati, C. C. & Onyekwelu, A. I. & Okpalibekwe, S. I. (2015). *Developing Knowledge Management Skills among Male and Female Lecturers for Capacity Building in Universities in South-East, Nigeria. International Publication of Education, Research and Innovation, Spain. Retrieved Jan; 2019 from intereduresin.com.*
19. Nkusi, L. (2018). *Managing Quality and Standard. RITES Publishers.*
20. Mustafa, M. & Othman, N. (2010). *The Effect of Work Motivation on Teacher's Work Performance in Pekanbaru Senior High Schools, Riau Province, Indonesia. Journal of Social Science Research* 3(2), 259-272.
21. Ogbonnaya, N. O. (2010). *Quality Assurance in Tertiary Institutions. LEAD Paper in Annual Conference of Educational Administrators and Planners, University of Port-Harcourt Branch, May.*
22. Ojebiyi, O. A. & Adediran, Adekunle, A. (2012). *Quality Human Resource Management for*



- Effective Educational System. Journal of Educational Leadership Administration and Planning (IJELAP) 1 (1); 65-74.*
23. OJO, B. (2016). *Administration and Management of Secondary Education Anxieties in D. Ajayi and S. Ibitola (Eds) Effective Management of Secondary Schools: The Principals Challenge Ibadan Adeose Publication. 9-20*
24. Okoroma, N. S. (2006). *The Poor Performance of Educational Sector in Nigeria. Port-Harcourt: Minson Publishers.*
25. Tobaojo, C. M. (2011). *A Study of Administrator/Leadership Activities of the Niger State Science and Technical Schools Board, Minna. Knowledge Review 5 (2); 28-37.*



# THE IMPACT OF CONFLICT RESOLUTION ON PEACE BUILDING IN MOGADISHU SOMALIA

<sup>1</sup>Abdi Kamil Iman Jim'ale, <sup>2</sup>Abdullahi Mohamed Sheik Ali

<sup>1,2</sup>Master of Public Administration (MPA), Graduate school, University of Somalia (UNISO), Mogadishu - Somalia.

## ABSTRACT

*This is to investigate the impact of conflict resolution on peace building in Mogadishu Somalia. The main objectives of the study were; to assess the impact of conflict resolution in Mogadishu Somalia, to investigate consequences of political conflict resolution in Mogadishu Somalia., and to determine relationship between conflict resolution and peace building in Mogadishu Somalia. This study was conducted through Questioner to reveal the impact of conflict resolution on peace building in some Intellectual Members including; Lecturers, Students, Business people, in Mogadishu Somalia. The purpose of this study was to describe the impact of conflict resolution on peace building in Mogadishu-Somalia. The sample size was 66 respondents which I selected mainly the methods of data collection were by questionnaire, to collect quantitative data from the selected respondents, besides greater convenience in the context of time, stability, uniformity and consistency. The researcher was started gathering data through questionnaire, after that the researcher was analyze the data collected and then interpret, summarized, statistically treated and drafted in tables using the Statistical Package for Social Sciences (SPSS) version 20. In conclusion of the study the majority of the respondents were strongly agree the impact of conflict resolution on peace building, according to the findings of this research.*

**KEYWORDS:** Conflict resolution, Peace building, Local government

## 2.1 INTRODUCTION

Foundation of conflict resolution was after end the first world war in the year 1920 , world leaders joined to form a new world organization i.e league of nations. In the 1970s, Norwegian sociologist Johan Galtung first created the term peace building through his promotion of systems that would create sustainable peace. Such systems needed to address the root causes of conflict and support local capacity for peace management and conflict resolution. Galtung's work emphasized a bottom-up approach that decentralized social and economic structures, amounting to a call for a societal shift from structures of coercion and violence to a culture of peace. American sociologist John Paul Literacy proposed a different concept of peace building as engaging grassroots, local, NGO, international and other actors to create a sustainable peace process. He does not advocate the same degree of structural change

as Galtung Peace building has since expanded to include many different dimensions, such as disarmament, demobilization and reintegration and rebuilding governmental, economic and civil society institutions. (Gomes et al., 2000).

The concept was popularized in the international community through UN Secretary-General Boutros Boutros-Ghali's 1992 report An Agenda for Peace. The report defined post-conflict peace building as an "action to identify and support structures which will tend to strengthen and solidify peace in order to avoid a relapse into conflict" At the 2005 World Summit, the United Nations began creating a peace building architecture based on Kofi Annan's proposals. The proposal called for three organizations: the UN Peace building Commission, which was founded in 2005; the UN Peace building Fund, founded in 2006; and the UN Peace building Support Office, which was created in



2005. These three organizations enable the Secretary-General to coordinate the UN's peace building efforts. National governments' interest in the topic has also increased due to fears that failed states serve as breeding grounds for conflict and extremism and thus threaten international security.

Some states have begun to view peace building as a way to demonstrate their relevance. However, peace building activities continue to account for small percentages of states' budgets. ((December 2006 to January 2009), which Peace building, Power, and Politics in Africa is a critical reflection on peace building efforts in Africa. The authors expose the tensions and contradictions in different clusters of peace building activities, including peace negotiations; state building; security sector governance; and disarmament, demobilization, and reintegration. Essays also address the institutional framework for peace building in Africa and the ideological underpinnings of key institutions, including the African Union, the African Development Bank, and the Pan-African Ministers Conference for Public and Civil Service. The volume includes on-the-ground case studies of Sudan's the Great Lakes Region of Africa, Sierra Leone and Liberia, the Niger Delta, Southern Africa, and Somalia, analyzing how peace building operates in particular African contexts. The authors adopt a variety of approaches, but they share a conviction that peace building in Africa is not a script that is authored solely in Western capitals and in the corridors of the United Nations. Rather, the writers in this volume focus on the interaction between local and global ideas and practices in the reconstitution of authority and livelihoods after conflict. (Fernandez et al., 2003)

Somalia has been without a functioning state since 1991 when former Siyad Barre was overthrown. None of the competing functions was strong enough to take gradually a formation state less order. The international interventions have ever since failed and counterproductive intervention on by the United Nations and the United States in the early 1990 exacerbated rather than mitigated the problem, let alone solved them. This was especially the case for the Ethiopian invasion (produced utter chaos and a severe humanitarian crisis. Since the withdraw of the Ethiopian forces, islamist extremist militias have been establishing control of Somalia and they may or may not be able to maintain this control. If they pursue their radical programme of islamisation, their reign is likely to be short, but if they moderate themselves they may retain control. (Excelente-Toledo and Jennings, 2002)

### 3.1 LITERATURE REVIEW

Concepts of the conflict resolution field up to

date at the beginning of the twenty-first century Conflict resolution as a defined specialist field has come of age in the post-Cold War era. It has also come face to face with fundamental new challenges, some of which have come into even sharper focus since the first edition of this book As a defined field of study, conflict resolution started in the 1950s and 1960s. This was at the height of the Cold War, when the development of nuclear weapons and the conflict between the superpowers seemed to threaten human survival. (Wolke, 1992).

A group of pioneers from different disciplines saw the value of studying conflict as a general phenomenon, with similar properties whether it occurs in international relations, domestic politics, industrial relations, communities, families or between individuals. They saw the potential of applying approaches that were evolving in industrial relations and community mediation settings to conflicts in general, including civil and international conflicts. A handful of people in North America and Europe began to establish research groups to develop these new ideas. They were not taken very seriously. The international relations profession had its own categories for understanding international conflict, and did not welcome the interlopers. Nor was the combination of analysis and practice implicit in the new ideas easy to reconcile with traditional scholarly institutions or the traditions of practitioners such as diplomats and politicians Nevertheless, the new ideas attracted interest, and the field began to grow and spread. Scholarly journals in conflict resolution were created. Institutions to study the field were established, and their number rapidly increased. The field developed its own subdivisions, with different groups studying international crises, internal wars, social conflicts and approaches ranging from negotiation and mediation to experimental games. By the 1980s, conflict resolution ideas were increasingly making a difference in real conflicts. In South Africa, for example, the Centre for Intergroup Studies was applying the approaches that had emerged in the field to the developing confrontation between apartheid and its challengers, with impressive results. In the Middle East, a peace process was getting under way in which negotiators on both sides had gained experience both of each other and of conflict resolution through problem-solving workshops. In Northern Ireland, groups inspired by the new approach had set up community relations initiatives that were not only reaching across community divides but were also becoming an accepted responsibility of local government. In war torn regions of Africa and South-East Asia, development workers and humanitarian agencies were



seeing the need to take account of conflict and conflict resolution as an integral part of their activities (Holder, 2011).

The anthropological study of war focuses on attempts to explain armed conflicts as a universal feature of the human condition manifesting itself in culturally specific terms (Njeru 1998). The institution of war may take different forms. In a single society, various categories of armed conflict are recognized. These range from duels between two groups by appointment, wherein the participants seek to inflict non-mortal injury, to "mother-of-all-wars" battles, which are rare and result in many deaths (Fortes & Evans-Pritchard, 1940). Feuds or collective actions using force or the threat of force are not synonymous with wars since the actions are limited to obtaining satisfaction for a particular injury and are controlled by the norms of a given society. Raiding for cattle is only one aspect of conflict.

The social structure of the pastoral groups is largely based on generational lines and age-sets. Elders form the senior generation set. In their role as political and spiritual leaders of the society, the elders laid down rules and procedures to initiate warriors, settle disputes, sanction raiding expeditions and determine grazing areas in their transhumant pattern. The society therefore relied on their wise guidance, prayers and blessings. Their advanced age and experience was seen as indicating their close relationship with the spiritual world. Thus, their decisions on any issue were sacrosanct. The warriors constitute the junior generation set. Their role in society was to execute decisions agreed upon by the elders. The elders, therefore, played an important part in defusing tensions and conflicts, which usually centered on the control of grazing land or water. They had well laid down procedures for settling disagreements in which all the parties to the conflict got a chance to put across their views. The elders were recognized as having authority to act as arbiters and give judgment on the rights or wrongs of a dispute submitted to them and suggest a settlement though they may have had no power of physical coercion by which to enforce them (Fortes & Evans-Pritchard 1940).

By the closing years of the Cold War, the climate for conflict resolution was changing radically. With relations between the superpowers improving, the ideological and military competition that had fuelled many regional conflicts was fading away. Protracted regional conflicts in Southern Africa, Central America, and East Asia moved towards settlements. It seemed that the UN could return to play the role its founders expected. The dissolution of the Soviet Union brought to a close the long period in which a single

international conflict dominated the international system. Instead, internal conflicts, ethnic conflicts, conflicts over secession and power struggles within countries became the norm in the 1990s. These reflected not so much struggles between competing centres of power, of the kind that had characterized international conflict for most of the 350 years since the peace of Westphalia, but the fragmentation and breakdown of state structures, economies and whole societies. At their extreme, in parts of Africa, the new wars witnessed the return of mercenary armies and underpaid militias which preyed on civilian populations in a manner reminiscent of medieval times. In this new climate, the attention of scholars of international relations and comparative politics turned to exactly the type of conflict that had preoccupied the conflict resolution thinkers for many years. (Jiljil, 2009).

### 3.1.1 Consequences of conflicts

The most immediate and direct impact of violent civil conflict on health is death which is measured quantitatively and qualitatively however, the indirect effect of conflict on mortality is defined as "the number of deaths following a war minus the number of deaths that would have occurred in the same period if the war had not occurred (The previous working ratio of indirect to direct conflict deaths was emphasizing the complexity of violent civil conflict However, Murray, King, Lopez, Tomijima and Krug (2002) found that this ratio had no actual basis therefore this is an example of the erroneous use of numbers in the health conflict field. However, this is a distinct problem from that of unreliable data, which will be discussed further in the following section. Nevertheless, most indirect deaths from violent civil conflict are concentrated in the civilian population (These numbers are higher in groups that suffered discrimination pre-violent civil conflict, as they are likely to still be marginalized, resulting in more barriers to accessing health services. (Collin et al., 1991).

### 3.1.1 Impact of conflict resolution

lost productivity, poor relationships, mental health problems, sabotage, litigation, workplace violence bullying, employee loss and turn over, customer loss and impact on sales. The above outcomes are only a partial list of the impact of conflict that occur in an organization. Although some conflict in the work place is healthy, the impact of conflict that escalates into personality clashes, warring egos and a risk of violence can have a huge impact of productivity and bottom line-costing organizations millions of dollars. The sad truth is that many organization do not have the tools to manage the impact of conflict in an



effective manner and spend an excessive amount of time dealing with in many cases, without positive results. Conflict will never disappear, however arming yourself with the tools necessary to address it in a healthy, productive fashion will go a long way towards a more harmonious and productive workplace. (Global human capital report, 2008).

### 3.2 PEACE BUILDING

The term peace building was first introduced through UN Secretary-general Boutros BoutrosGhali's report to the Security Council, Agenda for Peace, in 1992. Since then, peace building has been included in the policies of donors, multilateral and regional organizations. Emergency and developmental nongovernmental organizations have also come to play an important part in peace building activities. This issue paper, commissioned by the nongovernmental organization Peace build, aims to provide a concise review of certain peace building policies and practices. This will be done by looking at the ways in which a variety of international actors has conceived the concept of peace building and how civil society, mostly a few international non-governmental organizations (INGOs) have contributed to its expansion Readers ought to bear in mind that this draft issue paper was produced under a tight timeline (three weeks) and primarily for the purpose of stimulating discussion during a consultation in Ottawa on March 14, 2011.

It does not pretend to present an exhaustive review of all approaches, debates and peace building strategies. Neither does it pretend to defend a thesis or a particular argumentative line. We have sought to provide an overview of some peace building strategies and main debates (how to include local ownership in specific peace building strategies, how to promote integrative

strategies between donor countries, how to increase interactions between international and local actors, etc.) and elicit a discussion with practitioners over what peace building means for them. The main conclusions of the debate will be summarized in a workshop report the current field of peace building developed out of a realization that forging a peace agreement and providing relief would not be sufficient to have the long-term stabilizing impact that many hoped to achieve. (Holder, 2008).

Violence and warfare, especially in the form of raids and skirmishes among pastoral peoples, have existed from time immemorial. However, the borderlands of Eastern Africa have witnessed unparalleled violence, anarchy, and insecurity in the last two decades. These acts often degenerate into war. Yet, the often wanton destruction of life and property and the rise of terror in

all its manifestations tend to undermine the sense of value and dignity of human life. (Batten, T.R., 1965).

### 3.3 RELATIONSHIP OF CONFLICT RESOLUTION AND PEACE BUILDING

Until World War I, Burundi was a German colony after which time it was transferred to a Belgian controlled UN mandate. Belgian colonial administration, governed through indirect rule, reinforced the power of the elite. In contrast to Rwanda, the major social cleavages in Burundi before independence were between different clans, as well as between the more affluent elite and the poorer peasantry. However, this relative harmony crumbled around the time of independence in 1962. (Cheeseman et al., 1991).

Burundi's ethnic makeup is similar to neighboring Rwanda with two main ethnic groups, the majority Hutus accounting for about 85% of the population, and the minority Tutsis accounting for 14%, alongside the Twa that account for just 1% of the total population. The history of the country has been marked by ethnic violence and the reinforcement of mutual fears between the ethnic groups (Cheeseman et al, 1991).

The principal problem in Burundi has been the „ethnic“ conflict between the majority Hutus and the minority Tutsis, who have historically held power and still control the military. Tutsis also dominate educated society and their position is sometimes vehemently defended by militant elements among them. During massive clashes in the 1970s for instance, militant Tutsi targeted educated Hutus. The ethnic clashes are fuelled by a continuing power struggle between Hutus and Tutsi political elites who are trying to secure access to scarce economic resources though control of state power. Major massacres took place in 1965, 1972 (when 100,000-200,000 people were killed), 1988, and 1993. (Adam Roberts, 2004).

The violent ethnic confrontation of 1993 is known as the starting point of the current phase in Burundi's civil war. In response to the installation of a Hutu majority government, brought to power by the first democratic election, elements in the Tutsi-led army staged an attempted coup in October 1993. Their attempt failed, but they killed the democratically elected Hutu president, MelchiorNadadeye, and many other senior Hutu members of government. This event triggered ethnic massacres of Tutsi by Hutus in revenge while the Tutsi army killed many Hutus in retaliation. At least 100,000 people were killed, among them many children and elderly, often slaughtered in an extremely brutal fashion. (Darr and Birmingham, 2012).



#### 4.1 METHODOLOGY

This study was conducting through explanatory research design. Explanatory is data collection method that determines whether, and to what extent an association exists between two or more paired and quantifiable variables (Onen and Oso, 2008) survey research aims to ascertain if there is significant association between two variables (Reid, 1987).

The target population includes some districts in Mogadishu. The researcher's selection is based on the society long time inexistence. The target population of this study was 134 respondents from selecting societies Lectures 24, Student 44, Business people 66, Mogadishu Somalia. The sample consisting 100 participants selected from some districts in Mogadishu Somalia. These participants were chosen according to the possibility of getting accurate information. To determine the ideal sample size for a population, the study was using Slovene's formula.

The researcher uses questionnaire for collecting data in this study. The rationale for choosing questionnaire was guided by the nature of data to be gathered, the time available, as well as the objectives of this study and data analyses with the help of the statistical program SPSS 20.

#### 5.1 SUMMARY OF FINDINGS

The general objectives is examine The Impact Of Conflict Resolution On Peace Building In Mogadishu Somalia. The most immediate and direct impact of violent civil conflict on health. and 68% denoted strongly agree, 15% denoted agree, 11% denoted disagree, while 6 % were denoted strongly disagree. Cause of death data is inaccurate, if recorded at all. Since violent civil conflict tends to be highly politicized both within countries and without, it is easy for data to be misrepresented nevertheless. and 9% denoted strongly agree, 41% denoted agree, 30% denoted disagree, 20 denoted strongly disagree Violent civil conflicts "are armed conflicts that challenge the sovereignty of an internationally recognized state and occur within. And 23% donated strongly agree, 23% denoted agree, 20% denoted disagree, 34% were denoted strongly disagree. building has been included in the policies of donors, multilateral and regional organizations. And 34% denoted strongly agree, 41% denoted agree, 11 denoted disagree, while 14% were denoted strongly disagree. Peace building is the best way that we can reduce the conflict. And 22.7% denoted strongly agree, 22.7% denoted agree, 19.7% denoted disagree, while 34.8% were denoted strongly disagree.

The most immediate and direct impact of violent civil conflict on health. number of deaths following a

war minus the number of deaths that would have occurred in the same period if the war had not occurred. Cause of death data is inaccurate, if recorded at all. Since violent civil conflict tends to be highly politicized both within countries and without, it is easy for data to be misrepresented nevertheless. Peace building is the best way that we can reduce the conflict.

#### 6.1 CONCLUSION

This study is to investigate appropriate the impact of conflict resolution on peace building. The main objective of the study was To investigate the impact of training security forces on peace building. Literature review is basically synthesis of relevant and significant of conflict resolution and researchers in the specified area of interest.

In the literature review, the researcher of this research report collected relevant primary and secondary data to this research report, from different source and referenced as guide authorized. Research design is the overall plan the study was be conducted through an explanatory study; the purpose of explanatory research is to measure an accurate profile persons, events and situations.

Additionally, this study was be used survey approach; survey is any data collection technique ( such as questionnaire) or analyses procedure ( such as graphs or statistics ) that uses numerical data. The target population of the study was be drawn from lectures, students and business people in Mogadishu. Therefore, the target population is **80**. The sample size of this study is **66 respondents** lectures, students and business people.

#### 7.1 RECOMMENDATIONS

Recommendation, based on the findings, and conclusion of the researcher, the following recommendations were highly appreciated:

1. The researcher recommended to the federal government of Somalia to make social interaction among the society and security agencies to get any information that is danger to the security of the country.
2. The researcher recommended to ministry of interior affairs to make peace building orientations to the citizens.
3. The researcher suggests to Federal Government of Somalia to make negotiations to the Al- Shabab groups that is the main obstacle that faces the security of the country.
4. The researcher recommends to Somali citizens to work with their government as fully as they can and inform the security branches when they meet something that is risk to the security.



5. Finally the researcher recommends to make further researches about conflict resolution and peace building to know extra information that is possible to assist this research findings

## REFERENCES

1. [Adam Roberts, 2004] J. G. D'Ambrosio, T. Darr, and W. P. Birmingham. Hierarchical concurrent engineering in a multiagent framework. *Cocurrent Engineering: Research and Applications Journal*, 4, 1996.
2. [Angelopoulos and Panetta, 1998] V. Angelopoulos and P.V. Panetta, editors. *Science Closure and Enabling Technologies for Constellation Class Missions*. University of California, Berkeley, 1998.
3. [Armstrong and Durfee, 1997] A. Armstrong and E.H. Durfee. Dynamic prioritization of complex agents in distributed constraint satisfaction problems. In *Proceedings of International Joint Conference on Artificial Intelligence*, 1997.
4. [Barrett, 1999] A. Barrett. Autonomy architectures for a constellation of spacecraft. In *Proceedings of International Symposium on Artificial Intelligence Robotics and Automation in Space*, 1999.
5. [Bernstein et al., 2010] D. S. Bernstein, S. Zilberstein, and N. Immerman. The complexity of decentralized control of mdps. In *Proceedings of the International Conference on Uncertainty in Artificial Intelligence*, 2000.
6. [Bessi`ere et al., 2014] C. Bessi`ere, A. Maestro, and P. Meseguer. Distributed dynamic backtracking. In *Proceedings of the International Workshop on Distributed Constraint Reasoning*, 2001.
7. [Cheeseman et al., 1991] P. Cheeseman, B. Kanefsky, and W. M. Taylor. Where the really hard problems are. In *Proceedings of the International Joint Conference on Artificial Intelligence*, 1991.139
8. [Collin et al., 1991] Z. Collin, R. Dechter, and S. Katz. On the feasibility of distributed coonstraint satisfaction. In *Proceedings of the International Joint Conference on Artificial Intelligence*, 1991.
9. [Darr and Birmingham, 2012] T. P. Darr and W. P. Birmingham. An attribute-space an attributespace representation and algorithm for concurrent engineering. Technical Report CSE- TR-22194, Department of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, October 1994.



## STRUCTURE OF MORBIDITY OF THE ORAL MUCOSA

**Tojiboeva Yokutxon Rejabovna**

*Assistant of the Department of Therapeutic, Orthopedic and Pediatric Dentistry, Andijan State Medical Institute, Andijan city*

### ABSTRACT

*This article describes the prevalence of diseases of the oral mucosa, accompanied by erosive-ulcerative and hyperkeratotic lesions.*

**KEY WORDS:** *prevalence, oral mucosa, relapse, diagnosis, treatment.*

### DISCUSSION

Over the past decade, the problem of prevention and treatment of chronic diseases of the oral mucosa has received considerable attention from domestic and foreign researchers [1, 2, 3, 4, 5, 6, 7, 8]. This is primarily due to an increase in the negative impact of immunosuppressive environmental factors on the human body, and the widespread and not always justified use of medicines with antibacterial properties [9, 10, 11, 12, 13, 14].

In everyday clinical practice, patients who seek dental care for diseases of the oral mucosa (OM) represent one of the most difficult problems in dentistry due to difficulties in diagnosis and treatment [15]. The problem is further complicated by the fact that so far no measures have been developed for the communal prevention of SOPR diseases [16].

Chronic recurrent aphthous stomatitis (CHD) is considered one of the most common diseases of the oral mucosa. It was found that the age of most patients ranges from 20 to 40 years. Before puberty, people of both sexes are equally often ill, but women predominate among adults (cited by L. G. Borisenko, 2003).

Currently, due to the lack of special epidemiological studies, information about the pathology of the oral mucosa is practically not found in the literature.

The etiology and pathogenesis of chronic recurrent aphthous stomatitis have not been definitively elucidated. It is established that a significant role in the pathogenesis of chronic inflammatory processes belongs to the state of microbiocenosis of the oral mucosa [17, 18, 19, 20].

Its participation in the processes of metabolism, vitamin synthesis, formation of immune status and nonspecific resistance has been proven. The role of gastrointestinal pathology and liver diseases in the pathogenesis of CHD is evidenced by clinical and experimental data [21, 22]. The question of the allergic genesis of the disease is widely discussed [23, 24]. It is known that disorders of the immunological status can affect the course and prognosis of chronic diseases of the oral mucosa [25, 26, 27, 28, 29]. Human herpetic infection is currently one of the most common. Up to 95% of the world's population is infected with the herpes simplex virus. The herpes simplex virus can infect almost all human organs and systems, causing various clinical forms of infection. Among the diseases of the oral mucosa, the leading role belongs to the pathology of herpetic nature. The most common diagnosis is acute herpetic stomatitis, which accounts for 85% of all diseases of the oral mucosa [30].

Today, it is important to study the level of prevalence of diseases of the oral mucosa accompanied by erosive-ulcerative and hyperkeratotic lesions, analyze the provision of diagnostic methods and therapeutic and preventive measures, which determines the relevance of scientific research.

The most common lesions of the human body are dental diseases. A special place among them is occupied by diseases of the oral mucosa. Diseases of the oral mucosa remain one of the urgent problems of therapeutic dentistry [21, 22, 23, 24]. Diseases of the oral mucosa are leading among the main problems of modern dentistry. There is no such organ and tissue where a greater number of diseases occur than on the oral mucosa [35]. Diseases of the oral mucosa are a



section that requires a dentist to have extensive knowledge not only in a narrow specialty, but also knowledge of general clinical disciplines, which is the main thing in the diagnosis and treatment of this category of patients. The list of diseases that appear on the oral mucosa is quite diverse [16, 17]. For quite a long time, the epidemiology of diseases of the oral mucosa was overshadowed by large-scale studies of these diseases. One of the largest studies on the epidemiology of more than 70 diseases of the oral mucosa was conducted in the 70s of the last century by the Swedish scientist Dr. T. Ache11. These studies allowed us to identify and identify further study of the structure of dental morbidity of the oral mucosa with the participation of the World Health Organization (WHO)[18, 19, 20].

The high prevalence, tendency to progression, and multi-faceted impact of adverse environmental factors on the dentoalveolar system and the body as a whole, as well as ambiguous treatment results, make it possible to classify inflammatory diseases of the oral mucosa among the most urgent problems of modern dentistry. Multicenter studies conducted in 53 countries of the world indicate a high level of spread of diseases of the oral mucosa in the form of white manifestations-candidiasis, leukoplakia, lichen planus red46 % .

In addition, the urgency of this problem is caused by the escalation of environmental problems that evolve under the influence of multi-factor technogenic pressure, an excess of chemicals in food products, bad habits (smoking, alcohol intake), and the prevalence of infectious diseases.

Diseases, immunodeficiency states, allergization of the body, irrational use of antibacterial agents, active physiological restructuring of the body and psychoemotional stress. In this regard, the number of dental diseases caused not only by pathogenic, but also by "normal" or conditionally pathogenic microflora increases, which under the influence of the above factors receives a change in typical morphological properties. Normally, populations of microorganisms present in the oral cavity can be considered as continuously changing self-regulating "living" systems in physiological and morphological terms. All this, while reducing the levels of local resistance and increasing psychoemotional stress, leads to a predisposition to the development of inflammatory periodontal diseases (ADDs) and COP in young people. One of the leading etiological factors in the development of diseases of the oral mucosa is considered to be the microflora of the oral cavity .

It is known that microflora plays an important role in the formation of oral pathology and the occurrence of various somatic diseases [18, 19]. It has been shown that among the bacteria that colonize the human body, there are many microorganisms

with a high pathogenicity potential that can cause diseases of various localization or complicate their course [11-0]. Most diseases of the oral mucosa occur against the background of impaired microbiocenosis [11, 12].

Among diseases of the oral mucosa, herpes virus infection occupies a certain specific weight. According to WHO, about 90% of the world's inhabitants are infected with the herpes simplex virus, and 25% -30% of them have clinical manifestations of the disease that are not recognized in time. Chronic recurrent aphthous stomatitis is a widespread disease worldwide, accompanied by the appearance of painful afts on the oral mucosa. Data from various studies of the prevalence of CHD are highly variable (from 5% to 60%) and depend on the population studied, environmental factors, and diagnostic criteria.

According to various authors, chronic recurrent aphthous stomatitis affects from 5 to 50 % of the population [14, 15, 17, 18, 19].

In recent years, the number of patients with autoimmune diseases, such as lichen planus, leukoplakia, erythema multiforme, etc., has increased in dental practice. Although these diseases are systemic, they are most often locally manifested in the oral cavity. Therefore, dentists are among the first to diagnose this pathology and start the necessary medical measures in a timely manner, involving other specialists in the work. Such autoimmune diseases include pemphigus. The disease has a long-term chronic course with remissions of varying severity and duration. The development of this pathology can be triggered by infectious, viral, and chronic somatic diseases, periodontitis, as well as food and drug poisoning and occupational hazards. Lichen planus erythematosus (CPL) is a chronic inflammatory, immune-dependent disease of the skin and mucous membranes with a characteristic papular rash [10, 11, 12]. In the general structure of dermatological morbidity, it ranges from 1.5 to 2.4%, among all diseases of the oral mucosa (SOPR) — 3035% [11, 14]. Patients with isolated lesions of only the oral mucosa are described by dermatologists much less frequently, while dentists note a large percentage of isolated forms of CPL-from 50 to 75% [15]. According to G. D. Savkina (1978), only the oral mucosa was affected in 78% of patients with CPL [16]. Rashes on the oral mucosa can long precede the appearance of rashes on the skin or remain the only sign of the disease. When the SOPR is affected, 62-67% of patients are women aged 40-60 years [11-7]. Mashkillayson (2001) considers CPL SOPR as a special form of the disease that develops mainly in women during the menopausal period and menopause [18]. Systematizing the existing classifications of CPL, we can distinguish: typical form, which occurs in approximately 45% of patients, exudative -



hyperemic — in 25%, erosive-ulcerative — in 23%, bullous — in 3%, hyperkeratotic — in 2%, atypical-in 2%[19]. The infiltrative form of CPL is rare, and only 11 patients with this form of the disease were observed for a number of years [11-0].

To date, about 80 genotypes of human papillomavirus (HPV), which belongs to the Papovaviridae family, are known. Some of these viruses are constantly present in the epidermis of a healthy person. Under the influence of a number of factors — immunosuppression, stress, smoking, etc. - this conditional pathogen causes epithelial hyperplasia of such areas of the mucous membrane and epidermis as anal-genital, face, oral cavity, pharynx, skin of fingers, feet, sole, etc. For example, HPV DNA was found in 92% of gingival hyperplasia biopsies in patients with kidney transplantation [11-1]. Today, there is an obvious need for predictive ranking of those factors that initiate and contribute to the progression of malignant transformation of the epithelium. The introduction of the term "precancer" into medical theory and practice in 1965 gave a powerful impetus to the further development of the precancer theory by clinicians and pathologists [1, 2]. In Russia, the incidence of lip cancer is 3-4 people per 100 thousand population, or 3% of all malignant tumors (8th-9th place). The incidence of lip cancer in men is 6-7 times higher than in women, according to the literature [83]. Leukoplakia is a type of keratosis characterized by a chronic course and affecting the oral mucosa and the red border of the lips. The factors leading to the development of leukoplakia are polyetiological. These are smoking, injuries of mechanical, chemical, thermal origin, and genetic predisposition. At the same time, leukoplakia is associated with chronic candida infection and diseases of the gastrointestinal tract [14, 15]. Leukoplakia is characterized by the presence of foci of hyperkeratosis with the phenomena of chronic inflammation in areas that are normally not subject to keratinization [11-6]. It is generally recognized that leukoplakia belongs to precancers as long-existing atrophic-degenerative proliferative changes in the tissue of a non-specific nature.

A. L.Mashkillayson in 1970 proposed a classification in which he identified 4 clinical forms of leukoplakia: flat, verrucous, erosive and leukoplakia of smokersTappainera (nicotine stomatitis) [17]. Verrucous leukoplakia has a significantly higher potential malignancy than squamous leukoplakia — up to 20% of cases [88]. In erosive leukoplakia, erosions are different in shape and size and are formed in the foci of flat and verrucous leukoplakia. Erosive leukoplakia is considered the most malignant (25.5% of cases). Most often, lesions of the mucous membrane of the cheeks and the bottom of the oral cavity are noted. LeukoplakiaTappainera is described in the literature

as an independent clinical form of the disease, never undergoing malignancy and quickly passing after smoking cessation.

violation of the integrity of all layers of the mucous membrane, which has a bottom and edges, is called an ulcer, healing occurs with the formation of a scar [89]. Aphthous lesions of the oral mucosa occur in both adults and children, more often in women. Long-term course, periodic exacerbations, accompanied by these factors, which are associated with severe pain syndrome and worsen the quality of life of patients, together with the variety of existing theories of the origin and mechanisms of the disease development, indicate the need to search for new approaches to the treatment of CHD [19, 20]. Recently, there has been an increase in the number of inflammatory diseases of the oral mucosa [22-1]. This is due to both an increase in the number of unfavorable factors affecting the body (environmental degradation, chronic stress) and a decrease in the standard of living [2, 2]. Actually, diseases of the oral mucosa are caused by various etiological factors, and the features of the structure and functioning of the oral cavity create conditions for the impact of traumatic factors, pathogens or viruses on the mucous membrane. At the same time, the severity and prevalence of the disease is determined by the nature of the etiological factor and the intensity of aggression. In the case when the aggressiveness of the factor is insignificant, the body reacts by mobilizing a complex of non-specific defense reactions and the disease does not occur. Despite the variety of etiological factors of influence, there are general patterns in the development of the pathological process [11-7].

Erosive and ulcerative diseases of the oral mucosa are sources of constant discomfort associated with pain syndrome, which complicates a full meal, communication with others and thereby significantly reduces the quality of life. Some of them, especially chronically and permanently occurring with the phenomena of pronounced inflammation and tissue destruction, contribute to the formation of chronic foci of intoxication and sensitization [28].

With incorrect diagnosis and the lack of timely rational treatment measures, the disease often recurs, the course becomes prolonged and severe, causing various complications in the body, up to chronic viral sensitization and intoxication [11-9], which subsequently leads to the occurrence of autoimmune diseases such as pemphigus and lichen planus.

If earlier it was considered that diseases of the oral mucosa are a local process and the approach to their treatment and prevention was carried out only from a local point of view, now they are considered in an inseparable connection with the body as a whole. The oral mucosa may reflect metabolic



disorders, pathology of individual organs and systems of the body. Changes in the oral mucosa can be strictly specific, when it is already possible to establish a diagnosis and determine treatment tactics based on the appearance of the mucosa. However, in most cases, the diagnosis of diseases that manifest on the mucous membrane is difficult, since the clinical picture is non-specific and often burdened with additional unfavorable local (insufficient hygienic care, trauma, secondary infection) and general (hypovitaminosis, somatic pathology) factors [12, 13]. Diagnosis of these diseases is complicated by the lack of clear ideas about their etiology and pathogenesis, significant clinical similarity of these diseases, as well as the presence of various manifestations of pathological changes. At the same time, the clinical picture of the course of many diseases of the oral mucosa, which has changed recently, also makes it difficult to diagnose. Often, the appearance of primary morphological elements on the oral mucosa can be the first symptom that appears long before the general clinical symptoms of the underlying disease, pathology even before its objective symptoms appear, and patients can seek help first of all in dental institutions [23, 25, 26]. Chronic diseases of the oral mucosa are manifested by functional disorders that can lead to anatomical changes in the tissues of the oral cavity. Edema, erosion, atrophy, hyperplasia, and sclerosis of the oral mucosa, which are manifested by primary and secondary elements on the mucous membrane of the cheeks, palate, tongue, gums, and in the corners of the mouth, create unfavorable conditions for the use of dentures, fixation of orthopedic structures, and hygienic care [14, 15]. Diseases of the oral cavity, especially those that are accompanied by aphthous rashes and erosive-ulcerative lesions, are a fairly common dental pathology, which affects from 8 to 60 % of the population and is a serious problem [3, 4, 5, 6]. Such diseases include lichen planus, aphthous stomatitis. They are characterized by a torpid course, polymorphism of clinical manifestations, complexity of diagnosis, and low efficiency of treatment [5, 10, 17]. In recent years, there has been a tendency to increase and develop complications in these diseases. This poses a problem

treatment of inflammatory diseases of the oral cavity is one of the most complex and important tasks of modern dentistry. The most studied and scientifically based immune theory is considered to be related to disorders of local and general cellular and humoral immunity. The conducted immunological studies of SOPR confirm that the development of aphthous elements is associated with circulating immune complexes, where the antigens are microorganisms or cells of the mucosa itself, and the antibodies are immunoglobulins [8, 11]. In the structure of diseases of the oral mucosa, lichen

planus is from 2 to 17 % [2,3,4,5], and as an isolated lesion only of the oral mucosa occurs in 70-75 % [116,117].

Pemphigus can be benign (non-acantholytic) or true (acantholytic). Acantholytic pemphigus is a serious disease characterized by the formation of blisters on the skin, as well as on the mucous membrane: the mouth, nose, pharynx, larynx, conjunctiva of the eye, in the gastrointestinal tract (esophagus, stomach, large intestine), on the mucous membrane of the bladder and genitals (cervix, urethra). In this case, the central nervous system may be affected [18].

Leukoplakia is white formations in the form of spots or plaques that are not scraped off by the instrument during examination, and differ in size, shape, and consistency on palpation [19, 20]. For the diagnosis of leukoplakia, it is necessary to have a clear understanding of the influence of causal factors on the oral mucosa, taking into account the localization of lesions, and changes in both the structural features of the SOPR and physiological processes should be taken into account. The physiological process of keratinization (exfoliation of the surface cells of the epithelium of the oral mucosa), as a rule, is expressed unevenly. In response to various types of stimuli, the oral mucosa is capable of forming and accumulating keratin due to the pronounced granular layer in the multi-layered keratinizing epithelium, which leads to thickening of the whitish epithelium. At the same time, in areas of non-keratinizing epithelium with a pronounced submucosal layer, the peeling of the surface layers increases under the influence of constant trauma, and this also leads to a violation of the keratinization process [21]. In both cases, we are talking about a keratotic type of inflammation due to a violation of the keratinization process-leukoplakia is clinically diagnosed in the form of white non-scraping mucosal lesions [12].

Exudative erythema multiforme (SOPR) is a complex multifactorial acute inflammatory disease characterized by polymorphic rashes on the oral mucosa, genitals, and skin, and is prone to relapses. EE is based on such etiopathogenic significant components as the patient's genetic characteristics, exposure to environmental factors, inflammatory and immune-inflammatory reactions, sensibilization (toxic-allergic and infectious-allergic forms), as well as dysbiotic disorders in the body [22, 23].

The effectiveness of the organization of dental care and its planning depend on studying the structure of morbidity of the oral mucosa depending on gender and gender characteristics [24]. Treatment of diseases of the oral mucosa and prevention of their relapses present significant difficulties and are often ineffective [11, 12, 13, 14].



It should be noted that an increase in the number of relapses contributes to the transition of the disease to more severe forms, which are subsequently difficult to treat. In this regard, prevention of relapses of diseases of the oral mucosa is considered not only as a dental problem, but also as part of a comprehensive system of human health improvement [24, 25]. Therefore, pathogenetic approaches to relapse prevention should be applied, based on a deep knowledge of the mechanisms of development of pathological processes.[21, 22, 23, 26, 27]. Based on the data on the mechanisms of development of the pathological process in the oral mucosa, the main provisions of the strategy of therapeutic and preventive measures necessary to prevent or reduce the intensity of the pathological process are formed [9, 12].

A particular problem is the treatment of diseases of the oral mucosa, accompanied by the development of erosive and ulcerative elements of the lesion and characterized by a chronic or recurrent course. These diseases include some forms of lichen planus and chronic recurrent aphthous stomatitis. The development of these diseases is accompanied by an inflammatory reaction of the mucous membrane, significant soreness and torpidity of the course, polymorphism of clinical manifestations and low effectiveness of treatment, as evidenced by numerous studies [28, 29, 30]. In the modern specialized literature, issues of improving conservative, medical, or less often physiotherapy treatment of diseases of the oral mucosa are more often addressed [24]. According to the literature data, oral mucosal diseases are detected 3.3 times more often in patients with complete removable lamellar prostheses than in individuals with preserved dentition on both jaws [13]. The ultimate goal of complex conservative and prosthetic treatment of patients should be to improve the quality of life of a patient with chronic pathology of the oral mucosa [5]. The epithelium of the oral mucosa is a traditional object of cytological studies, which allow detecting the development of precancerous processes, impaired cell differentiation, and infectious lesions [6].

The epithelium of the oral mucosa serves as the most important barrier to entry of antigens, allergens and carcinogens into the body, as well as an area of probable introduction of microorganisms [7,8]. A characteristic feature of the CPL is prolonged relapsing course, the possibility of transition from one form to another, the probability of malignancy of individual forms, the difficulties in the choice of methods of treatment and resistance to drug therapy [1, 2, 3]. High protection effect of the oral cavity provides the immune system including specific and nonspecific cellular and humoral factors that function in a close relationship [11]. In the study of protection factors in oral flushes, neutrophilic

granulocytes (NG) are of great importance [12]. Local immunity, which reflects the overall immunological reactivity at the SOPR level, is also manifested by the production of antibodies [14]. Chronic diseases of the SOPR are accompanied by significant changes in the microflora, which are characterized by dysbiosis. These data can serve as confirmation of the weakening of the functional activity of local protective factors in such patients [14, 15].

## LIST OF LITERATURE

1. *Samoilov K. O., Shkurupiy V. A., Vereshchagina G. N. Ultrastructure of endothelial cells of blood capillaries of the gums of patients with chronic catarrhal gingivitis on the background of connective tissue dysplasia. Stomatologiya, 2004, No. 4, pp. 9-12.*
2. *Sarap L. R., Butakova L. Yu., Zenkova Yu. A. et al. Prevention of pathology of the oral mucosa in patients with removable dentures // Clinical Dentistry.- 2007. - No. 1. - p. 44-46.*
3. *Yanochkina N. S. Complex application of magneto-laser therapy and solcoseryl dental adhesive paste *солкосерил* for the prevention and treatment of chronic recurrent aphthous stomatitis: abstract. dis. . Candidate of Medical Sciences, Moscow, 2006, 26 p.*
4. *Ashley R., Waid A., Corey L. Cervical antibodies in patients with oral herpes simplex virus type 1 (HSV-1) infections: local anamnestic responses after genital HSV-2 infections // J. Virol., 1994.- Vol. 68. - №8. - P.5284-5286.*
5. *Slomiany B.L., Piotrowski J., Slomiany A. Role of endothelin-1 and interleukin-4 in buccal mucosal ulcer healing: effect of chronic alcohol ingestion // Biochem. Biophys. Res. Commun.- 1999. - №2. - P.373-377.*
6. *Maksimovsky Yu. M., Chirkova T. D., Ulyanova M. A. Features of the activation composition of periodontal immunocompetent blood cells in catarrhal gingivitis. Dentistry.- 2003. - No. 5. - p. 45-47.*
7. *Maksimovsky Yu. M., Chirkova T. D., Ulyanova M. A. Features of cellular immunity in catarrhal gingivitis (Report 2). Dentistry.- 2003. - No. 3. - p. 6-8.*
8. *Maksimovsky Yu. M., Chirkova T. D., Frolova T. A. et al. Clinical and immunological features of the pathogenesis of catarrhal gingivitis (Report 1) // Dentistry.- 2003. - No. 3. - p. 24-27.*
9. *Savichuk N. O., Savichuk A.V., Pyankova A.V. Novy farmakoterapevticheskiy podkhod v lechenii khronicheskikh stomatitov [A new pharmacotherapeutic approach in the treatment of chronic stomatitis].- 2003.- № 3.- From.34-36.*
10. *Biagioni P.A., Lamey P.J. Acyclovir cream prevents clinical and thermographic progression of recrudescing herpes labialis beyond the prodromal stage // Acta. Derm. Venereol. - 1998.- Vol. 78.- №1.- P.46-47.*



11. Campisi G., Di Liberto C., Iacono G. et al. Oral pathology in untreated coeliac disease // *Aliment. Pharmacol. Ther.*- 2007.- №11-12. - P.26.
12. Lewkowicz N., Lewkowicz P., Kurnatowska A. et al. Innate immune system is implicated in recurrent aphthous ulcer pathogenesis // *J. Oral. Pathol. Med.*- 2003.- N 8,- P.475-481.
13. Lichon J.F. Treatment of recurrent oral aphthous and herpetic ulcerations // *Dent. Today.* 1994,- Vol. 13,- N 10,- P.88-89.
14. Natah S.S., Hayrinen-Immonen R., Hietanen J., Malmstrom M. Factor XHIIa-positive dendrocytes are increased in number and size in recurrent aphthous ulcers (RAU) // *J. Oral. Pathol. Med.*- 1997.- N 9,- P.408-413.
15. Riggio M.P., Lennon A., Wray D. Detection of *Helicobacter pylori* DNA in recurrent aphthous stomatitis tissue by PCR // *J. Oral. Pathol. Med.*- 2000,- N 10,-P.507-513.
16. Kuzmina E. M. Profilaktika stomatologicheskikh zabolevaniy [Prevention of dental diseases]. Poli-Media Press, 2001, 216 p.
17. Aliaga L., Cobo F., Mediavilla J.D., et al. Localized mucosal leishmaniasis due to *Leishmania (Leishmania) infantum*: clinical and microbiologic findings in 31 patients // *Medicine (Baltimore)*.- 2003,- N 3.- P. 147-158.
18. Thomas S., Kolumam G.A., Murali-Krishna K. Antigen presentation by nonhemopoietic cells amplifies clonal expansion of effector CD8 T cells in a pathogen-specific manner // *J Immunol.*- 2007,- N 9> P.5802-5811'.
19. Stomatology / Ed. by V. N. Tregubov, S. D. Arutyunov / M., 2003. - 576 p.
20. Patil C.S., Kirkwood K.L. MAPK signaling in oral-related diseases // *J Dent. Res.*- 2007,- N 9,- P.812-825.
21. Slomiany B.L., Piotrowski J., Slomiany A. Role of endothelin-1 and interleukin-4 in buccal mucosal ulcer healing: effect of chronic alcohol ingestion // *Biochem. Biophys. Res. Commun.*- 1999 N 2,- P.373-377.
22. Storck C. Aphthae of the oral cavity: differential diagnostic considerations concerning a case report // *Schweiz. Med. Wochenschr.*- 2000,- Suppl.- 125.-P.127S-130S.
23. Yadav M., Nambiar S., Khoo S.P., Yaacob H.B. Detection of human herpesvirus 7 in salivary glands // *Arch. Oral. Biol.*- 1997,- N 8,- P.559-567.
24. Davydova T. R., Karasenkova Ya. N., Khavkina E. Yu. On the problem of dysbiosis in dental practice. *Stomatologiya*, 2001, No. 2, pp. 42-45.
25. Rabinovich I. M., Banchenko G. V., Rabinovich O. F. Experience of clinical application of solcoseryl dental adhesive paste in the treatment of aphthous and dental stomatitis // *Klin, stomat.*, 1998, No. 4, pp. 49-52.
26. Lipsker D., Chosidow O. White lesions of the oral mucosa // *Rev. Prat.*-2002.-N2,- P:389-393.,
27. Serra-Guillen C., Requena C., Alfaro A. et al. Oral involvement in lymphomatoid papulosis // *Actas Dermosifiliogr.* - 2007. - N 4. - P.265 -267.
28. Toche P.P., Salinas L.J., Guzman M.M.A., Afani S.A. Recurrent oral ulcer: clinical characteristic and differential diagnosis // *Rev. Chilena Infectol.* - 2007. - N 3. - P.215-219.
29. Vaillant L., Fontes V. Bullous diseases of the oral mucosa // *Rev Prat.* - 2002. - N 4. - P.385-388.
30. Orekhova L. Yu., Levin M. Ya. Indicators of cell sensitization in inflammatory periodontal diseases. // *New in dentistry.* - 1998. - No. 7. - pp. 71-74.



## POSSIBILITIES OF GETTING ELECTRICITY WITH THE HELP OF A SMALL SOLAR FURNACE

**Kuchkarov Akmaljon Axmadaliyevich<sup>1</sup>, Muminov Shermuhammad**

**Abdushukur ugli<sup>2</sup>, Egamberiyev Xomidjon Abdullayevich<sup>3</sup>**

*<sup>1</sup>PhD. Head of the department, Department of Electronics and instrumentation,  
Ferghana Polytechnic Institute, Ferghana, Uzbekistan*

*<sup>2</sup>Assistant, Department of Intellectual engineering systems,  
Ferghana Polytechnic Institute, Ferghana, Uzbekistan*

*<sup>3</sup>Assistant, Department of Intellectual engineering systems, Ferghana Polytechnic Institute,  
Ferghana, Uzbekistan*

### ANNOTATION

*The results on development of technology of conversion of concentrated solar energy into electricity at the Small Solar Furnace with thermal capacity of 2.0 kW are given. The results were analyzed and ways to improve the efficiency of the transformation were shown.*

**KEYWORDS:** solar furnace, focus, concentrator, receiver, steam turbine.

### INTRODUCTION

Currently one of the most important energy problems is the expected depletion of natural reserves of fossil fuels. In addition, the increased use of traditional energy sources has global environmental and climatic consequences. For this reason, it becomes necessary to significantly expand the use of renewable energy sources: solar, geothermal, wind, small streams and biomass. Among renewable energy sources, the Sun is considered the most highly efficient, because the Sun's energy is inexhaustible [1-3].

As you know one of the main branches of large-scale use of solar energy is its conversion into electrical energy using photoelectric and thermodynamic converters, as well as its use in a concentrated form for the purpose of high-temperature materials science - the synthesis of materials. In this direction, the development and creation of combined solar power plants with a capacity of about 2 kW based on mirror-concentrating systems (MCS) [4-6] is relevant.

Thus the issues of practical use of solar radiation concentrators for the creation and development of combined heat and energy production processes require the development of new

methodological and technical issues of creating a concentrator - receiver system for solar thermal power plants and the development of stands for studying the processes of simultaneous production of thermal and electrical energy. On the basis of many years of experience in the field of solar power plants at the Institute of Materials Science NPO "Physics-Sun", Small Solar Furnaces (SSF) with a thermal power of 2000 W were developed and created [4,7]. The SSF is equipped with an automatic tracking system for the Sun. The flux of radiant energy captured by the heliostat is directed to a parabolic mirror concentrator, which focuses the incident flux of radiant energy in the focal plane on the ray-sensing surfaces of the synthesized or tested materials [8-11].

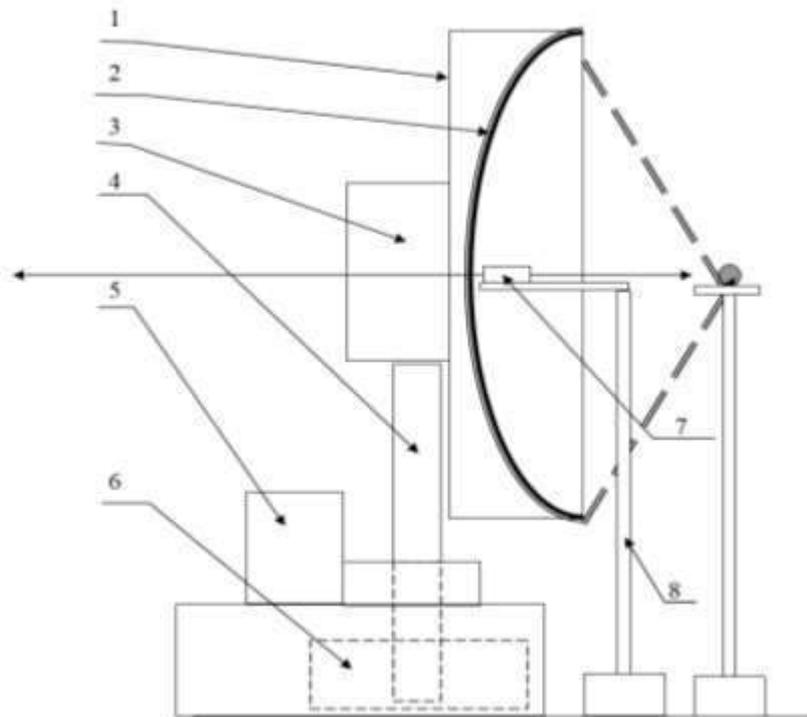
### METHODS AND MATERIALS

The purpose of this work was to develop a technology for converting concentrated solar energy at the focus of SSFs into electricity (Fig. 1). To achieve the goal, the following tasks were solved.

1. Development and research of the system concentrator - receiver of solar thermal power plants.

To create an effective concentrator-receiver system, it is necessary to ensure optimal distribution of the concentrated flow over the working surface of the receiver. Such optimization can be carried out in the first approximation by calculation and further, refined on the basis of experimental studies of the field of concentrated solar radiation. As follows from the above, the literature review on the calculation of

the optical-energy characteristics of concentrators and the concentrator-receiver system, the solution of these issues of optimization of the parameters of the K-P system, the operation of parabolic solar radiation concentrators and the control of their optical-energy characteristics require the development of calculated and experimental methods for determining their concentrating ability are more close to practice.



1-concentrator frame, 2- concentrator mirror, 3- angle electromechanical drive, 4- suspension unit, 5- azimuth electromechanical drive, 6- support unit, 7- light sensor, 8- light sensor support.

**Fig. 1. The SSF consists of a self-tracking system concentrator with a thermal power of 2.0 kW.**

In this regard, calculations were carried out on the regularities of the distribution of the concentrated flow in the focal plane and over the surface of the receiver, taking into account the inaccuracies of the concentrator, as well as the development of a methodology for calculating K-P systems with receivers of steam generators [12-14].

2. Development and research of receivers of steam generators of solar thermal power plants.

In general, a solar receiver steam generator performs the same functions as a conventional steam generator. However, in solar steam generators we have fewer possibilities for choosing the geometry of the radiation-receiving surfaces and, in this regard, we also have limitations on the design solutions of the receivers. The fact is that the receivers of solar installations are fundamentally open, have an inlet for supplying a concentrated solar flux, which is also a source of heat loss.

In the general case, the tasks of calculating the receiver-steam generator are to determine the following parameters:

1. Determination of the surface area of the evaporator –  $C_i$ .
2. Determination of the surface area of the superheater –  $C_p$ .
3. Choice of parameters of heating pipes - diameter  $D$ , wall thickness  $C$ , length -  $L$  for the evaporator and superheater.
4. Boiler steam output -  $S$ , [kg / s].
5. Geometry of the heating surface and its location.

The initial data for the calculation for solar installations are:

1. Source power –  $\Theta$ .
2. The diameter of the image spot in the focal plane -  $D_p$
3. Average flux density -  $E_{sr}$
4. Working steam pressure –  $P_p$

Let's consider the main stages of the calculation.

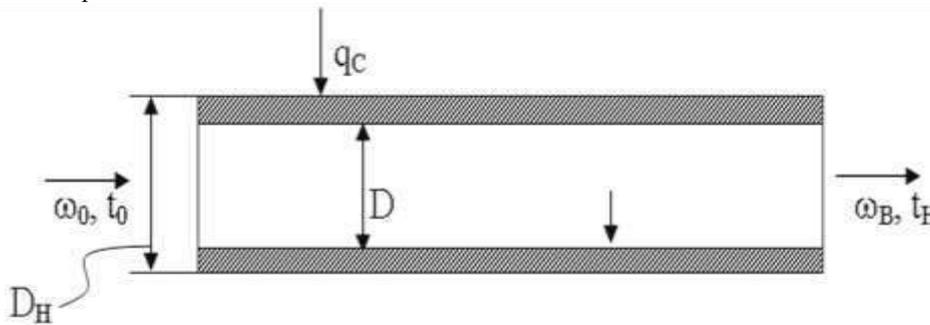
The calculated boiler productivity for steam -  $S_p$ , [kg / s] is determined.

$$S_p = \Theta * \eta_K / h'' \quad (1)$$

where  $\eta_K$  is the boiler efficiency,  $h''$  is the enthalpy of steam, [kJ / kg], including the heat of vaporization  $p$  and the enthalpy of water -  $h'$ , heated to the saturation temperature.

Let us consider the option when the steam temperature is equal to the saturation temperature  $T_H = 1800C$ ,  $\eta_K = 0.5$ ,  $p = 2at$  and  $\Theta \approx 2000Wt$ .  $h'' = 14.1$  [kJ/kg], or  $S_p = \Theta * \eta_K / h'' = 500 * 0.5 / 14.1 = 0.714$  kg / sec.

Heat exchange surface area (without superheater). The simplest scheme of the problem is heating water in a pipe (see Fig. 2) with the outer diameter of the  $D_H$  and the inner diameter of the  $D_W$  at constant flux density  $q_C$  or the temperature of the vehicle on the pipe wall. The problem is reduced to determining the length  $L$  of the pipe, from which we obviously determine the heating surface area.



**Fig. 2. Scheme of a tubular heater [12].**

Determine the length of the pipe for its internal diameter adopted above  $D = 6$  mm Assuming that the pipe wall thickness is 0.1 mm and it is irradiated from one side, we have

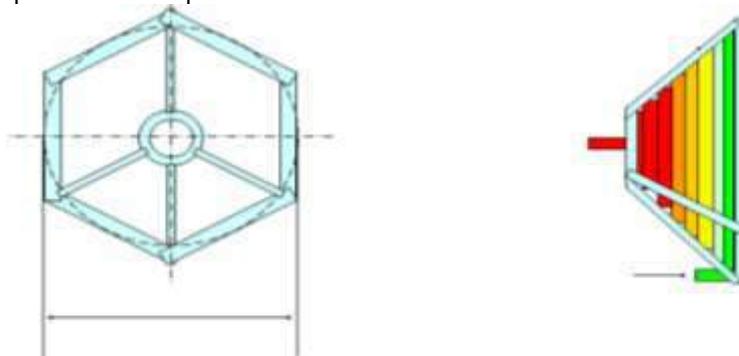
$$L = 2D_{LP} / \pi * (D + 2C) = 2 * 0,01 / (3.1416 * (0,1 + 4) * 10^{-3}) = 0,366m.$$

3. Development of the layout of the steam turbine and the production of electrical energy.

For the boiling process to occur and superheated steam to be obtained, two conditions must be met: bringing the water temperature to saturation temperature at a given pressure in the system (liquid overheating relative to the saturation temperature), and the presence of a superheater.

## RESULTS

Preliminary experiments have shown that it is desirable to make a water evaporator in the form of a one-piece cylindrical pipe with a diameter of 10 mm, and a superheater in the form of a single spiral made of a pipe with an outer diameter of 6 mm made of steel grade BM100n40 (see Fig. 3). The spiral formed a cavity receiver with a shape close to a part of a sphere. The diameter of the outlet of such a receiver was  $D = 100$  mm. The number of turns of the spiral superheater was 8.



**Fig. 3. Layout of a common superheater and spiral fastening diagram.**

The installation works as follows. Water from the tank (the tank is installed 10 m in height from the installation to increase the water pressure) at a

pressure of 2 atm, depending on the intensity of solar radiation, is supplied to the evaporator. With solar radiation of  $800 W / m^2$ , then a heliostat is directed



to the concentrator at this time, a density of 20 W/cm<sup>2</sup> is reached at the focus of the SSF. Average flow rate of cold water 0.7-0.8 l/min. Preliminary experiments have shown that, depending on the power of the concentrated solar flux, the steam temperature can be brought up to 800 °C at a pressure of 2 atm, the operating temperature was lower, to 600-700 °C.

A jet of steam at a high speed comes from the nozzles into the channels of the rotor blades. Due to the curvilinear shape of the channel, the steam changes its direction of movement. In this case, a centrifugal force acts on each element of the working fluid jet. The presence of these forces causes an uneven distribution of pressure in the jet. As a result, the pressure on the concave surface of the blades is greater than the pressure on the back of the blades. This pressure difference is the force under which the blades rotate.

The connection between the steam consumption M

kg/sec, the work of 1 kg of steam and the power of the rotating body N<sub>mech</sub>, measured in watts, will be represented as:

$$N_{\text{mech}} = P * \omega \quad (7)$$

$$\omega = 2 * \pi * H = 2 * 3.14 * 2000 \text{ rot/sec} = 209.12 \text{ m/sec}$$

$$P = M * W / m = 0.093 \text{ kg/sec} * 56.6 \text{ m/sec} / 1 = 5.26 \text{ n}$$

$$N_{\text{mech}} = 5.26 * 209.12 = 1100 \text{ W} = 1.1 \text{ kW}$$

where, P - steam force; ω - angular velocity; t-time.

The table shows the parameters of the steam turbines of the combined system, the steam turbine of which is rigidly fixed on the same shaft with the 672 W, PH brand.

The speed of rotation of the turbine shaft depends on the pressure of the superheated steam and its specific volume. With an increase in pressure and temperature, the specific volume of superheated water vapor fits (table. №1).

Table № 1. Steam turbine parameters of the combined system.

Names of quantities	Stage №.		Parameters
	Designation	Dimension	
Steam consumption	m	kg/h	33,6
Average diameter	D	m	0,62
Peripheral speed	n	1/min	2000
Pressure	P <sub>0</sub>	atm	12
Temperature	t	°C	470
Blade height	l	mm	180
Mechanical power	H <sub>MEX</sub>	W	1100
Electric power	P <sub>эл</sub>	W -	672
Coefficient of usefulness	η <sub>л</sub>	-	0.62

However, to obtain current using a 336 W generator, you need steam with a pressure of up to 6-9 atm. At pressures below 6 atm, the current power fits up to 17 W, and at pressures above 9 atm, the generator armature will spin faster, causing a breakdown of the generator stabilizer, and it cannot produce an electric current.

## CONCLUSION

Thus, the functionality of SCFs was expanded on the basis of the laws of distribution of the flux of concentrated solar radiation in the light receiver and methods of conversion into other types of energy. In addition, SSFs have the ability to generate electricity through engineering calculations and heat transfer experiments in a focal plane light receiver.

## REFERENCES

1. Govind, N. K., et al., *Design of Solar Thermal Systems Utilizing Pressurized Hot Water Storage for Industrial Applications*, Solar Energy, (2008), Vol.82, pp. 686-699.

2. Shrestha, J. and Byanjankar, M. *Thermal performance evaluation of box type solar cooker using stone pebbles for thermal energy storage*. International Journal of Renewable Energy, (2007), Vol.2, pp. 11-21.
3. Zakhidov, R.A., *Renewable Energy Source Are the New Way in Energy Engineering*, Geliotekhn., (2002), no. 2, pp. 101-111.
4. Abduraxmanov A.A. *Zerkalno-kontsentriruyushchie sistemy solnechnykh energosilovykh va texnologik ustanovok va ix effektivligi pri ispolzovanii priemnikov selektivnogo luchepoglochenii: Dis. doktora texnickix nauk. M. : 1992. p. 300.*
5. Lovegrove, K.; Burgess, G.; and Pye, J. *A new 500 m<sup>2</sup> paraboloidal dish solar concentrator*. Solar Energy, (2011), Vol. 85(4), 620-626.
6. Kaushika, N. D., Reddy, K. S., *Performance of Low Cost Solar Paraboloidal Dish Steam Generating*, Energy Conversion & Management, (2000), Vol. 41 7, pp.713-726.
7. Zainutdinova, Kh.K., *(Solar Energy Marketing in Uzbekistan)*, Tashkent: Science, 2011.
8. Abdurakhmanov, A.A., Akbarov, R.Yu., Gulamov, K.G., et al., *Exploitation Experience of Larger*



- Solar Furnace of 1000 kW Power, Geliotekhn., (1998), no. 1, pp. 39–44.*
9. Paizullakhanov, M.S., Faiziev, S.A. Calcium carbide synthesis using a solar furnace. *Tech. Phys. Lett.*, (2006), Vol. 32, pp. 211–212.
  10. *Proceedings of the 9th PACES International Symposium on Solar Thermal Concentrating Technologies, Font Romeu, 1999, J. Phys. IV (France) 9, Part 3 (1999).*
  11. Abdurakhmanov, A.A., Paizullakhanov, M.S. & Akhadov, Z. Synthesis of calcium aluminates on the big solar furnace. *Appl. Sol. Energy*, (2012), Vol.48, 129–131.
  12. Klychev Sh.I. Modeling of receiving and concentrating devices of solar thermal power plants: Dis. ... Dr. Tech. sciences. Tashkent: FTL, 2004. 268 p.
  13. Strebkov D.S., Tveryanovich E.V. Concentrators of solar radiation // under. ed. Academician of the Russian Academy of Agricultural Sciences D.S. Strebkov. M.: GNU VIESH. 2007.S. 316.
  14. Abduraxmanov A.A., Axadov J.Z., Mamatkosimov M.A., Klychev Sh.I. *Kontsentriruyushchi sistemy va vybor optimallash parametrlari luhevosprininamayushche poverxnosti // Gelotexnika. 2009. № 2. S. 72-76.*



## DESIGN AND CHARACTERIZATION OF PRAMIPEXOLE DIHYDROCHLORIDE NANOPARTICLES

**K.Vandana\*,G.Samyuktha,L.Swathi,K.Priyanka,A.Srinu**

*K.V.K College of Pharmacy,Department of Pharmaceutics,Surmaiguda,Hyderabad,T.S.*

### ABSTRACT

The present investigation was undertaken to develop nanoparticles of hydrophilic drug pramipexole dihydrochloride and improve the entrapment efficiency of the drug. Nanosuspension of pramipexole dihydrochloride was prepared with PLGA by the process of modified nanoprecipitation technique. The particle size, zeta potential, SEM, TEM and invitro drug release were performed. Nano-formulations are prepared with different concentrations of PLGA. The formulation variables such as polymer concentration were found to possess significant effect on the particle size and entrapment efficiency of drug in nanosuspension. The maximum entrapment efficiency, least particle size and optimal invitro drug release profile were exhibited with 1;2 ratio of drug and PLGA. The least particle size of 145 nm and maximum zeta potential value 34.8 mv were observed with PMPNP2 formulation. The SEM, TEM and invitro drug release of PMPNP2 were performed shows spherical shape with controlled release when compared to other formulations. PMPNP2 can be selected as best among two best formulations. Thus, the biodegradable polymers influences a better delivery in brain for the treatment in Parkinson's disease.

**KEYWORDS:** Pramipexole dihydrochloride; PLGA, Zeta potential; MTT assay; Parkinson's disease

### INTRODUCTION

The development of polymer based drug carriers has attracted increased attention over the last years. Nanoparticles are the forefront of the rapidly developing field with several potential applications in drug delivery, clinical medicine and research, as well as in other various sciences(1). Other drug delivery systems for brain disease have a low therapeutic effect due to insufficient bioavailability in the targeted site(2). Nanoparticles may overcome this problem due to its smaller particle size and may produce therapeutic effect in a particular site which offers the possibility to develop newtherapeutics (3).

The development of new drug alone is not sufficient to provide the base for the progress in drug therapy and the in-vitro data obtained from various experiments are very often followed by disappointing results in vivo due to poor absorption, rapid metabolism and elimination lead to insufficient drug concentration at the specific site, high fluctuation of the plasma levels due to unpredictable bioavailability after oral drug administration with poor drug solubility.(4-6).

The nanosuspension is a newer drug delivery system in the pharmaceutical field to overcome all these above problems(7,8,9). The aim of the present study is to develop polymeric nano suspensions of pramipexole dihydrochloride for treating Parkinson's disease. Pramipexole is a well known antiparkinsonism drug which produces toxicity as a side effect with frequent administration in dose regimen only a minimal amount of the drug crosses the blood brain barrier(10,11). Pramipexole dihydrochloride is having manageable bio availability due to its high first pass metabolism and poor penetrability through blood brain barrier due to its hydrophilic nature. Therefore more amount of the drug is required to achieve the required therapeutic activity. But in nanosuspension with small amount of drug which can achieve the better therapeutic activity. Nanosuspension is a novel drug



delivery system which makes the drug lipophilic and protect the drug from degradation.(12,13) Due to this the drug can able to penetrate the blood brain barrier easily for targeting the brain disorder with increased bioavailability(14,15). Hence the present study is to formulate and evaluate nano suspension of Pramipexole dihydrochloride for treating Parkinson's disease

## MATERIALS AND METHODS

### Materials

Pramipexole dihydrochloride, PLGA and Pluronic F68 are purchased from Sigma Aldrich, Bangalore. Other chemicals were purchased from Hi media and Sisco Research Laboratories, India. All the chemicals which were used in the formulation and evaluation were analytical grade.

### Compatibility studies:

#### Fourier Transform Infra Red Spectroscopy (FTIR) studies

The Fourier transform infra red analysis was conducted for the structure characterization. FTIR spectra of the Pramipexole dihydrochloride, polymer and in combination were recorded. FTIR spectra were recorded on Bruker alpha – T Spectrophotometer. Test samples were mixed with KBr, pressed into a pellet and scanned from 400 to 4000 cm<sup>-1</sup>.

#### Differential Scanning Calorimetry (DSC)

Samples were analyzed by differential scanning calorimetry (DSC), with a Shimadzu DSC T-60 using nitrogen gas. The sample was poured in an Al crucible, which was then sealed. The sample was kept at 25°C for 10 min, and heated from 25 to 250°C at a scan rate of 50°C/min.

#### Preparation of Pramipexole dihydrochloride nanosuspension

Preparation of Pramipexole dihydrochloride nanosuspension is carried by modified nano precipitation method(16,17). In modified nanoprecipitation method, phosphate buffer with pH 9.0 was used as external medium instead of aqueous phase. Various concentration ranging 10- 50 mg of PLGA and 10 mg pramipexole were accurately weighed and dissolved in 5 ml acetone. This organic solution was added slowly to Pluronic F 68 (1%) in phosphate buffer (pH 9.0) solution. The organic solvent was then allowed to evaporate for 2 h with continuous stirring on a magnetic stirrer (Remi). The NP suspension was then centrifuged at 15,000 rpm for 30 min at 4°C using high-speed centrifuge (Remi). Supernatant was taken for further evaluation. Formula for the pramipexole nanosuspension is given in the table-1.

**Table-1: Formula for Pramipexole dihydrochloride nanosuspension**

	PPNP1	PPNP2	PPNP3	PPNP4	PPNP5
Pramipexole (in mg)	10	10	10	10	10
PLGA (in mg)	10	20	30	40	50
F 68 (in %)	1				
SPEED (in rpm)	1000				
TIME (in hr)	2				

### Characterization of Nanoparticles

The optimized nanoparticles containing Pramipexole dihydrochloride were characterized by studying various physico-chemical properties.

#### Particle size and Zeta potential

The size of the prepared nanoparticles was analyzed by using malvern apparatus. All samples were diluted with ultra purified water and the analysis was performed at a scattering angle of 90° and at a temperature of 25°C. The mean diameter for each sample and mean hydrodynamic diameter was generated by cumulative analysis in triplicate. Nanoparticles were characterized with Zeta potential using a Zeta Sizer. The measurements were performed using an aqueous dip cell in an automatic mode by placing diluted samples in the capillary measurement cell and cell position is adjusted.



### Scanning Electron Microscopy (SEM)

The surface morphology of the particles were studied using Scanning Electron Microscopy Quanta 200 FEG scanning electron microscope (FEI Quanta FEG 200) set at 200 kV by placing an air dried nanoparticle suspension on copper electron microscopy grids and the image was captured at desired magnification.

### Transmission electron microscopy (TEM)

TEM analysis of the prepared formulations was carried out to understand the morphology of nanoparticles. A drop of NPs suspension containing 0.01% of phosphotungstic acid was placed on a carbon film coated on a copper grid for transmission electron microscopy. TEM studies were performed at 80 kV. The copper grid was fixed into sample holder and placed in vacuum chamber of the transmission electron microscope and observed under low vacuum, and the images were recorded.

### Drug content

Drug content was determined by taking 1ml of the PLGA Nanoparticles loaded Pramipexole dihydrochloride . To this formulation 1ml of aqueous potassium dihydrogen phosphate solution (30mM) was added and the mixture was centrifuged at 33,000 xg at 150C. The clear supernatant was removed and analysed spectrophotometrically and drug content was calculated.

### Drug Entrapment Efficiency

The drug loaded nanoparticles are centrifuged at 13000xg for 30 min and the supernatant is assayed for non-bound drug concentration by spectrophotometer. Entrapment efficiency was calculated as follows:

### In vitro release studies

In *in vitro* release studies were performed using diffusion test apparatus USP-II at 50rpm(18). 10ml of the nanoformulation was placed in dialysis membrane having molecular weight cut-off from 12000 to 14000 daltons. Membrane was soaked in phosphate buffer saline for 12 hours before using. Pramipexole dihydrochloride formulation in dialysis membrane was placed in the bowl containing 100 ml of phosphate buffer saline pH 7.4 at fixed time intervals, 1 ml of the aliquot was withdrawn and fresh phosphate buffer saline pH 7.4 was replaced to maintain constant volume.

## RESULTS AND DISCUSSION

### COMPATIBILITY STUDIES

#### Fourier transforms infra red spectroscopy (FTIR)

The FTIR spectrum of Pramipexole dihydrochloride, polymer, and the mixture of both drug and polymer were carried out by KBr pellet technique using FTIR spectrophotometer.

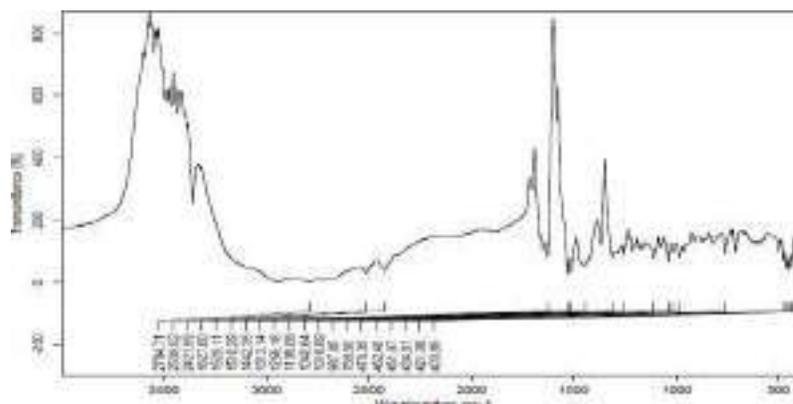
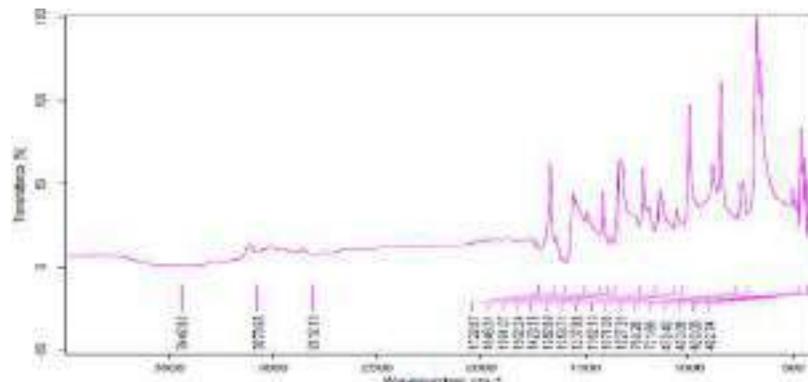
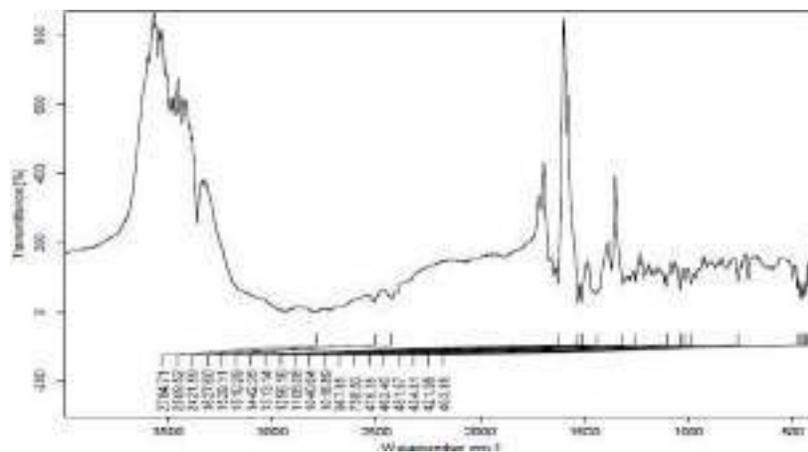


Fig 1: FTIR spectrum of Pramipexole



**Fig -2: FTIR spectrum of PLGA**

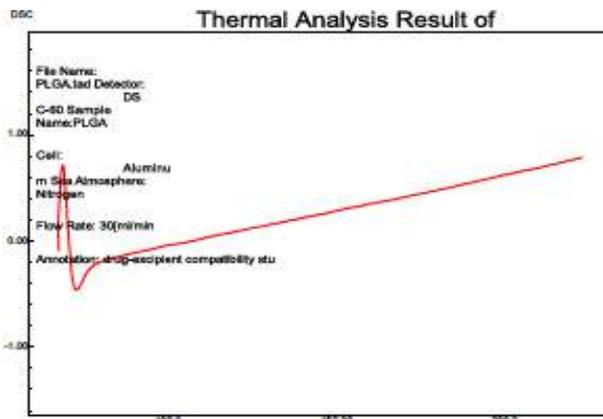
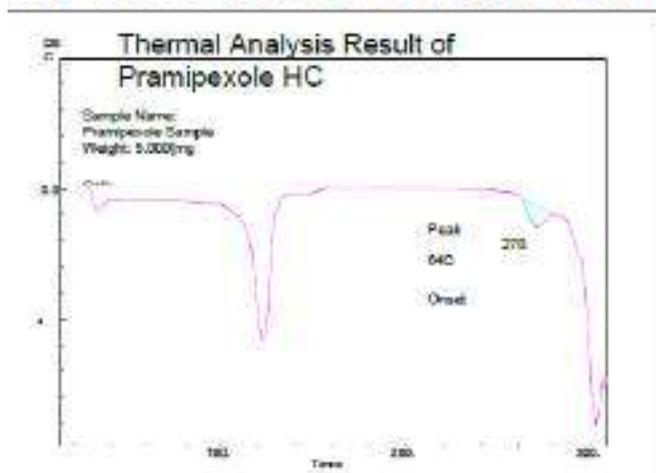
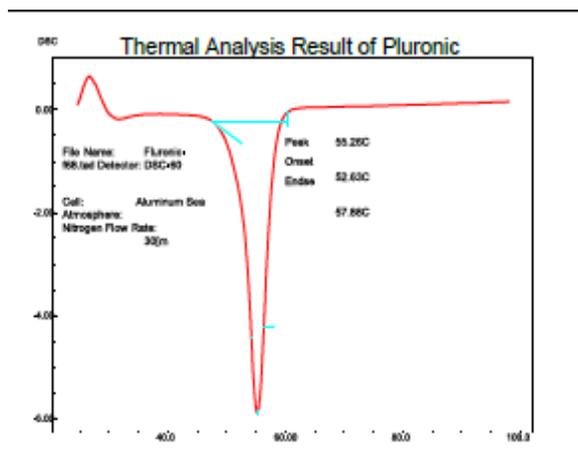
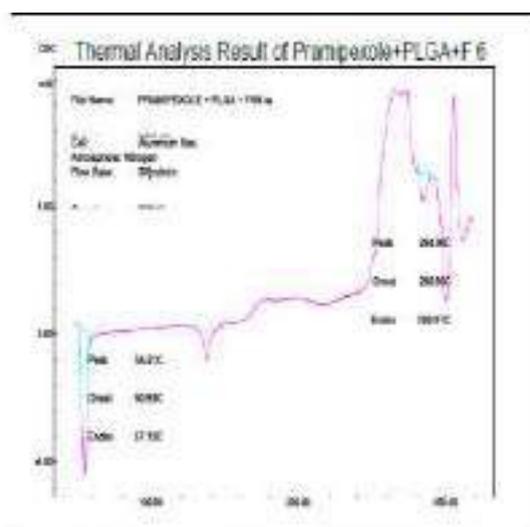


**Fig -3: FTIR spectrum of Pramipexole dihydrochloride and PLGA**

A sharp peak obtained at 3489cm<sup>-1</sup> showed an NH stretching of Pramipexole dihydrochloride, peak obtained at 1256cm<sup>-1</sup> showed a C-O stretching of PLGA and similar peaks were observed in combination mixture. There is no significant changes observed in Pramipexole dihydrochloride and PLGA mixture spectra and it will conclude that there was no incompatibility and significant interaction between drug and polymer.

### Differential Scanning Calorimetry (DSC)

The DSC studies were carried out by Differential Scanning Calorimeter.

**Fig -4: DSC of Pramipexole dihydrochloride****Fig -5: DSC of PLGA****Fig -6: DSC of Pluronic F68****Fig -7: DSC of a mixture of Pramipexole dihydrochloride PLGA-Pluronic F68**

### Dihydrochloride PLGA-Pluronic F68

A sharp exothermic peak for Pramipexole dihydrochloride and PLGA was obtained at 270.640C, 55.260C and similar exothermic peaks was observed in combination of both drug and polymer. There is no significant interaction observed between drug and polymer.

### Particle size and Zeta Potential Analysis

The particle size analyses were carried out for the nanoformulations prepared with different concentration of polymer. The particle sizes were shown in the following table 3 which describes increase in polymer concentration having an impact on particle size. The pramipexole dihydrochloride loaded PLGA nanoformulations of 1:3 shows 195 nm in the table is chosen as better particle size because other ratio of 1:1, 1:2 having less polymer so that more drug may not be encapsulated. On the other hand 1:4, 1:5 are having more amount of polymer with high zeta potential, hence the 1:3 ratio with 195 nm particle size with 34.8 mv zeta is chosen due to the higher value of zeta potential implies more stable The size and stability may be compromised to achieve a better bioavailability.

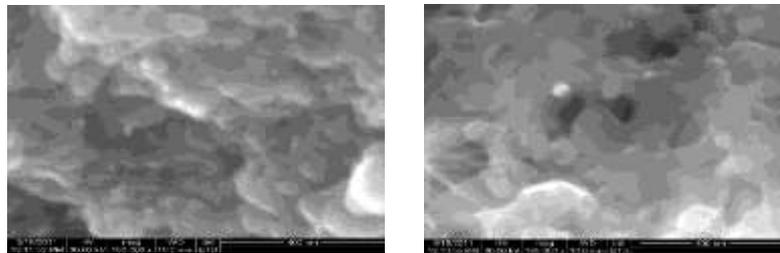
**Table- 2: Particle size and Zeta Potential analysis of pramipexole dihydrochloride nanosuspension**

S. NO.	FORMULATION	RATIO	PARTICLE SIZE (nm)*	ZETA POTENTIAL (mV)*
1.	PPNP1	1:1	160±1.5	27.2± 1.7
2.	PPNP2	1:2	183±1.6	30.4±1.1
3.	PPNP3	1:3	195±2.8	34.8±1.5
4.	PPNP4	1:4	223±2.3	34.4± 1.4
5.	PPNP5	1:5	240± 2.4	34.2±2.3

\* Values indicated in the results of triplicate trials ± s.e.m

**Scanning Electron Microscopy (SEM)**

The SEM analysis was performed for the polymeric nanosuspension after selecting appropriate field and magnification. The SEM photographs are shown in fig 8 & 9 shows the morphological characters of PPNP 3 nanoformulation. It is conferred that the particles are in nano sizes and the particle shape was found to be spherical shaped in appearance.



A

B

**Fig 8: SEM photos of pramipexole dihydrochloride nanosuspension (PPNP3)****Drug content and entrapment efficiency**

The drug content of the prepared nanoformulations were determined and the results shows 0.57 mg/ml with 86.21% entrapment efficiency in PPNP3 with higher drug content having more entrapment efficiency which was shown in table 4, since other formulation shows less drug content when compare to PPNP3 with varying entrapment efficiency. Thus based upon result PPNP3 may be best formulation among the remaining nano suspension.

**Table 3: Drug content and entrapment on efficiency of pramipexole dihydrochloride nanoparticle formulations**

Formulation	Average drug content mg/ml*	Average entrapment efficiency (%)*
PPNP1	0.35±0.03	67.28% ± 2.2
PPNP2	0.49±0.05	75.53% ± 1.2
PPNP3	0.57±0.02	86.21% ± 2.6
PPNP4	0.55±0.04	86.13% ± 1.8
PPNP5	0.54±0.03	85.89% ± 2.1

\* Values indicated in the results of triplicate trials ± s.e.m

**In vitro release studies**

The table shows *in vitro* drug release of all formulations; in that, PPNP1, PPNP2 shows the highest drug release but was rejected as the particle size was very high PPNP 4 and PPNP 5 were not selected despite low particle size because they act as release retardants due to a high concentration of polymer. So PPNP 3 is selected as the best formulation due to its optimum drug release 95.2 in 24hrs . The selected formulation was taken for further cell viability studies and *in vivo* studies.

**Table - 4: In vitro release studies of pramipexole dihydrochloride nanosuspension**

S. No.	TIME (HOURS)	% CUMULATIVE DRUG RELEASE*				
		PPNP1	PPNP2	PPNP3	PPNP4	PPNP5
1.	0	0	0	0	0	0
2.	1	12.3± 1.1	11.2± 1.1	7.2± 1.5	6.7± 0.7	6.1± 0.6
3.	2	36.1± 1.8	28.7± 2.2	10.8± 1.3	11.1± 1.2	9.2± 1.2
4.	4	58.2± 3.3	45.1± 2.4	21.2± 2.5	22.7± 3.2	19.9± 2.6
5.	6	75.9± 2.2	59.5± 3.3	33.5± 3.3	35.4± 2.6	30.7± 2.1
6.	8	77.4± 3.1	74.3± 3.2	46.1± 3.4	52.1± 2.3	43.4± 3.1
7.	12	99.9± 1.1	88.4± 2.3	62.6± 1.2	61.3± 3.4	59.3± 2.9
8.	16	100± 0.3	97.9± 3.4	71.3± 3.6	73.8± 2.8	60.5± 2.7
9.	20	-	100± 0.5	85.7± 1.5	75.3± 3.1	65.7± 2.2
10.	24	-	-	89.2± 2.4	76.8± 2.6	72.1± 1.8

\* values indicated in the results of triplicate trials ± s.e.m

## CONCLUSION

There was no incompatibility observed between drug and polymer. The particle size was found to be 195 nm for formulation PPNP3. The entrapment efficiency was found to be 86.21% for formulation PPNP3. More than 85% drug release was observed in PPNP3. The zeta potential of PPNP3 was found to be 34.8mV. PPNP4 were rejected due to high content of polymer. Therefore, PPNP3 were chosen as the best formulation as they has better release than other formulations Thus, the biodegradable polymers which help in production of more controlled release dosage form for treatment in Parkinson's disease.

## REFERENCE

1. P. V. Pede, S. S. Mitkare, R. S. Moon, Various methods of drug targeting to the brain: a review. 2011, Volume 7, Issue 1, 33-35.
2. Kreuter J, Alyautdin RN, Kharkevich DA, Ivanov AsssaA, Passage of peptides through the blood-brain barrier with colloidal polymer particles (nanoparticles), 1995,13,674(1),171-4.
3. Swatantra Bahadur Singh, Novel Approaches for Brain Drug Delivery System- Review, International Journal of Pharma Research & Review, June 2013; 2(6):36-44.
4. Celeste Roney, Padmakar Kulkarni, Veera Arora, Peter Antich, Frederick Bonte, Aimei Wu, N.N. Mallikarjuana, Sanjeev Manohar, Hsiang- Fa Liang, Anandrao R. Kulkarni, Hsing-
5. Wen Sung, Malladi Sairam d, Tejraj M. Aminabhavi d, Targeted nanoparticles for drug delivery through the blood-brain barrier for Alzheimer's disease, Journal of Controlled Release, 2005, 193-214
6. Jiang Chang, Youssef Jallouli, Maya Kroubi, Xu-bo Yuan, Wei Feng, Chun- sheng Kang, Pei-yu Pu, Didier Betbeder, Characterization of endocytosis of transferrin-coated PLGA nanoparticles by the blood-brain barrier International Journal of Pharmaceutics, 2009, 285-292s
7. Ulrike Schroeder, Petra Sommerfeld, Sven Ulrich and Bernhard A. Sabel, Nanoparticle Technology for Delivery of Drugs across the Blood-Brain Barrier, Journal of Pharmaceutical Sciences, 1998, Vol. 87, 1305
8. Shrinidh A. Joshi, Sandip S. Chavhan, Krutika K. Sawant, Rivastigmine-loaded PLGA and PBCA nanoparticles: Preparation, optimization, characterization, in vitro and pharmacodynamic studies, European Journal of Pharmaceutics and Biopharmaceutics, 2010, 76, 189-199
9. Ambikanandan Misra, Ganesh S., Aliasgar Shahiwala, Drug delivery to the central nervous system: a review. J Pharm Pharmaceut Sci 2003, 6(2):252-273.
10. Mohammad Fazil, Shadab Md, Shadabul Haque, Manish Kumar, Sanjula Baboota, Jasjeet kaur Sahni, Javed Ali, Development and evaluation of rivastigmine loaded chitosan nanoparticles for brain targeting, European Journal of Pharmaceutical Sciences 2012, 47, 6-15.
11. Adriana Trapania, Elvira De Gigliob, Damiana Cafagnab, Nunzio Denoraa, Gennaro Agrimic, Tommaso Cassanod, Silvana Gaetanie, Vincenzo Cuomoe, Giuseppe trapania, Characterization and evaluation of chitosan nanoparticles for dopamine brain delivery, International Journal of Pharmaceutics, 2011, 419, 296-307
12. A. Krishna Sailaja, P. Amreshwar, P. Chakravarty, Different techniques used for the preparation of nanoparticles using natural polymers and their application, International Journal of Pharmacy and Pharmaceutical Sciences, 2011, Vol 3, 45-50.
13. Madan J, Pandey RS, Jain V, Katare OP, Chandra R, Katyal, A Poly (ethylene)-glycol conjugated nanoparticles of noscipine improve biological half-life, brain delivery and efficacy in glioblastoma cells, Nanomedicine 2012, 12, 600-4.
14. Sarah Küchler, Michal R. Radowski, Tobias Blaschke, Margitta Dathe, Johanna Plendl, Rainer Haag, Monika Schäfer-Korting, Klaus D. Kramer, Nanoparticles for skin penetration enhancement – A comparison of a dendritic core-multishell-nanotransporter and solid lipid nanoparticles, European Journal of Pharmaceutics and Biopharmaceutics 2009, 71, 243-250.
15. Bandameedi R, Pandiyan PS. Formulation and evaluation of gastro retentive floating bioadhesive tablets of hydrochlorothiazide. Asian J Pharm Clin Res 2017; 10:150-5.



16. *M.rajana and v.raj, Encapsulation, characterization and in-vitro release of anti- tuberculosis Drug using chitosan – poly ethylene glycol nanoparticles, international journal of pharmacy and pharmaceutical sciences, 2012, vol 4, issue 4, 255-259.*
17. *Bhagyeshwar G., Ramu B. and Rajkamal B. (2017) Formulation and evaluation of transdermal patches of metformin hydrochloride. World Research Journal of Pharma Technology.; 2:1-20.*
18. *Ramu B, Chittela KB. High Performance Thin Layer Chromatography and Its Role Pharmaceutical Industry [Review]. Open Sci. J. Biosci. Bioeng. 2018;5(3):29–34.*
19. *M.Rajana and V.Raj, Encapsulation, Characterisation and In-Vitro Release Of Anti- tuberculosis Drug Using Chitosan – Poly Ethylene Glycol Nanoparticles, International Journal of Pharmacy and Pharmaceutical Sciences, 2012,Vol 4, Issue 4.*
20. *Aminu Umar Kura, Nooraini Mohd Ain , Mohd Zobir Hussein, Sharida Fakurazi and Samer Hasan Hussein-Al-Ali, Toxicity and Metabolism of Layered Double Hydroxide Intercalated with Levodopa in a Parkinson's Disease Model, Int. J. Mol. Sci. 2014, 15, 5916-5927*



## A REVIEW ON CHEMISTRY OF PEPTIDES

**Satyam Tiwari\*, Nitin Rajan , Udit Sagar Dwivedi**

### INTRODUCTION

Peptide is compound consisting of two or more amino acids linked in a chain, the carboxyl group of each acid being joined to the amino group of the next by a peptide bond. The word "peptide" itself comes from πέσσειν (peptós), the Greek word meaning "to digest." Peptides are an essential part of nature and biochemistry, and thousands of peptides occur naturally in the human body and in animals. In addition, new peptides are being discovered and synthesized regularly in the laboratory as well. Indeed, this discovery and innovation in the study of peptides holds great promise for the future in the fields of health and pharmaceutical development.

Polypeptide consist of 10-50 amino acids residues are called peptides; peptides contain more than 50 amino acids often refer as protein. Peptides can be naturally or synthetically obtained, comprising of two or more amino acids linked through an amide formation. The chemical bond (covalent bond) formed between a nitrogen atom of one amino acid to a carboxyl group of another amino acid. Peptides can be distinguished with protein on the basis of number of amino acids. The dipeptides are known as shortest peptides which contained of two amino acids connected to each other through a single bond known as peptide bond. Peptides often classified by function or by synthesis.

Glycine is the simplest amino acid. There is no stereo form of glycine because in glycine the side-chain is another hydrogen atom. While glycine is not a chiral compound, still for all other amino acids has two structural configuration or substituents arrangement around the central  $\alpha$ -carbon atom are possible, so each exists in two stereochemical forms, known as the L-isomers for the amino acids found in proteins and the D-isomers for those with the opposite configurations. The natural amino acids & glyceraldehyde have the same configuration, which arbitrarily had been designated the L-form. Two isomers of opposite configuration or chirality (handedness) have the relationship of mirror images and are referred to as enantiomers. According to the Cahn-Ingold-Prelog system of nomenclature, L-amino acids are of the (S)-configuration, except for

cysteine and its derivatives. In discussion, when the configuration of an amino acid residue is not indicated, it is assumed to be the L-enantiomer.

Synthetic peptides becoming crucial in commercial and pharmaceutical industry, from the dipeptide sugar substitute aspartame to hormones which are clinically used such as oxytocin, adrenocorticotrophic hormone, and calcitonin. The epitope-specific antibodies development against pathogenic proteins is the application of different using synthetic peptides, synthetic peptides are also used in the study of enzyme-substrate interactions within enzyme categories such as proteases and kinases, which has a key role in cell signalling.

In biology of cell, binding on receptors or the recognition of substrate specificity of newly developed enzymes can be studied using sets of homologous synthetic peptides. Synthetic peptides having similar chemical structure as naturally occurring peptides and act as drugs against carcinogenic diseases and other major diseases. In spectrometry synthetic peptides are also used as reagents and standards in mass spectrometry and Mass Spectrometry-based applications. In MS-based discovery, characterization and quantitation of proteins, synthetic peptides play a major role, especially in case of early biomarkers for diseases.

### IMPORTANT TERMS OF PEPTIDE

There are some basic peptide-related terms that are key to a general understanding of peptides, peptide synthesis, and the use of peptides for research and experimentation:

**Amino Acids** – Peptides are composed of amino acids. An amino acid is any molecule that contains both amine and carboxyl functional groups. Alpha-amino acids are the building blocks from which peptides are constructed.

**Cyclic Peptides** – A cyclic peptide is a peptide in which the amino acid sequence forms a ring structure instead of a straight chain. Examples of cyclic peptides include melanotan-2 and PT-141 (Bremelanotide).



**Peptide Sequence** – The peptide arrangement is basically the request in which amino corrosive deposits are associated by peptide bonds in the peptide.

**Peptide Bond** – A peptide bond is a covalent bond that is formed between two amino acids when a carboxyl group of one amino acid reacts with the amino group of another amino acid. This reaction is a condensation reaction (a molecule of water is released during the reaction).

**Peptide Mapping** – Peptide mapping is a process that can be used to validate or discover the amino acid sequence of specific peptides or proteins. Peptide mapping methods can accomplish this by breaking up the peptide or protein with enzymes and examining the resulting pattern of their amino acid or nucleotide base sequences.

**Peptide Mimetics** – A peptide mimetic is a molecule that biologically mimics active ligands of hormones, cytokines, enzyme substrates, viruses or other bio-molecules. Peptide mimetics can be natural peptides, a synthetically modified peptide, or any other molecule that performs the aforementioned function.

**Peptide Fingerprint** – A peptide fingerprint is a chromatographic pattern of the peptide. A peptide fingerprint is produced by partially hydrolysing the peptide, which breaks up the peptide into fragments, and then 2-D mapping those resulting fragments.

**Peptide Library** – A peptide library is composed of a large number of peptides that contain a systematic combination of amino acids. Peptide libraries are often utilized in the study of proteins for biochemical and pharmaceutical purposes. Solid phase peptide synthesis is the most frequent peptide synthesis technique used to prepare peptide libraries.

## PEPTIDE TERMINOLOGY

Peptides are generally classified according to the amount of amino acids contained within them. The shortest peptide, one composed of just two amino acids, is termed a “dipeptide.” Likewise, a peptide with 3 amino acids is referred to as a “tripeptide.” Oligopeptides refer to shorter peptides made up of relatively small numbers of amino acids, generally less than ten. Polypeptides, conversely, are typically composed of more than at least ten amino acids. Much larger peptides (those composed of more than 40-50 amino acids) are generally referred to as proteins.

While the number of amino acids contained is a main determinate when it comes to differentiating between peptides and proteins, exceptions are sometimes made. For example, certain longer peptides have been considered proteins (like amyloid beta), and certain smaller proteins are referred to as peptides in some cases (such as insulin). For more information about the similarities and differences among peptides and proteins.

## CLASSIFICATION OF PEPTIDES

Peptides are generally divided into several classes. These classes vary with how the peptides themselves are produced. For example, ribosomal peptides are produced from the translation of mRNA. Ribosomal peptides often function as hormones and signalling molecules in organisms. These can include tachykinin peptides, vasoactive intestinal peptides, opioid peptides, pancreatic peptides, and calcitonin peptides.

Antibiotics like microcin’s are ribosomal peptides produced by certain organisms. Ribosomal peptides often go through the process of proteolysis (the breakdown of proteins into smaller peptides or amino acids) to reach the mature form.

Conversely, non-ribosomal peptides are produced by peptide-specific enzymes, not by the ribosome (as in ribosomal peptides). Non-ribosomal peptides are frequently cyclic rather than linear, although linear non-ribosomal peptides can often occur. Non-ribosomal peptides can develop extremely intricate cyclic structures. Non-ribosomal peptides frequently appear in plants, fungi, and one-celled organisms. Glutathione, a key part of antioxidant defines in aerobic organisms, is the most common non-ribosomal peptide.

Milk peptides in organisms are formed from milk proteins. They can be produced by enzymatic breakdown by digestive enzymes or by the proteinases formed by lactobacilli during the fermentation of milk. Additionally, peptones are peptides derived from animal milk or meat that have been digested by proteolytic digestion. Peptones are often used in the laboratory as nutrients for growing fungi and bacteria.

Peptide fragments, moreover, are most commonly found as the products of enzymatic degradation performed in the laboratory on a controlled sample. However, peptide fragments can also occur naturally as a result of degradation by natural effects.

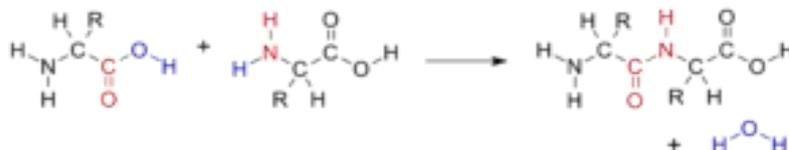
## PEPTIDES FORMATION

Peptides are formed both naturally within the body and synthetically in the laboratory. The body manufactures some peptides organically, such as



ribosomal and non-ribosomal peptides. In the laboratory, modern peptide synthesis processes can create a virtually boundless number of peptides using peptide synthesis techniques like liquid phase peptide

synthesis or solid phase peptide synthesis. While liquid phase peptide synthesis has some advantages, solid phase peptide synthesis is the standard peptide synthesis process used today.



The first synthetic peptide was discovered in 1901 by Emil Fischer in collaboration with Ernest Fourneau. Oxytocin, the first polypeptide, was synthesized by Vincent du Vigneaud in 1953.

## METHODS OF PEPTIDE SYNTHESIS

In the old style arrangement stage technique, all the functionalities other than the  $\alpha$ -amino gathering of one of the amino acids and  $\alpha$ -carboxyl gathering of the other amino are reversibly secured and afterward the alpha-carboxy bunch is enacted and couple utilizing a reasonable strategy. Ensuing evacuation of the N-amino shielding bunch from the dipeptide in this way got and the coupling of the following N-ensured amino corrosive delivers a tripeptide. This pattern of tasks kept on getting the ideal peptide. Since this technique includes the partition, refinement and characterisation of the intermediates at each progression. This is an exceptionally monotonous, difficult and tedious system. The capricious insolubility of the secured peptide sections particularly hydrophobic peptides at different phases of combination is the ordinary, task frequently experienced in this method. Union of  $\beta$ -amyloid plaque protein is the best model for solvency issues. Also, an outstanding test aptitude is needed for the fruitful get together of the peptide. Notwithstanding, the technique has the upside of acquiring profoundly unadulterated items in enormous amounts.

The cycle of SPPS, includes the stepwise joining of N-and side chain secured amino acids into an insoluble strong help utilizing appropriate substance strategies, typically in the C to N course of the ideal peptide to evade the risk of racemisation. Notwithstanding, combination in the N to C course (opposite amalgamation) was likewise endeavoured. At the point when the grouping get together was finished, the security holding the peptide to the help was specifically severed and the peptide was freed in arrangement. The overall highlights and steps associated with the strong stage amalgamation of peptides. This method can be stretched out to the combination of any polymer particle from

bifunctional monomers. Depsipeptides, polyamides, polysaccharides, polynucleotides, epoxides and lactones have been integrated by this technique. Despite the fact that this technique appreciates the benefits of simple manufactured control it faces a difficult issue of collection of firmly related contaminations as cancellation and shortened successions alongside the objective peptide.

## Solid supports (resins and linkers)

The right choice of resins and linkers is prime for a hit peptide synthesis. The strong guide has to provide balance to mechanical stirring in a large variety of solvents and temperatures. In addition, the strong guide has to be capable of swell in order that the reagents can without difficulty get admission to the energetic sites. A collection of resins and linkers has been advanced withinside the beyond permitting a huge variety of applications. Selection of defensive groups, coupling reagents, and cleavage situations are without delay related to the choice of the polymer guide and the linker. The first polymer guide utilized by Merrifield become polystyrene, which continues to be in use. Later, resins primarily based totally on polystyrene incorporating polyethylene glycol (PEG) chains and resins composed of PEG chains sporting precise go linkers had been advanced. Linkers in SPPS play a pivotal position. Firstly, they offer a reversible linkage among the peptide chain and the strong guide and secondly, they play a shielding position towards aggregation. In addition, the linker acts as a defensive institution for the C-terminus carboxy institution. Furthermore, the linker is used for the C-terminus change of the peptide and determines the foremost choice of the protective groups, coupling reagents and the cleavage situations.

## RESINS

Based at the polymer aspect group, there are 3 varieties of resin:

- (i) Polystyrene(PS)-primarily based totally resins;
- (ii) PS-functionalized polyethylene glycol (PS-PEG) resins, and

**(iii) natural crosslinked PEG resins.**

PS resins were broadly used with extraordinary fulfillment withinside the synthesis specially of short- to medium-period peptides. For medium- to long-peptides or peptides with “hard sequences” PEG-primarily based totally resins regularly display higher overall performance ensuing in peptides with excessive purity and yield.

**PEPTIDE APPLICATIONS IN BIOMEDICINE, BIOTECHNOLOGY AND BIOENGINEERING**

In the case of polystyrene resin, the polymer is commonly crosslinked with 1% of divinylbenzene (DVB). The resin is produced via way of means of suspension polymerization of styrene withinside the presence of divinylbenzene. This sort of polymer help swells properly in non-polar solvents together with dichloromethane (DCM) or toluene however it's also like minded with solvents like N,N-dimethylformamide (DMF), dioxane, or tetrahydrofuran (THF), or N-methyl-2-pyrrolidone (NMP). However, this resin isn't always like minded with water or different polar solvents. In the case of syntheses regarding pretty hydro-phobic amino acids, tough peptide sequences, or peptides with a bent to aggregate, greater hydrophilic strong helps must be selected.

Tenta Gel (TG) then again behaves nicely in each polar and non-polar solvents and famous notable swelling houses in maximum solvents well matched with PEG chains. The extrade of the solvent from non-polar to polar ought to be executed step by step to be able to maintain the most effective swelling houses of the polymer. Tenta Gelis the maximum nicely studied PEG-PS resin today[10]. TG resins are organized via way of means of grafting of PEG chains (50p%) to low pass connected polystyrene via way of means of ether linkages. The 0.33 institution of polymer helps is the hydrophilic PEG-primarily based totally resins, which include no polystyrene or a totally low quantity of it. This institution consists of polymers that swell thoroughly in water supplying the gain to look at peptide proteins inter-moves while the protein is as much as 3570 kDa.

Poly(ethylene glycol)-poly-(N, N-dimethyl acrylamide) copolymer (PEGA) are the main achievements of this category which was developed by Meldal, and the cross linked ethoxylate acrylate resin(CLEAR) which was given by Kempe. PEGA resins are very sophisticated when dried and therefore they are supplied swollen in ethanol. A new variety of polymer support called Chem Matrix (CM), which was developed by Cote, with the advantages of the two previous polymers, namely,

the chemical stability of polystyrene resins and the versatility of the PEG grafted resins, making it a powerful tool for the synthesis of large peptides or difficult sequences with many hydrophobic amino acids. As well, many polar solvents including water, DMF, THF, methanol, and acetonitrile, as well as trifluoroacetic acid (TFA) could be used with Chem Matrix because the polymer is highly polar and therefore it retains its excellent swelling properties in the presence of polar solvents. Most of the polymer supports enlisted above are marketed with different types of linkers, such as PAL linker, Fmoc-Rink linker, HMBA linker, etc.

**LINKERS FOR FMOC-BASED SPPSA**

Linker plays a twin role throughout amide synthesis. It offers protection to beat aggregation during the elongation of the peptidic sequence whereas it provides a reversible linkage between the peptide chain and also the solid support. Linkers are simply classified into low and high acid-labile linkers supported the conditions that are used for cleavage, sometimes TFA solution. Another classification is predicated on their linkage with solid support. during this case, the linkers are classified as integral or non-integral. a 3rd classification is based on the ultimate C-terminal practicality of the peptide, usually peptide acid or peptide amide. The classical Rink-amide linker or other aminomethyl-based linkers are bound onto the rosin with a chemical bond exploitation normal coupling procedures. On the opposite hand, trityl sort linkers, just like the 2-chlorotrityl chloride resin (Barlos resin), are tethered to the compound support (e.g., polystyrene) by direct synthesis. The aryl hydrazide linkers are among the foremost helpful resin-linkers for the synthesis of a good style of with chemicals changed peptides, head-to-tail cyclic peptides, yet as lipidated peptides. These linkers will be cleaved beneath gentle aerophilous conditions to supply protected peptides whereas they're absolutely compatible with each Boc- and Fmoc-based methodologies. Also, the backbone organic compound linker (BAL) allows for the synthesis of C-terminal changed amides, peptide aldehydes, or thioesters whereas once cleavage the C-terminal remains free for more reactions. Another form of linker is that the “safety catch linker” that is especially helpful for the synthesis of peptide thioesters, which are free from the rosin exploitation and more than thiol in DMF or NMP. The term “safety catch” was introduced by Kenner in1971 for peptide chemistry to explain a method that enables a linker to stay stable till it's activated for cleavage by chemical modification. because of several disadvantages, appreciate poor loading and low reactivity as compared to alternative well-known



normal linkers, this linker ne'er found a widespread application. However, today it presents a helpful and broadly speaking applicable tool for the synthesis of a series of changed amides upon treatment with different nucleophiles. Linker plays a twin role throughout peptide synthesis. It offers protection to beat aggregation during the elongation of the peptidic sequence whereas it provides a reversible linkage between the peptide chain and also the solid support. Linkers are simply classified into low and high acid-labile linkers supported the conditions that are used for cleavage, sometimes TFA solution. Another classification is predicated on their linkage with solid support. during this case, the linkers are classified as integral or non-integral. a 3rd classification is predicated on the ultimate C-terminal practicality of the amide, sometimes peptide acid or peptide amide. The classical Rink-amide linker or other aminomethyl-based linkers are bound onto the resin with a chemical bond exploitation normal coupling procedures. On the opposite hand, trityl sort linkers, just like the 2-chlorotriyl chloride resin (Barlos resin), are tethered to the compound support (e.g., polystyrene) by direct synthesis. The aryl hydrazide linkers are among the foremost helpful resin-linkers for the synthesis of a good style of with chemicals modified amides, head-to-tail cyclic peptides, yet as lipidated peptides. These linkers will be cleaved beneath gentle aerophilous conditions to supply protected peptides whereas they're absolutely compatible with each Boc- and Fmoc-based methodologies. Also, the backbone organic compound linker (BAL) permits for the synthesis of C-terminal changed peptides, peptide aldehydes, or thioesters while once cleavage the C-terminal remains free for further reactions. Another form of linker is that the "safety catch linker" that is especially helpful for the synthesis of peptide thioesters, which are free from the resin exploitation an more than thiol in DMF or NMP. The term "safety catch" was introduced by Kenner in 1971 for amide chemistry to explain a method that enables a linker to stay stable till it's activated for cleavage by chemical modification. because of several disadvantages, appreciate poor loading and low reactivity as compared to alternative well-known normal linkers, this linker ne'er found a widespread application. However, today it presents a helpful and broadly speaking applicable tool for the synthesis of a series of changed peptides upon treatment with different nucleophiles.

### GREEN PEPTIDE SYNTHESIS

Solid-phase amide synthesis is one in all the foremost polluting and least inexperienced chemical processes. DMF, NMP, or DCM are toxic, polar

aprotic solvents movement environmental threats as a result of they combine with water. Disposal of those solvents to waste water treatment facilities results a high BOC/COD and N loading that may be drawbackatic with the added problem of Roman deity emissions. they're among the chemicals of highest concern below the laws of EU REACH (Registration, analysis and Authorization of Chemicals). Therefore, there's a good have to be compelled to replace DMF with green alternatives.

Recently, Albericio and his co-workers published the elimination of the sham group by using  $\gamma$ -Valero lactone instead of DMF during SPPS in PS resins and Chem Matrix. Another alternative for DMF during Fmoc was N-formyl morpholine, which only performed excellently when the polymer carrier Chem Matrix was used. Previously, the same group had published the synthesis of the Aib-enkephalin pentapeptide (H-Tyr-Aib-Aib-Phe-Leu-NH<sub>2</sub>) using 2-methyltetrahydrofuran (2-MeTHF) as an alternative solvent that can be obtained from renewable raw materials ; In addition, they have reported the substitution of AcN and THF with DMF in the synthesis of the hindered peptides Aib-enkephalin-pentapeptide and Aib-ACP-decapeptide using the SPPS methodology on Chem Matrix resin. This work showed a better coupling efficiency than when using DMF. The development of solid phase peptide synthesis in water using Fmoc-protected amino acids is still a topic of research interest. Most of these new approaches are limited to laboratory research areas. Hojo and his team developed an environmentally friendly method using water-dispersible amino acid nanoparticles. It can be easily applied to His-containing peptides that are sensitive to racemization. Other recently introduced processes use alternative solid supports in place of conventional resins. Sarma et al. Demonstrated the synthesis of small dipeptides, mainly with aliphatic amino acids, at room temperature using banana water extract (WEB) / ethylene glycol as an aqueous medium with and without an external base. The peptide synthesis technique (MEPS) could be an alternative method for peptide synthesis on an industrial scale, using the RADA tetramer as a model.

### CONCLUSION

Taken together, these results illustrate the applicability of multiple peptide synthesis methods for obtaining large amounts of peptides, which can then be cleaved in solution under mild conditions. The purity of the peptide is comparable to that obtained by conventional solid-phase peptide synthesis. In addition, the purity can be achieved through simple processing steps after protection, without the need for complicated chromatography.



The amount of digestion is sufficient to characterize and perform several biological analyses. In addition, the lytic peptide solution is non-toxic to cells and should be suitable for other biological agents. The method we describe should make it possible to conduct research projects requiring hundreds or thousands of peptides or peptide analogs in a short period of time without special equipment. The study included an alpha-alanine spacer for comparison with the diketopiperazine study described above. Terminal peptide. By replacing one of the 20 amino acids with P-ala-9, a natural C-terminal peptide can also be obtained.

## REFERENCE

1. Nestor J. *The medicinal chemistry of peptides. Current medicinal chemistry.* 2009 Nov 1;16(33):4399-418.
2. Sewald N, Jakubke HD. *Peptides: chemistry and biology.* John Wiley & Sons; 2015 Nov 19.
3. Rammensee HG. *Chemistry of peptides associated with MHC class I and class II molecules. Current opinion in immunology.* 1995 Feb 1;7(1):85-96.
4. Vasudev PG, Chatterjee S, Shamala N, Balaram P. *Structural chemistry of peptides containing backbone expanded amino acid residues: conformational features of  $\beta$ ,  $\gamma$ , and hybrid peptides. Chemical reviews.* 2011 Feb 9;111(2):657-87.
5. Lau JL, Dunn MK. *Therapeutic peptides: Historical perspectives, current development trends, and future directions. Bioorganic & medicinal chemistry.* 2018 Jun 1;26(10):2700-7.
6. Hughes AB. *Amino acids, peptides and proteins in organic chemistry, analysis and function of amino acids and peptides.* John Wiley & Sons; 2013 Feb 13.
7. Severin K, Bergs R, Beck W. *Bioorganometallic chemistry-transition metal complexes with  $\alpha$ -amino acids and peptides. Angewandte Chemie International Edition.* 1998 Jul 3;37(12):1634-54.
8. Grant GA, editor. *Synthetic peptides: a user's guide.* Oxford University Press on Demand; 2002.
9. Erak M, Bellmann-Sickert K, Els-Heindl S, Beck-Sickinger AG. *Peptide chemistry toolbox-Transforming natural peptides into peptide therapeutics. Bioorganic & medicinal chemistry.* 2018 Jun 1;26(10):2759-65.
10. García-Ramos Y, Paradís-Bas M, Tulla-Puche J, Albericio F. *ChemMatrix® for complex peptides and combinatorial chemistry. Journal of Peptide Science.* 2010 Dec;16(12):675-8.
11. Mine Y. *Egg proteins and peptides in human health-chemistry, bioactivity and production. Current Pharmaceutical Design.* 2007 Mar 1;13(9):875-84.
12. Adebomi V, Cohen RD, Wills R, Chavers HA, Martin GE, Raj M. *CyClick Chemistry for the Synthesis of Cyclic Peptides. Angewandte Chemie International Edition.* 2019 Dec 19;58(52):19073-80.
13. Sebestyén MG, Ludtke JJ, Bassik MC, Zhang G, Budker V, Lukhtanov EA, Hagstrom JE, Wolff JA. *DNA vector chemistry: the covalent attachment of signal peptides to plasmid DNA. Nature biotechnology.* 1998 Jan;16(1):80-5.
14. Rose GD, Gierasch LM, Smith JA. *Turns in peptides and proteins. Advances in protein chemistry.* 1985 Jan 1;37:1-09.
15. Weissbuch I, Illos RA, Bolbach G, Lahav M. *Racemic  $\beta$ -sheets as templates of relevance to the origin of homochirality of peptides: lessons from crystal chemistry. Accounts of chemical research.* 2009 Aug 18;42(8):1128-40.
16. Hettiarachchy NS, Sato K, Marshall MR, Kannan A, editors. *Food proteins and peptides: chemistry, functionality, interactions, and commercialization.* CRC Press; 2012 Mar 19.
17. Rao KR. *Crustacean pigmentary-effector hormones: chemistry and functions of RPCH, PDH, and related peptides. American Zoologist.* 2001 Jun 1;41(3):364-79.
18. Turner RA, Oliver AG, Lokey RS. *Click chemistry as a macrocyclization tool in the solid-phase synthesis of small cyclic peptides. Organic letters.* 2007 Nov 22;9(24):5011-4.
19. Albericio F, Kruger HG. *Therapeutic peptides. Future medicinal chemistry.* 2012 Aug;4(12):1527-31.
20. Gracia SR, Gaus K, Sewald N. *Synthesis of chemically modified bioactive peptides: recent advances, challenges and developments for medicinal chemistry. Future medicinal chemistry.* 2009 Oct;1(7):1289-310.
21. Castellana ET, Russell DH. *Tailoring nanoparticle surface chemistry to enhance laser desorption ionization of peptides and proteins. Nano letters.* 2007 Oct 10;7(10):3023-5.
22. Trzeciak A, Bannwarth W. *Synthesis of 'head-to-tail' cyclized peptides on solid support by Fmoc chemistry. Tetrahedron letters.* 1992 Aug 4;33(32):4557-60.
23. Haug BE, Strom MB, M Svendsen JS. *The medicinal chemistry of short lactoferricin-based antibacterial peptides. Current medicinal chemistry.* 2007 Jan 1;14(1):1-8.
24. Degrado WF. *Design of peptides and proteins. Advances in protein chemistry.* 1988 Jan 1;39:51-124.
25. Collier JH, Segura T. *Evolving the use of peptides as components of biomaterials. Biomaterials.* 2011 Jun 1;32(18):4198-204.
26. Freidinger RM. *Design and synthesis of novel bioactive peptides and peptidomimetics. Journal of medicinal chemistry.* 2003 Dec 18;46(26):5553-66.
27. Berkessel A. *The discovery of catalytically active peptides through combinatorial chemistry.*



- Current opinion in chemical biology*. 2003 Jun 1;7(3):409-19.
28. Doonan S. *Peptides and proteins*. Royal Society of chemistry; 2002.
29. Danger G, Plasson R, Pascal R. *Pathways for the formation and evolution of peptides in prebiotic environments*. *Chemical Society Reviews*. 2012;41(16):5416-29.
30. Sovago I, Várnagy K, Lihí N, Grenács Á. *Coordinating properties of peptides containing histidyl residues*. *Coordination Chemistry Reviews*. 2016 Nov 15;327:43-54.
31. Declerck V, Nun P, Martinez J, Lamaty F. *Solvent-free synthesis of peptides*. *Angewandte Chemie International Edition*. 2009 Nov 23;48(49):9318-21.
32. Othman Al Musaimi, Yahya E. Jad, Ashish Kumar, Ayman El-Faham et al. "Greening the Solid-Phase Peptide Synthesis Process. 2-MeTHF for the Incorporation of the First Amino Acid and Precipitation of Peptides after Global Deprotection", *Organic Process Research & Development*, 2018
33. Shah A, Adhikari B, Martić S, Munir A, Shahzad S, Ahmad K, Kraatz HB. *Electron transfer in peptides*. *Chemical Society Reviews*. 2015;44(4):1015-27.
34. Yu Z, Yin Y, Zhao W, Yu Y, Liu B, Liu J, Chen F. *Novel peptides derived from egg white protein inhibiting alpha-glucosidase*. *Food Chemistry*. 2011 Dec 15;129(4):1376-82.
35. Phelan JC, Skelton NJ, Braisted AC, McDowell RS. *A general method for constraining short peptides to an  $\alpha$ -helical conformation*. *Journal of the American Chemical Society*. 1997 Jan 22;119(3):455-60.
36. Lefrancier P, Lederer E. *Chemistry of synthetic immunomodulant muramyl peptides*. *In Fortschritte der Chemie organischer Naturstoffe/Progress in the Chemistry of Organic Natural Products 1981 (pp. 1-47)*. Springer, Vienna.
37. Tam JP. *Recent advances in multiple antigen peptides*. *Journal of immunological methods*. 1996 Jan 1;196(1):17-32.
38. Bodanszky M. *Peptide chemistry*. Springer-Verlag, Berlin, Germany. 1993.
39. Bartke, T., Vermeulen, M., Xhemalce, B., Robson, S. C., Mann, M., & Kouzarides, T. (2010). *Nucleosome-interacting proteins regulated by DNA and histone methylation*. *Cell*, 143, 470–484
40. Botuyan, M. V., Lee, J., Ward, I. M., Kim, J. E., Thompson, J. R., Chen, J. J., et al. (2006). *Structural basis for the methylation state-specific recognition of histone H4-K20 by 53BP1 and Crb2 in DNA repair*. *Cell*, 127, 1361–1373
41. Canzio, D., Chang, E. Y., Shankar, S., Kuchenbecker, K. M., Simon, M. D., Madhani, H. D., et al. (2011). *Chromodomain-mediated oligomerization of HP1 suggests a nucleosomebridging mechanism for heterochromatin assembly*. *Molecular Cell*, 41, 67–81
42. Flanagan, J. F., Mi, L. Z., Chruszcz, M., Cymborowski, M., Clines, K. L., Kim, Y., et al. (2005). *Double chromodomains cooperate to recognize the methylated histone H3 tail*. *Nature*, 438, 1181–1185.
43. Fischle, W., Tseng, B. S., Dormann, H. L., Ueberheide, B. M., Garcia, B. A., Shabanowitz, J., et al. (2005). *Regulation of HP1-chromatin binding by histone H3 methylation and phosphorylation*. *Nature*, 438, 1116–1122
44. Freyer, M. W., & Lewis, E. A. (2008). *Isothermal titration calorimetry: Experimental design, data analysis, and probing Macromolecule/Ligand binding and kinetic interactions*. *Methods in Cell Biology*, 84, 79–113.
45. Fuchs, S. M., Krajewski, K., Baker, R. W., Miller, V. L., & Strahl, B. D. (2011). *Influence of combinatorial histone modifications on antibody and effector protein recognition*. *Current Biology*, 21, 53–58.
46. Jacobs, S. A., Fischle, W., & Khorasanizadeh, S. (2004). *Assays for the determination of structure and dynamics of the interaction of the chromodomain with histone peptides*. *Methods in Enzymology*, 376, 131–148.
47. Jacobs, S. A., & Khorasanizadeh, S. (2002). *Structure of HP1 chromodomain bound to a lysine 9-methylated histone H3 tail*. *Science*, 295, 2080–2083.
48. Jacobson, R. H., Ladurner, A. G., King, D. S., & Tjian, R. (2000). *Structure and function of a human TAFII250 double bromodomain module*. *Science*, 288, 1422–1425.
49. Kim, D., Blus, B. J., Chandra, V., Huang, P., Rastinejad, F., & Khorasanizadeh, S. (2010). *Corecognition of DNA and a methylated histone tail by the MSL3 chromodomain*. *Nature Structural & Molecular Biology*, 17, 1027–1029.
50. Lachner, M., O'Carroll, D., Rea, S., Mechtler, K., & Jenuwein, T. (2001). *Methylation of histone H3 lysine 9 creates a binding site for HP1 proteins*. *Nature*, 410, 116–120.
51. Ladbury, J. E., Lemmon, M. A., Zhou, M., Green, J., Botfield, M. C., & Schlessinger, J. (1995). *Measurement of the binding of tyrosyl phosphopeptides to SH2 domains: A reappraisal*. *Proceedings of the National Academy of Sciences of the United States of America*, 92, 3199–3203.
52. Macdonald, N., Welburn, J. P., Noble, M. E., Nguyen, A., Yaffe, M. B., Clynes, D., et al. (2005). *Molecular basis for the recognition of phosphorylated and phosphoacetylated histone h3 by 14–3–3*. *Molecular Cell*, 20, 199–211.
53. Min, J., Allali-Hassani, A., Nady, N., Qi, C., Ouyang, H., Liu, Y., et al. (2008). *L3MBTL1 recognition of mono- and dimethylated histones*. *Nature Structural & Molecular Biology*, 15, 114 (vol 14, pg 1229, 2007).
54. Morinier, J., Rousseaux, S., Steuerwald, U., Soler-Lopez, M., Curtet, S., Vitte, A. L., et al.



- (2009). *Cooperative binding of two acetylation marks on a histone tail by a single bromodomain*. *Nature*, 461, 664–668.
55. Nady, N., Min, J., Kareta, M. S., Chedin, F., & Arrowsmith, C. H. (2008). *A SPOT on the chromatin landscape? Histone peptide arrays as a tool for epigenetic research*. *Trends in Biochemical Sciences*, 33, 305–313.
56. Pierce, M. M., Raman, C. S., & Nall, B. T. (1999). *Isothermal titration calorimetry of protein–protein interactions*. *Methods (San Diego, Calif.)*, 19, 213–221.
57. Pollard, T. D. (2010). *A guide to simple and informative binding assays*. *Molecular Biology of the Cell*, 21, 4061–4067.
58. Ruthenburg, A. J., Allis, C. D., & Wysocka, J. (2007). *Methylation of lysine 4 on histone H3: intricacy of writing and reading a single epigenetic mark*. *Molecular Cell*, 25, 15–30.
59. Ruthenburg, A. J., Li, H., Milne, T. A., Dewell, S., McGinty, R. K., Yuen, M., et al. (2011). *Recognition of a mononucleosomal histone modification pattern by BPTF via multivalent interactions*. *Cell*, 145, 692–706.
60. Ösapay, G.; Dzilagyi, I.; Seres, J. *Tetrahedron* 1987, 43, 2997. 14.
61. Pozdnev, V. F. *Tetrahedron Lett.* 1995, 36, 7115. 15.
62. Oshikawa, T.; Yamashita, M. *Bull. Chem. Soc. Jpn.* 1989, 62, 3177.
63. .Birum, G. H. *J. Org. Chem.* 1974, 39, 209. 10.
64. Marnett, A. B.; Nomura, AM.; Shimba, N.; Ortiz de Montellano, P. R.; Craik, CS. *Proc. Natl. Acad. Sci. U.S.A.* 2004, 101, 6870.
65. Hackeng TM, Fernandez JA, Dawson PE, Kent SB, Griffin JH. *Chemical synthesis and spontaneous folding of a multidomain protein: anticoagulant microprotein S*. *Proc Natl Acad Sci U S A* 2000;97:14074–8.
66. Hamill OP, Marty A, Neher E, Sakmann B, Sigworth FJ. *Improved patch-clamp techniques for high resolution recording from cells and cell-free membrane patches*. *Pflügers Arch* 1981;391:85–100.
67. Johnson BA, Sugg EE. *Determination of the three-dimensional structure of iberitoxin in solution by 1H nuclear magnetic resonance spectroscopy*. *Biochemistry* 1992;31:8151–9.
68. Kaczorowski GJ, Knaus HG, Leonard RJ, McManus OB, Garcia ML. *High-conductance calcium-activated potassium channels; structure, pharmacology, and function*. *J Bioenerg Biomembr* 1996;28:255–67.
69. Robert M. Valerio, Mary Benstead, Andrew M. Bray, Rhonda A. Campbell, N. Joe Maeji. "Synthesis of peptide analogues using the multipin peptide synthesis method" , *Analytical Biochemistry*, 1991



# THE ROLE OF DEMOCRACY ON CONFLICT RESOLUTION IN MOGADISHU, SOMALIA

**Mowlid Mohamud Gabow**

*Master of Public Administration (MPA), Graduate school University of Somalia (UNISO)  
Mogadishu - Somalia.*

## ABSTRACT

*This study investigated the role of democracy on conflict resolution, achieve the objectives of this study, data was collected from 105 employees in Ministry of interior, Federal Affairs and Reconciliation. For data analysis, researchers employed correlation research design to test the relationship between democracy and conflict resolution by using SPSS software, also descriptive analysis such as frequency and percentage used to analyze the characteristics of respondents. As result of the analysis, the study revealed that all the Measurement of democracy. Total respondents of this study were 105 workers in the ministries institution of Mogadishu-Somalia, gender 71 out of 105 was male which means 67.6% while 34 of the respondents was female out the total which means 32.4%. According to this result the workers of ministries institution dominated by male. In the age group of this study was categorized into four groups such: 66 of the respondents their age between 20 -25 which means 62.9%. Also the age 22 of respondents lies 25-30 of the total of respondents on average is 21%. The age 15 of the respondents was between 30-40, in percentage is equivalent 14.2%. Lastly, the remaining respondents 40 years this means 1.9%. According the age groups of the local ministries institutions mostly their age lies 20-25 years. This result shows 61.5% of ministries institutions employees are youth.*

*The first objective of this study was to determine the role of human rights on conflict resolution in some selected ministries of Somalia. The correlation between human rights and conflict resolution as shown in the table above is 0.353. Which means one level high of human rights may cause an average of 35.3% of conflict resolution, thereby there is a weak positive relationship between human rights and conflict resolution ( $r=0.353, p<0.000$ ).*

*The second objective of this study was to find out the role of peace building on conflict resolution in some selected ministries of Somalia. The correlation between peace building and conflict resolution is 0.498. It states that one level for peace building increase may bring to 49.8% higher conflict resolution, so there is a Moderate positive correlation between peace building and conflict resolution ( $r=0.498, p<0.000$ ).*

*The third objective of this study was to investigate the impact of negotiation on conflict resolution in some selected ministries of Somalia. The correlation between negotiation and conflict resolution is 0.744. That is equivalent one level high attitudes may lead to 74.4% for a higher conflict resolution. This coefficient shows that there is strong positive relationship between negotiation and conflict resolution ( $r=0.744, p<0.000$ ).*



## 2.1 INTRODUCTION

While acknowledging that mature democracies rarely fight each other, Mansfield and Snyder (1995, 2002a, 2002b) have argued that the process of democratic reform may actually increase the probability of war. Their empirical findings, based on both qualitative and quantitative analyses, have been read not only as partly refuting democratic peace theory, but also as calling into question the wisdom of efforts to promote democracy in other countries, a cornerstone of Western foreign policy following the end of the Cold War. If the condition of being democratic decreases the probability of violent conflict, how could the process of becoming more democratic has the opposite effect? Mansfield and Snyder propose that transitional regimes experiencing high level of political mobilization despite weak institution controls are often tempted to incite external conflict (Rousseau, 2008).

Democratic political processes regulate competition among groups with conflicting preferences. Although much of the competition occurs peacefully within existing political institutions, democratic practices can also facilitate the resolution of intense conflict when the political system is challenged from within by groups fighting against the established government, and when it is challenged from without and on the brink of interstate war. This chapter provides an overview of the scholarly literature linking democracy to peace and conflict resolution, including pertinent theoretical propositions and the balance of evidence generated by empirical researchers. The promise of peace associated with civil liberty, political openness, and the foreign policies of democratic states has long figured into the writings of moral and political philosophers, perhaps most notably in Immanuel Kant's essay *Perpetual Peace*, published in 1795.

Conflict management should not be viewed as a simple, linear or structured process. Those assuming or charged with such a task must usually overcome an intensely chaotic situation. Conflicts are frequently managed directly by the society in which they occur. When not possible or when conflicts become national in scope, government normally assumes the task, provided it is not a party to the conflict. In cases where a government is unable or unwilling to intervene, international organizations increasingly assume the role of conflict manager.

According to Akpuru-Aja (2007), conflict management basically means the use of dialogue to assist opponents or parties not only to have

agreements against hostile images or actions, but to comply with earlier agreed resolutions and strategies. Given the fact that the end of hostilities in a conflict situation does not necessarily bring peace to the conflicting parties, and also bearing in mind that the most critical period is when a conflict is in the process of being addressed and resolved, at which time any mistake could be costly, there is always need to manage conflicts very well and effectively. It is a process that spans through conflict phases – from prevention through outright resolution. Thus it is seen as the process of reducing the negative and destructive capacity of conflict through a number of measures and by working with and through the parties involved in that conflict... It covers the entire area of handling conflicts positively at different stages, including those efforts made to prevent conflict, by being proactive. It encompasses conflict limitation, containment and litigation (Best, 2006:95).

In Somalia, clan identity both impacts and is impacted by conflict. In the post-independence period until the outbreak of the civil war, conflict resulted from divisions among major clans battling over power and resources. In recent years, conflict increasingly has devolved to sub clan and even sub-sub clan levels. The collapse of the central state led to fragmentation and an economy of plunder that brought leaders into conflict with other leaders, sometimes from the same clan, vying for control of the same local area and resources. This struggle for territorial control, political power, and economic control of a region that prompted lowering the level of clan identities so as to mobilize support from the sub clans. Thus, with the collapse of the central state, the clans tended to clash less across regions (northwest versus south-central versus northeast) and more within regions. Examples from the three regions illustrate this point. In all three regions, homogeneity of the clans has given way to the emergence of sub clan identity as dominant, with clans lowering their level of identity to the level of sub clans in the competition for economic power and political ascendancy. (Bank, 2005).

The nature of conflict management is such that it is very sensitive; it does not impose rigid conditions, it allows for free flow of information and communication; it is impartial, and gives a lot of leverages and relevant concessions when necessary to achieve the desired peace, which is the end-point. It could also involve either unilateral or bilateral actors; and dialogue is the desired medium of getting to the



solution of any conflict in terms of management. Knowing that conflicts are rarely completely resolved; but most often reduced, downgraded, or contained, conflict situations can be followed by a reorientation of the issue, reconstitution of the divisions among conflicting parties, or even by a re-emergence of past issues or grievances. Conflict management when actively conducted is, therefore, a constant process.

According to Ake (1996), there are two propositions for the promotion of liberal democracy as a conflict management and transformation strategy in Africa: (1). democracy provides the overlapping consensus and public reason for containing conflict in pluralistic societies; and (2). through institutional design, elections can be an opportunity for conflict management rather than an intoxicating brew from an ethnic concoction. There is a growing trend throughout the world towards democratization. Some 120 countries now hold generally free and fair elections, and a large number of internal conflicts end with a negotiated peace which includes an electoral process aimed at building political structures acceptable to all. The parties themselves agree to deliver a sustainable peaceful settlement through a democratic transition (Harris & Reiley, 1998).

According to Sisk (2003), democracy is promising as a conflict management strategy because the principles, institutions, and rules associated with democratic practice seek to manage inevitable social conflicts in deeply divided and less conflicted societies alike. Democracy provides predictable procedures in which collective decisions can be taken without the risk that losing a political battle will mean grave misfortune, imprisonment, or even loss of life. Democracy as a system of political decision-making is in many ways a system of conflict management in which the outcomes are unknown but the fundamental rules of the game provide a safe arena in which to compete. It provides a level playing ground for everybody which should mitigate bitterness even in the event of a loss in political struggle.

Democracy on conflict resolution institutions is about altering the risk of internal conflicts by facilitating effective bargaining and reducing commitment problems. It will select from the Ministry of interior.

However, in our best effort, the role of democracy on conflict resolution in public sector in Mogadishu, Somalia seems to be unclear. Therefore, this study

will consider the role of democracy on conflict resolution in Mogadishu, Somalia.

### 3.1 LITERATURE REVIEW

Democracy is a multi-faceted concept embracing political and social rights ranging from free and fair elections to accountable and transparent governance and civil society influence. Although these rights may appear in different forms in different national contexts, all democratic processes may be assessed on the basis of their realisation of two key democratic principles: the level of popular control and political equality (International IDEA, 2002:13).

According to Freedom House (2008c, pp. 9-10), to qualify as an "electoral democracy", a country must meet "certain minimum standards". Freedom House lists the following four criteria: (1) "A competitive, multiparty political system"; (2) "Universal adult suffrage for all citizens"; (3) "Regularly contested elections conducted in conditions of ballot secrecy, reasonable ballot secrecy, and in the absence of massive voter fraud, and that yield results that are representative of the public will"; (4) and "Significant public access of major political parties to the electorate through the media and through generally open political campaigning". Based on the conceptual and methodic framework of Freedom House, every liberal democracy also is an electoral democracy, but not every electoral democracy qualifies as a liberal democracy.

This means that a liberal democracy demands sufficient democracy standards, and not only minimum standards. Liberal democracy goes beyond the minimum standards of an electoral democracy. (Campbell, 2008).

Concept or model of democracy, but clearly a pluralism (or plurality) of different theories and models. I partially these varying theories or concepts could be integrated by a meta-theory or meta-concept; at the same time, however, it also should be acknowledged that some of those theories and concepts of democracy clearly contradict each other. This undoubtedly complicates every attempt of trying to set up and establish on a meta-level a process of theory/concept integration. Representatively, we may cite Bühlmann (et al. 2008, p. 5): "There is an abundant literature relating to democracy theory, with countless definitions of what democracy should be and what democracy is." We can add on by referring (Laza Kekic 2007).



Currently (as of 2008) only three governments in the world do not self-identity themselves in their official de jure understanding as democracies.<sup>12</sup> During the second half of the twentieth century there has been a substantial empirical spreading of democracies, i.e. of democratic forms of government (in country-based democracies). In empirical terms, this clearly is being reflected by the Freedom in the World country rating scores, beginning 1972, as they are released by Freedom House. In 1972, only a minority of countries will rated as free. However, since then the number of free countries rose steadily, and since the 1990s there are more free than either partly free or not free countries (Freedom House, 2008a). According to a Freedom House survey, in mid-1992 about 24.8% of the world population lived in “free” countries. Until mid-2007, this figure increased to 45.9%.<sup>13</sup> As is being revealed by the data set of the Polity IV organization, the number of democracies increased considerably during the later years of the 1980s, and after 1990 there are clearly more democracies than “anocracies” (semi-authoritarian regimes) and “autocracies” (authoritarian regimes).<sup>14</sup> The collapse of non-democratic communist regimes in Central Eastern and Eastern Europe critically marked a crucial watershed for the advancement of democracies. Thus the hypothesis can be set up for discussion that democracy, after 1990, represents the dominant global regime type. The famous The End of History notion of Francis Fukuyama claims that in the world of ideas there exist no more real alternatives or challenges to the concept of “liberal democracy” (Campbell, 2008).

First, democratic political elites have risen to positions of leadership within a political system that emphasizes compromise and nonviolence. Conflicts of interest in democracies are usually resolved through negotiation and log-rolling. Losing a political battle does not result in the loss of political rights or exclusion from future political competition. Moreover, coercion and violence are not considered legitimate means for resolving conflict. Conversely, political leaders in nondemocratic states are socialized in an environment in which politics is more akin to a zero-sum game in which rivals and those on the losing end of political struggles are regularly removed from the game. Coercion and violence are more widely accepted as legitimate means for resolving political conflicts. In general,

political leaders in autocracies are more likely to impose decisions rather than compromise when dealing with the opposition.

Second, the argument assumes that domestic political norms are externalized by decision makers when they become embroiled in international disputes. Presidents and prime ministers approach conflicts of interest in the international environment in much the same way they approach conflicts in the domestic environment, and with conflict resolution skills honed by their domestic political experiences. Compared to their counterparts in authoritarian regimes, democratic leaders are more likely to seek negotiation, mediation, or arbitration (Dixon 1994; Raymond 1994). Their approach to international conflict resolution reduces the likelihood that an international dispute will escalate into a militarized crisis and war. The strong version of the norms argument holds that democratic leaders externalize peaceful practices of conflict resolution in their interactions with all types of regimes. In contrast to this monadic claim, those who emphasize the dyadic nature of democratic peace argue that although all decision makers are inclined to externalize domestic practices of dispute resolution when dealing with interstate conflicts, this externalization is conditional for democratic decision makers.

Democratic leaders externalize their domestic norms only if they expect similar behavior from their foreign counterparts. Because democratic decision makers expect that choices by other democratic leaders are also shaped by norms of peaceful conflict resolution, there is little risk in attempting to resolve their conflict in accordance with these shared norms.

Conversely, because democracies expect nondemocratic states to externalize coercive and uncompromising norms of conflict resolution, they adopt similar strategies when dealing with these opponents. The arguments therefore assume that a democratic state’s behavior is conditioned upon the expected behavior of its opponent and that the opponent’s regime type informs this expectation.

### 3.1.1 Human Rights

Concept of human right often revolves around the necessity to respect and protect the individual or group from violation of their fundamental rights especially by the state. It will after the Second World War that, as a reaction against the excesses of the Axis forces, human rights law became part of the body of public international law, making human



rights law a supplement to the law protecting humanity from abuses in situations of war. On the other hand, international humanitarian law is that aspect of international law which deals with such matters as the use of weapons and other means of warfare in combat, and the treatment of war victims by the enemy. It deals with the direct impact of war on the life, personal integrity and liberty of human beings (Partsch, 1982: 215). A systematic development of humanitarian law in armed conflict is said to have originated not earlier than the second half of the 19th century when the need will felt to prevent wars by establishing methods of conciliation to humanize warfare and to protect the victims of armed conflicts (Ibanga, 1993). Its generally recognized that international humanitarian law and human rights norms have different origins, and apply in different situations humanitarian law during armed conflicts and human rights during peacetime (Osita Agbu, Human Rights Implications of, 2000).

### 3.1.2 Negotiation

Negotiators are often advised to seek win-win agreements by focusing on interests (primary features) rather than issues (secondary features), but whether such advice is valid remains to be seen. Consistent with construal level theory (Liberman, 2003), Experiments 1 and 2 show that negotiators focus on secondary features (issues) more than on primary features (interests) when psychological distance is low rather than high, and concomitant construal level is local and specific rather than global and abstract. Experiment 3 showed that high construal level promoted problem-solving behavior and therefore facilitated the achievement of win-win agreement, but only when integrative potential resided in underlying interests; when integrative potential resided in the issues; low construal level negotiators achieved higher joint outcomes. Thus, both low- and high-construal negotiators may achieve win-win agreements when such agreements require tradeoffs at the level of issues, or at the level of underlying interests, respectively.

### 3.1.3 Peace Building

Peace as a concept can better be explained by stating its attributes rather than trying to use specific terms in attempts to define it. Peace therefore is a situation which guarantees the following; good governance, security, a highly motivated populace, secure environment where no human suffering is

experienced, all that brings a feeling of contentment to humanity without violating the natural law of justice and the rights of others.

There being so many peace building/keeping processes in the world today, this paper seeks to point out the role of civil society in peace building. Although this paper ultimately examines the case study of civil society in Kenya, it commences by a general evaluation from a global perspective in the initial stages. (Greenidge, 2006).

Peace building initiatives in Sudan have been conducted at the top-level before 1980 with the Addis Ababa Agreement, however between the 1980s and 2001; no specific peace building initiatives were conducted at the top-level. Important peace building elements like communication, trust and relationship building that were present in several negotiation processes were not so heavily weighted at the end as negotiations often failed. The importance of good and non-partial negotiators will crucial for the two actors. In the case of Sudan the biggest negotiation process that has had a significant impact on the top level has been the IGAD (Intergovernmental Authority on Development) process which led to the signing of the CPA. It started out as a regional initiative in 1994 (Greenidge, 2006).

The conditions most conducive to preventing the outbreak of civil war are related to those most conducive to peace settlements and the reestablishment of political stability in the wake of civil war. The power of the central government must be consolidated, its legitimacy must be established or enhanced by allowing previously excluded groups access to the policymaking process, and sufficient economic resources must be mustered and allocated to support the peace-building process. The creation of each of these conditions may be assisted in various ways by external actors (Zartman 1995; Regan 2000).

## 3.2 CONCEPT OF CONFLICT RESOLUTION

Conflict resolution has been conceptualized as the methods and processes involved in facilitating the peaceful ending of a conflict usually in the shapes of group members initiating a compromising dialoguer ideologies to the rest of the group. This is to say that conflict resolution is essentially aimed at intervention to change or facilitate the course of a conflict. Conflict resolution provides an opportunity to interact with the parties concerned, with the hope of at least reducing the scope, intensity and effects of conflicts. During formal and informal meetings,



conflict resolution exercises permit, a re-assessment of views and chains as a basis for finding options to crisis and to divergent point of view. Communication thus, is very pivotal in resolving any conflict and this is where the media comes in handy. However, one factor that has been found common in conflict situation is the absence of the right information or breach of communication between parties involved. Provision of the right information has been seen as the panacea for conflict resolution. According to Conflict and peace have revealed that conflict are based on deficiency of information, stressing that cases of misinformation, wrong information or missing information chance, disparity in opinions and social difference which may lead to as well as heighten conflict. Thus, a wide range of methods and procedures for addressing conflicts exist, following the reason behind them. This includes but not limited to the following

- A. Negotiation
- B. Mediation
- C. Diplomacy

#### 4.1 METHODOLOGY

This study was conducted through explanatory survey to investigate the relationship between democracy and conflict resolution, which is research strategy that is used to present oriented methodology used to investigate population by selected samples to analyze and discover occurrence (Saunders, 2009). The study will use quantitative approach; Quantitative is any data collection technique (such as a questionnaire) or data analysis procedure (such as graphs or statistics) that generates or uses numerical data (Saunders, 2009). The study will be descriptive correlation design; it will describe democracy and conflict resolution in Mogadishu-Somalia.

The population of this study will be the employee of ministry of interior, federal affairs and reconciliation in Mogadishu Somalia; therefore the target population of this study will be 143 respondents (DG, 2020).

The sample size was consist of 105 from Ministry of interior, to determine the best sample size for the population, and the sample size of this study is 105 respondents. A justification of sample size, because the researchers used Slovene's formula, With maximum acceptable error is 5%.

Sample procedures utilize probability sampling procedure particularly simple random sampling method. Simple random sampling (sometimes called just random sampling) involves

selecting the sample at random from the sampling frame using either random number tables or a computer. The sample selection process is continued until your required sample size has been reached. The main purpose of this technique is to select or use in a finite populations because this technique is used when population is known and clear.

The research instrument of this study was questionnaire as the tool of data collection, the questionnaire is used in a quantitative research method,

#### 5.1 SUMMARY OF FINDINGS

The general objectives is examine the role of democracy on conflict resolution in mogadishu, Somalia. The first objective of this study was to determine the role of human rights on conflict resolution in some selected ministries of Somalia. The correlation between human rights and conflict resolution as shown in the table above is 0.353. Which means one level high of human rights may cause an average of 35.3% of conflict resolution, thereby there is a weak positive relationship between human rights and conflict resolution ( $r=0.353$ ,  $p<0.000$ ). The second objective of this study was to find out the role of peace building on conflict resolution in some selected ministries of Somalia. The correlation between peace building and conflict resolution is 0.498. It states that one level for peace building increase may bring to 49.8% higher conflict resolution, so there is a Moderate positive correlation between peace building and conflict resolution ( $r=0.498$ ,  $p<0.000$ ). The third objective of this study was to investigate the impact of negotiation on conflict resolution in some selected ministries of Somalia. The correlation between negotiation and conflict resolution is 0.744. That is equivalent one level high attitudes may lead to 74.4% for a higher conflict resolution. This coefficient shows that there is strong positive relationship between negotiation and conflict resolution ( $r=0.744$ ,  $p<0.000$ ).

The findings supported that the public institutions preferred human rights, peace buildings over negotiations. States in the findings there was a significant positive relationship between democracy and conflict resolution.

#### 6.1 CONCLUSION

This study was intended to investigate the role of democracy on conflict resolution in the ministry of interior, federal affairs and reconciliation of Mogadishu Somalia. The objective of this study was



to know the relationship between democracies on conflict resolution.

The questionnaire consisting twenty statements was used for collection of data and was distributed among 105 employees. SPSS was used for analysis.

This study reveals that all the dimensions of democracy –human rights, peace building and negotiation have a significant positive correlation with conflict resolution.

The aim of this study was to investigate the role of democracy on conflict resolution in some selected ministries of Somalia.

### 7.1 RECOMMENDATIONS

1. Fostering social reconciliation, negotiations and cohesion and respect for human rights
2. Ensuring democracy, peace and security for all.
3. We should not forget the overriding for developing democratic governments is to enable is to enable them to support peace and democracy, social harmony and finding the middle ground.
4. Give your public servants the conflict resolution skills they need to overcome everyday challenges that stand in the way of their goals. In fact, to achieve best results you may want to make conflict resolution a part of their work this gives them the ability to brush up on their skills and perfect their problem-solving approach on a regular basis.
5. We recommend implementing the necessary legislative reforms to guarantee that all human rights and democratic freedoms are fully safeguarded, setting up the necessary mechanisms for that. As a first step, an independent body must assess the current human rights situation.
6. Achieving these goals requires appropriate leadership capacities, governance mechanisms and public administration institutions and processes

### REFERENCES

1. Sambanis, Nicholas. 2001. "Do Ethnic and Nonethnic Civil Wars Have the Same Causes?" *Journal of Conflict Resolution* 45(3): 259–82.
2. Wantchekon, Leonard. 2004. "The Paradox of Warlord Democracy: A Theoretical

Investigation." *American Political Science Review* 98(1): 17–33.

3. Walter, Barbara F. 2002. *Committing to Peace: The Successful Settlement of Civil Wars*. Princeton, NJ: Princeton University Press.
4. Snyder, Jack. 2000. *From Voting to Violence: Democratization and Nationalist Conflict*. New York: W. W. Norton.
5. Rummel, R.J. 1995. "Democracy, Power, Genocide, and Mass Murder." *Journal of Conflict Resolution* 39(1): 3–26.
6. Rummel, R.J. 1995. "Democracy, Power, Genocide, and Mass Murder." *Journal of Conflict Resolution* 39(1): 3–26.
7. Rummel, R.J. 1985. "Libertarian Propositions on Violence Within and Between Nations: A Test Against Published Research Results." *Journal of Conflict Resolution* 29: 419–55.
8. Russett, Bruce, and John R. Oneal. 2001. *Triangulating Peace: Democracy, Interdependence, and International Organizations*. New York: W. W. Norton.
9. Russett, Bruce 1993. *Grasping the Democratic Peace: Principles for a Post-Cold War World*. Princeton, NJ: Princeton University Press.
10. Russett, Bruce. 2005. "Bushwhacking the Democratic
11. Bank, W. (2005). *Conflict in Somalia: Drivers and Dynamics*.
12. Campbell, D. F. (2008). *The Basic Concept for the*.
13. Curry. (1999).
14. Fisher & Ury. (1981).
15. Forsberg, S. (2006). *The role of the mass media thr. Forsyth. (2009)*.
16. Greenidge. (2006). *CIVIL SOCIETY IN PEACEBUILDING*. Harvey. (2008).
17. Konrad-Adenauer. (2011). *CONCEPTS AND CONCEPTS AND PRINCIPLES OF DEMOCRATIC*. Liberman, T. &. (2003).
18. Mpangala, G. P. (2004). *CONFLICT RESOLUTION AND PEACE BUILDING IN AFRICA AS A PROCESS: .Osita Agbu. (2000). Human Rights Implications of. Rousseau, D. K. (2008). Democracy and Conflict.*



## WE SAFE WOMEN SAFETY APPLICATION

**Abhishek Choudhary<sup>1</sup>, Anurag Upadhyay<sup>2</sup>, Chayan Barua<sup>3</sup>,**

### ABSTRACT

*The phrase “Violence against women” is a technical term used to collectively refer to acts that are primarily or exclusively committed against women to harm them. Woman security is a critical issue and it is much needed for every individual to act over such issue to safeguard them. When safety and security is concerned, a smart phone can become a powerful tool to prevent violence against women. Keeping this in mind, an android app has been developed which is dedicated to provide relief to the person in trouble. By clicking on a button (provided on the app) alert message is sent to the user’s already saved contacts. The application shares the user’s location with the registered contacts in the form of message.*

*The application has other key features like “Alarming neighbors by loud noise”, “Autodialing”, “Finding location of nearby police station and hospitals” etc. The work is developed in Java Development Kit using Android Studio. Thus, the app acts like a sentinel following behind the person till the user feels she is safe.*

### 1. INTRODUCTION

Swami Vivekananda stated that, “The best thermometer to the progress of a nation is its treatment of its women.” Violence against women is a significant public health problem, as well as a fundamental violation of women’s human rights. The phrase “Violence against women” is a technical term used to collectively refer to violent acts that are primarily or exclusively committed against women. Similar to a hate crime, which it is sometimes considered, this type of violence targets a specific group with the victim's gender as a primary motive. The United Nations General Assembly defines "violence against women" as any act of gender-based violence that results in, or is likely to result in, physical, sexual or mental harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or in private life." According to the reports of WHO, NCRB-social government organization 35% Women all over the world are facing a lot of unethical physical harassment in public places such as railway-bus stands, foot paths etc. Years ago on the night of December 16, 2012 the brutal gang rape of a paramedical student by six men on a moving bus in the national capital shook the nation for the sheer brutality and torture inflicted on the hapless girl. Thousands of youngsters protested on the streets of Delhi demanding justice for her. She finally

succumbed to her injuries on December 29, 2012. The family members and colleagues of TCS software engineer Esther Anuhaya found her body with the help of a Vijayawada police team. Her parents spent the entire Thursday looking for her in Bhandup (East) as her last call signal on January 5th was from Bhandupeshwar Kund in Kanjurmarg, which falls under Bhandup (East) jurisdiction. The family had been trying to trace her whereabouts by showing the locals her photographs. Locals said that the spot where her body was found is a hangout for criminals. The body of Anuhaya has been procured by Vijayawada police. Gender-based violence kills and disables as many women, aged 15-44, as cancer, malaria, traffic accidents and war combined. Hence there should be a system to protect them in such times. So, after studying some journals based on women security system and keeping in mind that, a smartphone is one technology which almost every woman carries all the time, an app has been developed (still in developing stage) to help women in such emergency situations. An ‘app’ is a small, specialised software program, easily downloadable and installed onto mobile devices such as smartphones or tablet computers. The use of ‘apps’ has been popularised by Google’s ‘Play Store’. This paper describes a security application called ‘We Safe’ which will work as a helping



hand for women at emergency situations. On pressing a button an alert message will be send to the user's registered contacts along with the user's current location.

## 2. ANDROID OS: IDEAL PLATFORM FOR MOBILE DEVELOPMENT

Android is a mobile operating system developed by the Open Handset Alliance, led by Google, and other companies. Android is an open source and Linux-based Operating System for mobile devices. Android is designed primarily for touch screen mobile devices such as Smartphone and tablets. Android's user interface is mainly based on direct manipulation, using touch gestures that loosely correspond to real-world actions, such as swiping, tapping and pinching, to manipulate on-screen objects, along with a virtual keyboard for text input. In addition to touch screen devices, Google has further developed Android TV for televisions, Android Auto for cars, and Android Wear for wrist watches, each with a specialized user interface. Variants of Android are also used on notebooks, game consoles, digital cameras, and other electronics. Android offers a unified approach to application development for mobile devices which means developers need only develop for Android, and their applications should be able to run on different devices powered by Android. The source code for Android is available under free and open source software licenses. The few reasons which make android an ideal platform development is: Open source, Larger developer and community reach, Increased marketing, Inter App Integration, Reduce cost of development, Higher success ratio and Rich development environment.

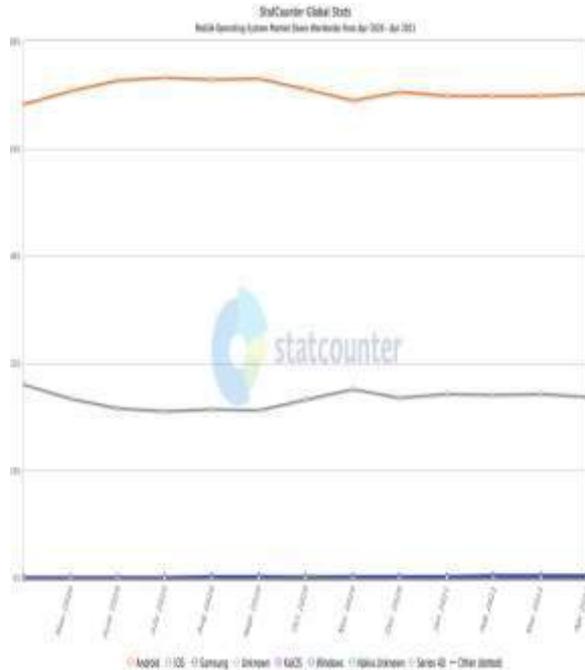


Figure shows current mobile operating market share worldwide by statcounter.

## 3. FEATURES OF 'We Safe' APP

In this section, the key features of the 'We Safe' App are listed below, which provides an overview of the system as well as explains why it is different from others.

### 3.1 Register and Verify

- 1). Home page have several features such as register, instructions view registered, register your number.
- 2). The first time users have to register to the app by entering the basic details of the user like Name, Phone no.
- 3). User will be able to manage their Emergency Contacts using the register your mobile numbers.
- 4). User will get help from instructions button for how to use the application.

### 3.2 At Emergency Situations

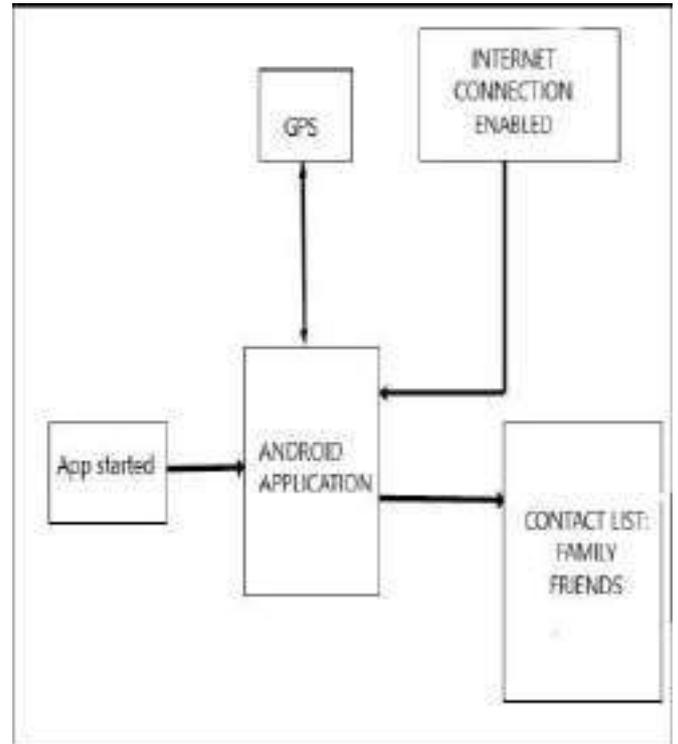
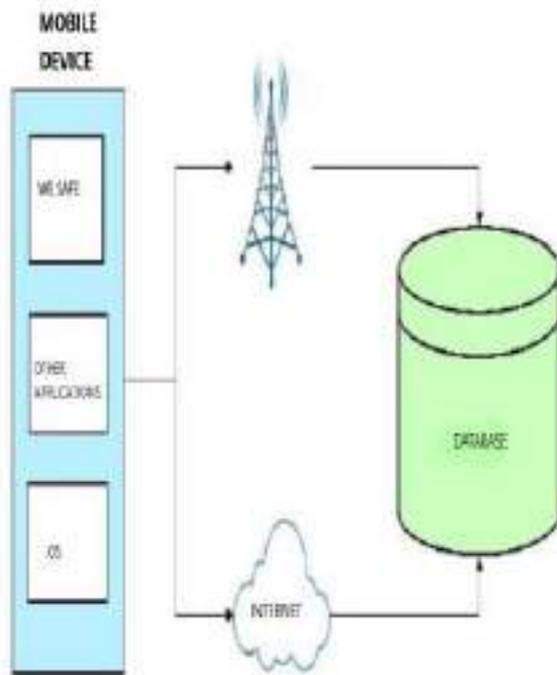
- 1). User will shake the device as per instructions.
- 2). As per application device will automatically sends the user's current location to the registered contacts.
- 3). Trusted contacted will get the user's current location and can get there as soon as possible.

## 4. EXPERIMENTAL SETUP

The experiments were performed using an Intel(R) Core(TM) i5 9300H CPU @2.4 GHz processor with 8GB RAM, 4GB of available disk space (minimum) and 3.6GB space for Android

SDK. The operating system is Windows 10 64-bit and the screen resolution must be 1280 x 800 (minimum). The software requirements are Java Development Kit 8 or higher and Android Studio 4.2 .

External output device is with google API 29 (Android 10) and has 6 GB RAM and snapdragon 835.



## 5. RESULT OF THE EXPERIMENTS

### 1. HOME PAGE





## 2. VIEW OF REGISTER

1:24 78%

Register

Name: Person Name

Number: Mobile Number

Save

Instructions View Registered

## 4. INSTRUCTIONS

1:24 78%

Instructions

INSTRUCTIONS

Please follow the below steps to setup your account:

- 1: Register Your Phone Number.
- 2: Register Your Guardian Numbers.
- 3: Always maintain working internet connection.
- 4: SHAKE your phone in case of emergency to alert your guardians.

LETS START NOW!

Main Menu

## 3. REGISTERED CONTACTS

1:24 78%

Verify

Your Phone Number

Submit

Back

## 6. CONCLUSION

It can be concluded that our 'WE SAFE' App provides a safe and secure environment to the women in the society, and allows them to work till late nights. Anyone before doing any crime against the women will be deterred and it help reducing the crime rate against the women. This application will act like a weapon for women that will ensure the safety and security which works on the Smartphone with the android operating system. With further research and innovation, our project can be implemented on a small wearable device like watch, pendent, wristband which will be build using GPS and GSM modules. On triggering this system the GPS data will acquired by the GPS module and will encoded into a valid Google maps link and send through text messages to enlisted family, friends.

## 7. REFERENCES

1. Pasha S., Kavana J., Mangala G.K.R., Nischitha K., Surendra B.K., Rakshitha M.S. (2016). BSecure for women: an android application , *International Journal of Innovative Research in Computer and Communication Engineering*, Vol. 4, No. 5, pp. 8073- 8080
2. Saranya N., Karthik K. (2015). Women safety application using android mobile, *International Journal of Engineering Science and Computing*, pp. 1317-1319.



4. *Thota B., Kumar U.K.P. (2015). Sauber: an android mobile for women safety, International Journal of Technology Enhancements and Emerging Engineering Research, Vol. 3, No. 05, pp. 122-126.*
5. *Mandapati S., Pamidi S., Ambati S. (2015). A mobile based women safety application (I safe apps), IOSR Journal of Computer Engineering, Vol. 17, No. 1 (Version 1), pp. 29-34.*
6. *Uma D., Vishakha V., Ravina R., Rinku B. (2015). An android application for women safety based on voice recognition, International Journal of Computer Science and Mobile Computing, Vol. 4, No. 3, pp. 216-220.*
7. *Divya S., Vinitha M., Logeshwari B., Indumathi P, A women secure mobile app for emergency usage (go safe app), IJRET: International Journal of Research in Engineering and Technology, Vol. 05, No. 03.*
8. *Mobile Operating System Market Share Worldwide | StatCounter Global Stats*



# **BARRIERS OF DISTANCE LEARNING ON LEARNERS' LIFE SKILLS**

**Hannah Mae Z. Gutierrez**

*Graduate School, Laguna State Polytechnic University, Santa Cruz, Laguna, Philippines*

## **ABSTRACT**

*Considering the students' security in the midst of the (Covid-19) pandemic, online and modular learning are evidently a new norm to be cultivated. With the abrupt closure of campuses across the country over to control the spread of COVID-19, students migrated to a wide assortment of living situations, a large number of which present difficulties to learning. As schools closed, many students entered stressful domestic situations that aren't conducive to learning.*

*Thus, the primary goal of this study is to figure out the students' barriers of distance learning on learner's life skills. The main reason that inspires the researcher to conduct this study is to investigate the problems encountered by the students on the implementation of distance learning.*

*The study covers 105 respondents from the science section of different grade levels of Junior High School in Dayap National High School – Main, Calauan, Laguna.*

*The descriptive method of research was used in the study to analyse and interpret the data being gathered to the respondents of this study.*

*Result reveals that students are experiencing barriers on distance learning. The barriers of distance learning are communication, cost and access to internet, credibility and motivation/family support, these were all highly experienced by the respondents. Then again, the acquisition of learners' life skills in terms of critical thinking skill, interpersonal skill and self – management skills were all highly insufficient, while technical skill was interpreted as averagely insufficient.*

*The barriers of distance learning have an effect on learner's life skills, accordingly the research hypothesis expressing that there is no significant effect between barriers of distance learning and learner's life skills is dismissed.*

*Researcher recommends further investigation of students' barriers would help educators and institution develop course materials and strategies properly. Understanding and alleviating technology issues are significant, particularly with the fast development of innovation.*

**KEYWORDS:** *distance learning, barriers, life skills, education,*

## **I. INTRODUCTION**

Learning can frequently resemble obstacle course for students. For a few, this is an exciting challenge driving them towards the end goal of graduation and accomplishment of their profession desires. However, this isn't generally the situation. Now and again the obstructions can turn out to be such huge difficulties that students fall by the wayside, either fizzling or deciding to leave their studies.

In the academic area, barriers classified as daily hassles incorporate scholastic cutoff times, time management, adjusting academic outstanding tasks at hand or getting lower grades than foreseen (Blankstein, Flett, and Koledin 1991; Ross, Niebling, and Heckert 1999). Significant life occasions explicit to the academic world have not been researched, despite the fact that students may at present experience non-academic significant life occasions during their time at school. Also, students may encounter incessant obstructions, for example, rehashed academic failure, or intense preventions, similar to a disengaged less than stellar score (Martin and Marsh 2008).

There are many factors that interfere with learning. These factors have been termed barriers to learning and development. Barriers to learning and development can be found in the learner (chronic illness or



disability), in the school (inaccessible buildings or lack of resources), the education system (lack of teacher and school development), or in the broader social system (negative attitudes and inadequate resource allocation) (DoE, 2001).

Today the latest hindrance that the students facing is the global coronavirus disease pandemic has changed the lives of millions around the world. Considering the learners' safety amid the disease 2019 (Covid-19) pandemic, online and modular learning are undeniably a new norm to be cultivated. Given that students are separated from their typical classroom settings and lacking everyday interactions with peers and teachers, they are having difficulty staying motivated. With the sudden closure of campuses across the nation to control the spread of COVID-19, students migrated to a wide assortment of living situations, a significant number of which present difficulties to learning. The effects of this surprising change to distance learning are not equal among students. As colleges shut, numerous students entered asset restricted or upsetting homegrown circumstances that are not helpful for learning. Students with low financial status may have insufficient lodging alternatives, restricted admittance to fast web, and be compelled to work.

To a huge extent education can be considered as a communication process among the members (Turkish Online Journal of Distance Education, 2013). The article centers around distance education, which has both the overall communication measures that in-person education settings have, and furthermore communication explicit to the advancements that intervene the teaching and learning taking place at a distance. There are different chances and barriers to compelling communication. A thorough audit of writing with respect to communication hindrances to distance education sums up the technical, psychological, social, cultural, and contextual challenges leading to a significant conclusion; that as technology utilized for distance education improves so does both the opportunities to conquer a large number of the obstructions to ineffectual communication and the multifaceted nature of the boundaries that are looked by the members. The chain of command of this structure is portrayed.

A study made by Rideout and Katz (2016) lower pay families might be at specific danger for this as past research has shown that lower pay families are bound to need to share gadgets to other family members contrasted with higher income counterparts. Nonetheless, (Turcotte 2010) since people with more elevated levels of schooling are bound to work from home.

Certain investigations showed that online schooling (distance training) could be as proficient/compelling as eye-to-eye instruction (Lack, 2013; Wu, 2015). Notwithstanding, Liu et al. (2020) announced that the internet-enabled and tangible user interface permits the students to see online instruction emphatically. Interestingly, online schooling could lead teachers and students to depend on dishonest literary theft (Ubell, 2017). Lucky et al (2019) talked about that the pace of students who resort to scholastic extortion in online schooling (distance training) was multiple times higher than the rate in face-to-face instruction.

Students feel isolated as far as they can tell. The difficulties they encountered in schooling may increment when they absence of sufficient help from their families and working environments. Likewise, grown-ups have different roles, for example, life partner, parent, associate, and student, every one of which implies extra obligations and outstanding task at hand (Thompson and Porto, 2014). These difficulties may influence their learning accomplishment just as causing dropout in online distance education programs or courses. Expanding dropout rates are considered as a vital issue in distance grown-up education.

Thus, the primary goal of this study is to figure out the students' barriers of distance learning on learner's life skills. The main reason that inspires the researcher to conduct this study is to investigate the problems encountered by the students on the implementation of distance learning Dayap National High School Main, Calauan, Laguna.

## II. OBJECTIVES

The main purpose of this study is to determine the barriers of distance learning on learners' life skills from Dayap National High School Main, Calauan, Laguna, and it sought to answer the following questions.

1. What is the profile level of the respondents as to:
  - 1.1 age;
  - 1.2 gender;
  - 1.3 grade level; and
  - 1.4 family income?
  
2. What is the level of barrier of distance learning in terms of:
  - 2.1. communication;
  - 2.2. cost and access to the internet;
  - 2.3. credibility; and



- 2.4. motivation/family support?
3. What is the level of the learners' life skills in terms of:
  - 3.1. critical thinking skill;
  - 3.2. interpersonal skill;
  - 3.3. self-management and skill; and
  - 3.4. technical skill?
4. Are the barriers of distance learning significantly affect the life skills of the learners?

### III. METHODOLOGY

The study covers 105 respondents. The respondents of the study will be directly from the science section of different grade levels from Dayap National High School. Stratified random sampling technique will be used to sample 105 respondents. With this technique, the researcher has a higher statistical precision compared to simple random sampling. Stratified random sampling ensures that each subgroup of a given population is adequately represented within the whole sample population of a research study.

The researcher will be utilized a survey questionnaire to gather data needed for the study supported by unstructured interviews. The main purpose of a survey questionnaire is to gather the point of views and opinions of respondents and know their mindset about a particular topic or issue.

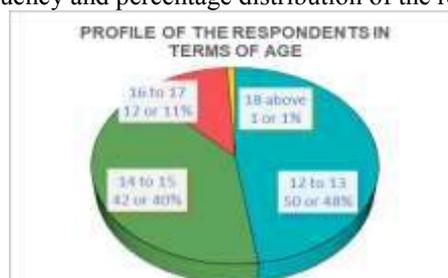
The mean and standard deviation was used to determine the level students' barriers in terms communication, cost and access to internet connection, credibility and motivation/family support as well as the level of learners' life skills such as decision – making/critical thinking skill, interpersonal skill, self-management and coping skill and technical skill; Two – way ANOVA suits the study to find the barriers of distance learning on learners' life skills.

### IV. RESULT AND DISCUSSION

The presentation of the significant findings followed the order as per the assertion of the problem specifically: to determine the profile level of the respondents as to age, gender, grade level and family income; level of the barrier of distance learning in terms of communication, cost and access to internet, credibility and motivation; level of the learners' life skills in terms of critical thinking, interpersonal, self-management and technical skills; and to determine if there is significant effect between the barriers of distance learning and learner's life skills.

#### Profile of the Learners

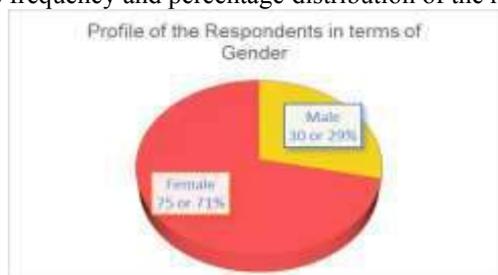
Figure 1 presents the frequency and percentage distribution of the respondents by age.



**Figure 1. Level of Learner's Profile in terms of Age**

It tends to be seen from the figure that out of 105 students 1 or 1 percent fell inside the age section of 18 or above years old; 12 or 11 percent were inside the age section of 16 to 17 years of age; 42 or 40 percent were inside the age bracket of 14 to 15 years of age; and 50 to 48 percent of the respondents fell inside the age bracket of 12 to 13 years of age.

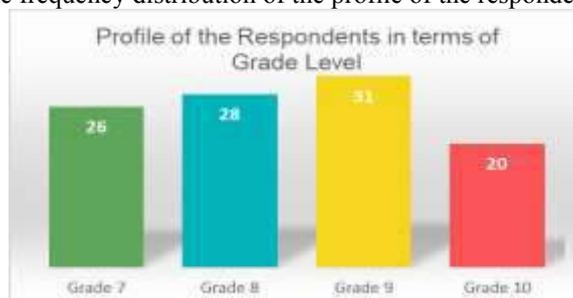
Figure 2 presents the frequency and percentage distribution of the respondents by gender.



**Figure 2. Level of Learner’s Profile in terms of Gender**

It can be noted from the figure that most of the respondents are female with 75 of 105 students or 71 percent of the respondents and just 30 or 29 percent were males.

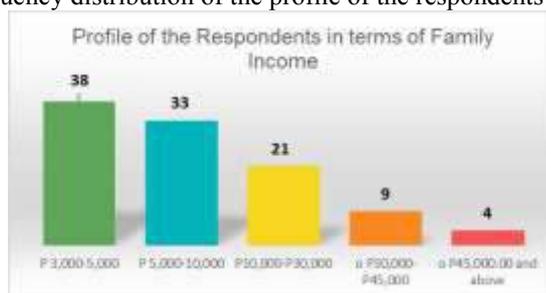
Figure 3 presents the frequency distribution of the profile of the respondents in terms of grade level.



**Figure 3. Level of Learner’s Profile in terms of Grade Level**

Figure 3 shows the distribution of respondents according to grade level. It totals of 105 Junior High School from science section. It can be gleaned from the figure that majority of them are from grade 9 with 31 of respondents, on the other hand the least number of respondents were came from the grade 10 with 20 respondents.

Figure 4 presents the frequency distribution of the profile of the respondents in terms of family income.



**Figure 4. Level of Learner’s Profile in terms of Family Income**

In this research, respondents’ family income is sorted into five range of income. As introduced in the Figure 4, 38 of the respondents fell inside the range of P3000 – P5000 family income and also 33 fell from the range of P5000 – P10000 family income. That large number of respondents have low income and below the basic salary of workers.

### Barriers of Distance Learning

Barrier of distance learning regarding communication, cost and access to internet, credibility and motivation was dealt with measurably utilizing mean and standard deviation joined by a 5 point-Likert scale made by the researcher. The table shows the indicative statement, mean, remark and interpretation.



Table 1 present the level of barriers of learning in terms of communication.

**Table 1. Level of barrier of distance learning in terms of Communication**

Statement	Mean	SD	Remarks
<b>I have experienced the...</b>			
1. Lack of peer collaboration.	3.48	1.02	Agree
2. Too inhibiting to express candid emotions and idea in online classes.	3.97	0.95	Agree
3. Get tired and bored from staying too long in online classes through communication with teachers and classmates.	3.76	1.02	Agree
4. Shy or lack confidence for online learning.	3.80	1.02	Agree
5. Distance learning courses do not get the practice of verbal interaction with professors and other students.	3.62	1.03	Agree
<b>Grand Mean Interpretation</b>	<b>3.73</b>	<b>1.02</b>	<b>Agree High</b>

*Legend:*

Scale	Range	Remarks	Verbal Interpretation
5	4.20 – 5.00	Strongly Agree	Very High
4	3.40 – 4.19	Agree	High
3	2.60 – 3.39	Neutral	Average
2	1.80 – 2.59	Disagree	Low
1	1.0 – 1.79	Strongly Disagree	Very Low

The result shows that communication *highly* hinders distance learning as shown by the grand (M=3.73, SD=1.02). This means that communication is one of the barriers of distance learning that may affect the acquisition of life skills for learners.

It can be seen from the table that the statement “too inhibiting to express candid emotions and idea in online classes.” obtained the highest (M=3.97, SD=0.95) indicates that the respondents *agreed* that communication is a barrier of distance learning. Students we’re not able to express their ideas and emotions during online class. However, “lack of peer collaboration” got the lowest (M=3.48, SD=1.02) which means that the respondents *agreed* that lack of collaborative communication is also barred. This meant that students we’re not able to learn due to lack of collaboration among their classmates.

In accordance with this base of the view on the examination of Abu Bakar, and so on (2020). Communication hindrances are a huge test in distance learning, which impacts the distance students’ performance and accomplishments.

Table 2 shows the weighted mean of barriers of distance learning in terms of cost and access to internet.

Most of the indicative statements under cost and access to internet received remarks of *agree*. “Difficulty in communication through the internet.” received the highest (M=4.19 SD=0.85) which the respondents *agreed* and shows that cost and access to internet is a barrier to distance learning. Students with poor internet connection were struggling to keep up with their lessons during online classes. Nonetheless, “lack adequate Internet access.” got the lowest (M=3.14, SD=1.10) which implies that the respondents were *neutral* whether lack adequate web access thwarts distance learning. It demonstrates that some of students are all around prepared in technological aspect and other are attempting to adapt up.

The outcome shows that cost and access to internet *highly* hinders distance learning as demonstrated by the grand (M=3.63, SD=1.10). This implies that cost and access to internet is one of the obstructions of distance learning that may influence the procurement of life skills for students.

**Table 2. Level of barrier of distance learning in terms of Cost and Access to Internet**

Statement	Mean	SD	Remarks
<b>I have experienced the...</b>			
1. Difficulty in communication through the internet.	4.19	0.85	Agree
2. Difficulty in accessing reliable information.	3.81	0.93	Agree
3. Online learning costs too much.	3.55	1.13	Agree
4. Lack adequate Internet access.	3.14	1.10	Neutral
5. Lack of consistent platforms, browsers, and software.	3.46	1.04	Agree
<b>Grand Mean Interpretation</b>	<b>3.63</b>	<b>1.10</b>	<b>Agree High</b>



The cost and access have become the primary issue in joining the online learning stage. This is upheld by Marcial et al. (2015) tracking down that the most serious barrier is the issue of cost and access to the web.

Table 3 reveals the weighted mean of barriers of distance learning in terms of credibility.

As projected in Table 3, “Teachers might find little time to talk about trivial details of a given topic, which are otherwise important to helping me understand better a given concept.” achieved the highest (M=3.98, SD=0.82) it exhibits that the respondents *agreed* that credibility is inadequate in gaining student's life skills. On the other hand, “Course materials not always delivered on time.” obtained the lowest (M=3.23, SD=1.05) with a remark of *neutral*. A few students can get their course material on schedule, the explanation for this was they are close to the school and the availability of their parents/ guardians. Then again students whose both parents are inaccessible and a long way from school experienced getting the materials late.

**Table 3. Level of barrier of distance learning in terms of Credibility**

Statement	Mean	SD	Remarks
<b>I have experienced the...</b>			
1. Lack of proper assessment. Not closely monitored if there's progress or improvement.	3.70	0.79	Agree
2. Lack of support and reassurance.	3.40	1.05	Agree
3. Teachers might find little time to talk about trivial details of a given topic, which are otherwise important to helping me understand better a given concept.	3.98	0.82	Agree
4. Can't understand the topic without the guidance of my parents/teachers.	3.64	0.99	Agree
5. Course materials not always delivered on time.	3.23	1.05	Neutral
<b>Grand Mean</b>	<b>3.59</b>	<b>0.98</b>	<b>Agree</b>
<b>Interpretation</b>			<b>High</b>

The result shows that credibility *highly* hinders distance learning as shown by the weighted (M=3.59, SD= 0.58). This suggests that credibility is one of the blocks of distance learning that may impact the acquirement of life skills for students.

As referenced by Sahar El Turk, and Isabelle D. Cherney, (2016). The third factor out of 10 that they researched was sorted as academic hindrances and included the accompanying five boundaries: absence of authority over students cheating, powerlessness to get a handle on obvious signals from students, trouble of passing on ideas in certain fields on the web, online students may not learn just as vis-à-vis students, and questions about the nature of internet learning results.

Table 4 reveals the weighted mean of barriers of distance learning in terms of motivation and family support.

**Table 4. Level of barrier of distance learning in terms of Motivation/Family Support**

Statement	Mean	SD	Remarks
<b>I have experienced the...</b>			
1. Lack of instructional materials that suit the interests of the learners and its appropriateness with the instructional tasks.	3.31	1.11	Neutral
2. Online learning environment that is not inherently motivating.	3.70	1.02	Agree
3. I can easily get confused during online class sessions.	3.83	1.04	Agree
4. Lack support from family and friends.	2.79	1.14	Neutral
5. Fear family life will be disrupted.	3.60	0.96	Agree
<b>Grand Mean</b>	<b>3.45</b>	<b>1.12</b>	<b>Agree</b>
<b>Interpretation</b>			<b>High</b>

The table presents the mean level of barriers of distance learning in terms of motivation. It further indicates that statement 4 “lack support from family and friends.” got the lowest (M=2.79, SD=1.14) received a remark of *neutral*. It specifies that particular students feels that they receive enough support from their family while others are not. Statement no. 3 “I can easily get confused during online class sessions.” got the highest (M=3.83, SD=1.04). It further indicates that the respondents *agreed* that motivation is a hinder in distance learning. Unmotivated students cannot focus and concentrate during their online classes.



The result shows that motivation *highly* hinders distance learning as shown by the grand (M=3.45, SD=1.12). This suggests that credibility is one of the barriers of distance learning that may impact the acquirement of life skills for students.

A further study by Lin et al. (2017). The investigation discovered the students had low degrees of intrinsic and extrinsic motivation in their online learning course. The analysts expounded on the low motivation and examined that it may have been brought about by an absence of real-time communication with educators and schoolmates.

### Life Skills of the Learners

Learner's Life Skills concerning critical skill, interpersonal skill, self – management skill and technical skills was dealt with measurably utilizing mean and standard deviation joined by a 5 point-Likert scale made by the researcher. The table shows the indicative statement, mean, remark and interpretation.

Table 5 present the level of learner life skill in terms of critical skills.

It can be seen from the table that the statement “lack of clear expectations/instructions.” obtained the highest (M=3.58, SD=0.95) indicates that the respondents *agreed* that critical thinking skills is absence in learners' life skill. Students we're not able to understand clearly the instructions given during online class. However, “lack language skills for online learning.” got the lowest (M=3.48, SD=1.04) which means that the respondents have *neutral* response. It denotes that some of the students can easily adjust in online learning language while others are having difficult time to deal with it.

**Table 5. Level of the learners' life skills in terms of Critical thinking skill**

Statement	Mean	SD	Remarks
<b>I have experienced the...</b>			
1. Inability to understand course materials.	3.43	0.99	Agree
2. Less commitment to education.	3.53	0.87	Agree
3. Lack of prerequisite knowledge.	3.54	0.95	Agree
4. Lack language skills for online learning	3.38	1.04	Neutral
5. Lack of clear expectations/instructions.	3.58	0.95	Agree
<b>Grand Mean</b>	<b>3.49</b>	<b>0.97</b>	<b>Agree</b>
<b>Interpretation</b>			<b>High</b>

The result shows that critical thinking skills is *highly* deficient in learners' life skills as shown by the grand (M=3.49, SD=0.97). This means that critical thinking skills of students as of today's distance learning are not enhanced, since more of their activities were focused on lower level of cognitive knowledge.

The fast development of data and communication innovation has made an expanding measure of accessible data. Individuals should have critical thinking skills so that they can examine and look at data just as build contentions. Everyone necessities to think basically in regular day to day existence. (Atabaki et al., 2015). Table 6 represents the level of learner's life skills in terms of interpersonal skills.

**Table 6. Level of the learners' life skills in terms of Interpersonal Skill**

Statement	Mean	SD	Remarks
<b>I have experienced the...</b>			
1. Low concentration on study.	3.89	0.97	Agree
2. Lack of faculty support.	3.08	1.04	Neutral
3. Lack of instant feedback from peers and teachers.	3.39	1.02	Neutral
4. Lack communication skills for online learning.	3.64	0.92	Agree
5. Difficulty contacting academic or administrative staff.	3.58	0.90	Agree
<b>Grand Mean</b>	<b>3.49</b>	<b>1.01</b>	<b>Agree</b>
<b>Interpretation</b>			<b>High</b>

In learners' life skills in terms of interpersonal skill, the data being analysed from the respondents' responses based on their discernment and is resulted to *highly* insufficient with the grand (M=3.49, SD=1.01). With this, students encounter problems with expressing their ideas and knowledge in distance online learning.

As noticed in the Table 6, statement “low concentration on study.” accumulated a highest (M=3.89, SD=0.97) indicates that the respondents *agreed* that interpersonal skill is lacking in learner's life skills. Students



we're not able to utter ideas and concentrate during online class. In spite of this "lack of faculty support." acquired a lowest ( $M=3.08$ ,  $SD=1.04$ ) interpreted as *neutral*, it connotes that a part of respondents feels the help of the teachers while a bit of respondents may feel that the help from teachers isn't sufficient.

In accordance with Cole, Shelley, and Swartz (2014) examined graduate and undergraduate fulfilment with online learning at a college found absence of connection with faculty and with classmates as the principal wellspring of learner's disappointment.

Table 7 shows the level of learner's life skills in terms of self – management skills.

It tends to be seen from the table that statement "difficulty in time management." got the most noteworthy ( $M=4.11$ ,  $SD=0.94$ ) it shows that respondents concurred that they experience issues in time management. Then again, "inability to create balance between education and work." got the least ( $M=3.59$ ,  $SD=1.14$ ). Students who work part time and study simultaneously are experiencing difficulty adjusting their time during this distance learning.

**Table 7. Level of the learners' life skills in terms of Self - Management Skill**

Statement	Mean	SD	Remarks
<b>I have experienced the...</b>			
1. Inability to create balance between education and work.	3.59	1.14	Agree
2. Inability to create balance between education and family or social life	3.84	1.00	Agree
3. Difficulty in time management.	4.11	0.94	Agree
4. Significant interruptions during study at home.	3.80	0.97	Agree
5. Afraid of feeling isolated.	3.70	1.11	Agree
<b>Grand Mean</b>	<b>3.81</b>	<b>1.05</b>	<b>Agree</b>
<b>Interpretation</b>			<b>High</b>

As the aftereffect of the survey in regards to student's life skills towards self - management, it shows that respondents self-management is *highly* insufficient with the grand ( $M=3.81$ ,  $SD=1.05$ ) in learners' life skills. Learners accept that they are struggling getting sorted out and dealing with their own time in today new method of distance learning.

J. Xu (2013) acknowledged that time is additionally a significant part of learning. Without investing energy in an assignment, no advancement can be ever achieved.

Table 8 give an idea about the level of learner life skill in terms of technical skills.

**Table 8. Level of the learners' life skills in terms of Technical Skills**

Statement	Mean	SD	Remarks
<b>I have experienced the...</b>			
1. Insufficient computer skills.	3.23	1.17	Neutral
2. Difficulty in accessing software materials.	3.30	1.22	Neutral
3. Lack skills for using the delivery system.	3.30	1.15	Neutral
4. Unfamiliar with online learning technical tools.	3.26	1.21	Neutral
5. Lack of basic knowledge in operating a technology gadget.	3.01	1.20	Neutral
<b>Grand Mean</b>	<b>3.23</b>	<b>1.19</b>	<b>Neutral</b>
<b>Interpretation</b>			<b>Average</b>

All indicative statement received a remark of neutral. It can be perceived from the table that the statements "difficulty in accessing software materials." and "unfamiliar with online learning technical tools." attained the highest ( $M=3.30$ ,  $SD=1.22$ ,  $1.15$ ) indicates that the respondents stay *neutral* in terms of enhancement of technical skills in learner's life skills. While statement "lack of basic knowledge in operating a technology gadget." gained the lowest ( $M=3.01$ ,  $SD=1.20$ ).

As the outcome in terms of technical skills, the grand ( $M=3.23$ ,  $SD=1.19$ ) which is interpreted as *neutral*. In connection, some of the respondents has a natural computer skill that they can smear on today's distance learning. They have the competence to adopt to the new approach of learning since they innate skills in technologies. On the other hand, there are respondents who can't adjust easily because of some factors, such as affordability, way of living, etc. They find it hard to do some of their activities for they are lacking technological skills.



O' Doherty et al. (2018) referenced the primary hindrances to web-based learning were time limitations, poor technical skills, insufficient framework, nonappearance of institutional systems and backing, and negative mentalities.

### Effect of Barriers of Online Distance Learning to Life Skills of the Learners

Minitab 14 was used in computing the data gathered and treated them statistically using Analysis of Variance. The computed p-values were compared to the level of significance at 0.05 to determine the barriers of online distance learning significantly affect the life skills of the learners.

Table 9 reveals the effect of communication as a barrier of online distance learning to the life skills of the learners as to critical thinking skills, interpersonal skills, self-management skills and technical skills.

**Table 9. Effect of Communication as a barrier of Online Distance Learning to Life Skills of the Learners**

Variables	p-value	Decision on H <sub>0</sub>	Analysis
Communication Critical Thinking Skill	.000	Reject	Significant
Communication Interpersonal Skills	.000	Reject	Significant
Communication Self - management skill	.000	Reject	Significant
Communication Technical Skill	.000	Reject	Significant

*\*significant at .05 level of significance*

It can be seen from the table above that the obtained p-values of .000 between communication and life skills were lower than the 0.05 level of significance which indicated that the null hypothesis had been rejected. This further implied that communication as a barriers of online distance learning *significantly* affect the life skills of the learners. This means that communication in an online distance learning hindrance the acquisition of life skills which are vital to students learning.

Table 10 uncovers the impact of cost and access to internet as a barrier of online distance learning to the life skills of the learners as to critical thinking skills, interpersonal skills, self-management skills and technical skills.

**Table 10. Effect of Cost and Access to Internet as a Barrier of Online Distance Learning to Life Skills of the Learners**

Variables	p-value	Decision on H <sub>0</sub>	Analysis
Cost and Access to Internet Critical Thinking Skill	.000	Reject	Significant
Cost and Access to Internet Interpersonal Skills	.000	Reject	Significant
Cost and Access to Internet Self - management skill	.000	Reject	Significant
Cost and Access to Internet Technical Skill	.000	Reject	Significant

It tends to be seen from the table above that the obtained p-value of .000 among cost and access to internet and life skills were lower than the 0.05 level of significance which showed that the null hypothesis had been dismissed. This further inferred that that cost and access to internet as a barriers of online distance learning *significantly* affect the life skills of the learners. This implies that cost and access to internet in an online distance learning obstacle the procurement of life skills which are crucial to students learning.

Table 11 divulge the effect of credibility as a barrier of online distance learning to the life skills of the learners as to critical thinking skills, interpersonal skills, self-management skills and technical skills.

**Table 11. Effect of Credibility as a Barrier of Online Distance Learning to Life Skills of the Learners**

Variables	p-value	Decision on H <sub>0</sub>	Analysis
Credibility Critical Thinking Skill	.000	Reject	Significant
Credibility Interpersonal Skills	.000	Reject	Significant
Credibility Self - management skill	.000	Reject	Significant
Credibility Technical Skill	.000	Reject	Significant

It will in general be seen from the table, that the acquired p-value of .000 among credibility and life skills were lower than the 0.05 degree of importance which showed that the null hypothesis had been excused. This further surmised that credibility as a barriers of online distance learning *significantly* influence the life skills of the students. This suggests that credibility in an online distance learning barrier the obtainment of life skill which are vital to students learning

Table 12 disclose the outcome of motivation/family support as a barrier of online distance learning to the life skills of the learners as to critical thinking skills, interpersonal skills, self-management skills and technical skills.

**Table 12. Effect of Motivation/Family Support as a Barrier of Online Distance Learning to Life Skills of the Learners**

Variables	p-value	Decision on H <sub>0</sub>	Analysis
Motivation/Family Support Critical Thinking Skill	.000	Reject	Significant
Motivation/Family Support Interpersonal Skills	.000	Reject	Significant
Motivation/Family Support Self - management skill	.000	Reject	Significant
Motivation/Family Support Technical Skill	.000	Reject	Significant

It will overall be seen from the table, that the procured p-value of .000 among motivation/family support and life skills were lower than the 0.05 level of significance which showed that the null hypothesis had been rejected. This further derived that motivation/family support as a hindrances of online distance learning *significantly* affect the life skills of the learners. This implies that motivation/family support in an online distance learning barrier the acquisition of life skills which are indispensable to students learning.

## V. CONCLUSION

In light on the findings the following conclusion was drawn:

The barriers of distance learning have an effect on learner's life skills, accordingly the research hypothesis expressing that there is no significant effect between barriers of distance learning and learner's life skills is dismissed.

## Recommendation

In the view of the findings and conclusions of the study, the following recommendations may be done.

Further investigation of students' barriers would help educators and institution develop course materials and strategies properly. Close investigation of the intrinsic problems in distance learning would help conquer barriers experienced by learners.

Understanding and alleviating technology issues are significant, particularly with the fast development of innovation.

Further investigation into course improvement strategies would help learning institutions comprehend which techniques work best in the distance learning.

Future researcher can go with bigger samples of learners. Furthermore, conducting a focus group with



selected learners may give a richer set of information. A focus group can allow the researcher to investigate more nuanced inquiries regarding different hindrances and online class experiences.

## REFERENCES

1. **Abu B., Kiramat S, Xu Q.** 2020. *The Effect of Communication Barriers on Distance Learners' Achievements.* *Revista Argentina de Clínica Psicológica.* 2020, Vol. XXIX, N°5, 248-264. Retrieved from <https://www.revistaclinicapsicologica.com/archivesarticle.php?id=136>
2. **Atabaki, S., Mohammad, A., Keshtiaray, N., & Yarmohammadian, M. H.** (2015). *Scrutiny of Critical Thinking Concept.* *International Education Studies*, 8(3), 93–102. doi:10.5539/iesv8n3p93.
3. **Blankstein, K. R., Flett, G. L., & Koledin, S.** (1991). *The brief college student hassles scale: Development, validation, and relation with pessimism.* *Journal of College Student Development*, 32(3), 258–264.
4. **Cole, M. T., Shelley, D. J., & Swartz, L. B.** (2014). *Online instruction, e-learning, and student satisfaction: A three-year study.* *The International Review of Research in Open and Distance Learning*, 15(6), 111–131. <http://www.irrodl.org/index.php/irrodl/article/view/1748/3123>
5. **Department of Education.** (2001). *Education white Paper 6. Special Needs Education: Building an inclusive Education and Training.* Pretoria: Government Printer.
6. **J. Xu.** (2013) *Why do students have difficulties completing homework? the need for homework management.* *Journal of Education and Training Studies*, 1(1),
7. **Lack, K. A.** (2013). *Current status of research on online learning in postsecondary education.* ITHAKA S+R. Retrieved from <http://sr.ithaka.org/wpcontent/uploads/2015/08/ithakasronlinelearningpostsecondaryeducation-may2012.pdf>
8. **Lin, C. Z., Zhang, Y., & Zheng, B.** (2017). *The roles of learning strategies and motivation in online learning: A structural equation modeling analysis.* *Computers & Education*, 113, 75-85.
9. **Liu, S., Yang, L., Zhang, C., Xiang, Y. T., Liu, Z., Hu, S., & Zhang, B.** (2020). *Online mental health services in China during the COVID-19 outbreak.* *The Lancet Psychiatry*, 7(4), e17-e18. [https://doi.org/10.1016/S2215-0366\(20\)30077-8](https://doi.org/10.1016/S2215-0366(20)30077-8)
10. **Lucky, A., Branham, M., & Atchison, R.** (2019). *Collection-based education by distance and face to face: learning outcomes and academic dishonesty.* *Journal of Science Education and Technology*, 28, 414-428. <https://doi.org/10.1007/s10956-019-9770-8>
11. **Marcial, D. E., Caballero, R. D. B., Rendal, J. B., & Patrimonio, G. A.** (2015). *"I AM OFFLINE": MEASURING BARRIERS TO OPEN ONLINE LEARNING IN THE PHILIPPINES.* *Information Technologies and Learning Tools*, 45(1), 28-41. <https://doi.org/10.33407/itlt.v45i1.117>.
12. **Martin, Andrew & Marsh, Herb.** (2008). *Academic buoyancy: Towards an understanding of students' everyday academic resilience.* *Journal of School Psychology*. 46. 53-83. [10.1016/j.jsp.2007.01.002](https://doi.org/10.1016/j.jsp.2007.01.002).
13. **O'Doherty, D., Dromey, M., Lougheed, J., Hannigan, A., Last, J., & McGrath, D.** (2018). *Barriers and solutions to online learning in medical education – an integrative review.* *BMC Medical Education*, 18(130), 1-11.
14. **Rideout, V. J. and V.S. Katz.** 2016. *Opportunity for all? Technology and learning in lower income families. A report of the Families and Media Project.* New York: The Joan Ganz Cooney Center at Sesame Workshop.
15. **Ross, S. E., Neibling, B. C., & Heckert, T. M.** (1999). *Sources of stress among college students.* *College Student Journal*, 33, 312–317.
16. **Sahar El Turk, and Isabelle D. Cherney,** (2016). *Perceived online education barriers of administrators and faculty at a U.S. university in Lebanon.* ERIC (EJ1152181) Retrieved from <https://eric.ed.gov/?id=EJ1152181>.
17. **Thompson, J. & Porto, S.** (2014). *Supporting wellness in adult online education.* *Open Praxis*, 6(1), 17-28. *International Council for Open and Distance Education.* Retrieved November 21, 2020 from <https://www.learntechlib.org/p/130682/>.
18. **Turkish Online Journal of Distance Education** (2013). *Barriers to Communication in Distance Education.* *Turkish Online Journal of Distance Education*, v14 n1 p374-388.
19. **Turcotte, M.** (2010) *"Working at home: An update."* *Canadian Social Trends*, Catalogue no.11-008-X. Ottawa: Statistics Canada.
20. **Ubell, R.** (2017). *Online cheating. Inside Higher Education.* Retrieved from <https://www.insidehighered.com/digitallearning/views/2017/02/06/robert-ubell-online-cheating-and-what-colleges-can-do-about-it>
21. **Wu, D. D.** (2015). *Online learning in postsecondary education: a review of the empirical literature (2013–2014).* ITHAKA S+R. <https://doi.org/10.18665/sr.221027>



# **COPING WITH THE CHALLENGES IN TEACHING MAPEH SUBJECTS AMONG NON-SPECIALIZED TEACHERS OF DISTRICT 4 IN LAGUNA**

**Reem D. Montesur**

*Graduate School, Laguna State Polytechnic University, Santa Cruz, Laguna, Philippines*

Article DOI: <https://doi.org/10.36713/epra7323>

DOI No: 10.36713/epra7323

## **ABSTRACT**

*This study entitled coping with the challenges in teaching MAPEH subjects among the non-specialized teachers of District 4 in Laguna was conducted to specifically answer the following questions; What is the demographic profile of the Teachers in MAPEH in terms of; Age; Gender; Years in Service; Educational Attainment and Specialization? What is the coping mechanism of the Teachers in MAPEH in terms of; Time Management; Academic Advice and Mentoring; Appraisal Focused; Emotional-Focused; Occupation- focused coping? Do the coping mechanism used by teachers significantly affect the performance of non-specialized teachers teaching MAPEH of District 4 in Laguna?*

*The study utilized a descriptive design to determine the coping mechanism of the non-specialized teachers in MAPEH. The main source data of this study was the survey questionnaire which was prepared by the researcher and statistically treated by the use of simple descriptive statistics such as frequency, percentage and the mean to determine the significant effect on the performance of the non-specialized teachers in MAPEH of the District of 4 in Laguna.*

*In order to conduct this study, letters were sent to the Schools Divisions Superintendent Dr. Marites A. Ibanez, asking permission and approval to conduct the study, and to the School Principals of the selected schools, asking to distribute questionnaires to the ones teaching MAPEH.*

*Preparation of self-made questionnaire by the researcher followed. The researcher-made questionnaire was checked by the thesis adviser. Face validation of the contents of the questionnaire was done by the adviser of the researcher and other persons with specialization in the field. They were vital members of the education team.*

*Researchers use purposive sampling when they want to access a particular subset of people, as all participants of a study are selected because they fit a particular profile. Each individual was chosen entirely by chance and each member of the population had an equal chance of being included in the sample. The respondents of the study consisted of fifty non-major or non-specialized in MAPEH in District 4 in Laguna.*

*The purpose of the study may offer literature and findings that may be useful in the conduct of future studies more particularly in the context of communication considering the stressor and how to cope with the challenges of the teachers in teaching a non-major subject.*

*Copies of the questionnaire were multiplied based on the number of the respondents. Then it was administered. With confidentiality, the gathered information was transferred in a tally sheet. Subsequently, codes were assigned to each indicator. The encoded data were given to the researcher's statistician for the descriptive analysis. The gathered data were interpreted and presented in textual and tabular forms and appropriate interpretation was made.*

*The methods used was statistical to analyze and interpret the data gathered, the weighted mean and the F-test formula which is the statistical test in which the test statistic has an F-distribution under the null hypothesis. It is most often used when comparing statistical models that have been fitted to a data set, in order to identify the model that best fits the population from which the data were sampled.*

*The implication of this research is to find out the importance of how teachers of MAPEH especially the non-majors become aware of learning and dealing with teaching challenges. Have an important mechanism for handling situations related to MAPEH teaching.*

*The result showed that the coping challenges in teaching MAPEH subjects had no significant effect on the performance of the non-specialize Teachers teaching MAPEH subjects of District 4 in Laguna, and therefore the hypothesis was also rejected.*

**KEYWORDS:** *Coping Challenges, Coping mechanism, Non-Specialized, MAPEH, Stressor*



## I. INTRODUCTION

In the current situation of our educational system, many teachers are experiencing difficulties in teaching and facing complicated challenges because of their inadequate training in the field to which they belong. Due to the fact that teachers are in demand, the fashion in teaching is very evident. Teaching is a profession that many teachers enjoy doing because of their love and commitment for the sworn duty. On the other hand, some teachers especially the new ones experience high level of stress. After first year of teaching, they leave the field of education due to lack of administrative support, inability to manage personal and professional expectations, limited teaching resources, lack of professional development, and difficulty in handling behavioral problems in the classroom. There is an increased rate of attrition by as much as 50% of teachers who leave teaching within the first three to five years (Le Maistre & Paré, 2008).

It can be said that teaching has two faces: the experience that teaches how to learn and the experience that lead them to give up. In terms of learning, it can be said that one of the most important drivers for teachers to continue teaching is the students' achievements that they themselves have been instruments in their success. Teachers also referred to as novice teachers, if they are assigned to handle subjects they are not-specialized in most particularly teaching MAPEH components. A number of novice teachers are at high rates has. This situation has provoked administrators and other education planners to devise coping mechanisms. These mechanisms can be utilized by teachers as they begin their careers in the field of education. The concern of the teachers assigned in different specializations, with the lack of coping mechanisms is apparent in a specific sub-section within the education field, specifically, in geographical areas and subject, where these mechanism are highly needed. Offering a myriad of mechanisms to new teachers may help and support them to better assimilate to their new school cultures and roles. Implementation of these mechanisms has proven to be good approaches, which significantly have reduced the number of first year teachers who experienced frustration, unrewarding and intolerable difficulty throughout the school year, and desired or decided to leave the profession

Through this, a study of coping with the challenges in teaching MAPEH among non-specialized teachers in the Junior High School of District 4 in Laguna is conducted. All tasks in teaching such areas and MAPEH component and their effects on the performance of teachers especially the non-specialized ones in teaching MAPEH will be determined.

## II. OBJECTIVES

This study determined the coping mechanism in teaching MAPEH of the non-specialized teachers of District 4 in Laguna. Specifically, the study sought answers to the following questions:

1. What is the demographic profile of the Teachers in MAPEH in terms of;
  - 1.1 Age;
  - 1.2 Gender;
  - 1.3 Years in Service;
  - 1.4 Educational Attainment
  - 1.5 Specialization;
2. What are the coping mechanism of the Teacher's in MAPEH in terms of:
  - 2.1 Time management;
  - 2.2 Academic advice and mentoring;
  - 2.3 Appraisal focused;
  - 2.4 Emotion focused;
  - 2.5 Occupation- focused coping?
3. What is the performance of the non-specialized teachers in MAPEH in terms of;
  - 3.1 Classroom management;
  - 3.2 Coaches and Trainers;
  - 3.3 Handling Ancillary Task?
4. Do the coping mechanisms used by teachers significantly affect the performance of non-specialized teachers teaching MAPEH of District 4 in Laguna?

## III. METHODOLOGY

The researcher consulted her statistician on the sampling techniques. Purposive sampling, also known as judgmental, selective, or subjective sampling, is a form of non-probability sampling in which researcher relied on their own judgment when choosing members of the population to participate in their study. This sampling



method requires researchers to have prior knowledge about the purpose of their studies so that they can properly choose and approach eligible participants. Researchers use purposive sampling when they want to access a particular subset of people, as all participants of a study are selected because they fit a particular profile. Each individual was chosen entirely by chance and each member of the population had an equal chance of being included in the sample. The respondents of the study consisted of fifty non-major or non-specialized in MAPEH in District 4 in Laguna.

In order to conduct this study, letters were sent to the Schools Divisions Superintendent Dr. Marites A. Ibanez, asking permission and approval to conduct the study, and to the School Principals of the selected schools, asking to distribute questionnaires to the ones teaching MAPEH.

Preparation of self-made questionnaire by the researcher followed. The researcher-made questionnaire was checked by the thesis adviser. Face validation of the contents of the questionnaire was done by the adviser of the researcher and other persons with specialization in the field. They were vital members of the education team.

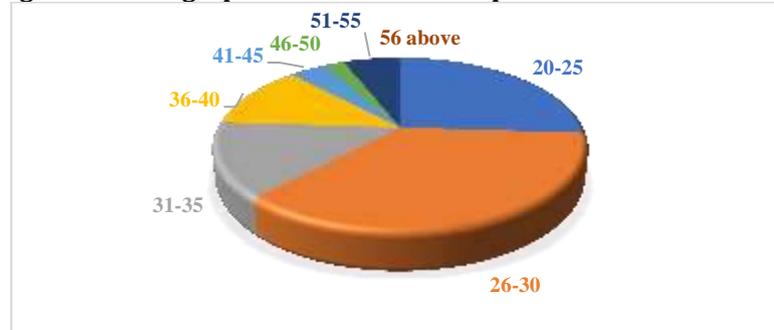
The following statistical tools were used in order to analyze and interpret the gathered data: Descriptive statistics were applied to properly derive information and frequency distributions of the gathered data. **Weighted mean** was used to find out the average responses of the respondents as measurement of the central tendency. **F-Test Formula** an F-test is any statistical test in which the test statistic has an F-distribution under the null hypothesis. It is most often used when comparing statistical models that have been fitted to a data set, in order to identify the model that best fits the population from which the data were sampled F Statistic variance of the group means / mean of the within group variances, was also utilized.

#### IV. RESULT AND DISCUSSION

This chapter deals with the presentation, analysis and interpretation of data gathered to answer the sub problem relative to the main problem of this study on coping with the challenges in teaching MAPEH and its effect on the performance of the non-specialized teachers. This chapter discusses the findings of the study based on the research questions

#### Demographic Profile of Teachers

**Figure 2. Demographic Profile of the Respondents in Terms of Age**



The data showed the age of fifty teachers, 13 of them ranged 20-25 years old (26%); 18, from 26-30 years old (36%); 7, from 31-35 years old (14%); 6, from 36-40 years old (12%); 2, from 41-45 years old (4%); 1, from 46-50 years old (2%); and 3, 51-55 years old (6%). This meant that teachers were generally young as evidenced in the profile in terms of age.

**Figure 3. Demographic Profile of the Respondents in Terms of Gender**

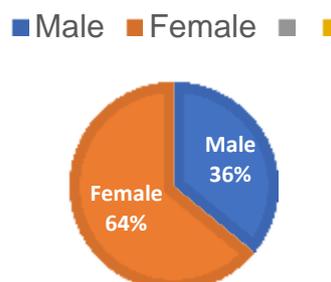




Figure 4 below includes the data of the respondents in terms or the years in service. Five (5 years) had twenty five teachers ( 50%); 6-10 years consisted of fourteen teachers (28%); 11-15 years had five teachers (10%); 16-20 years had two (4%); 21-25 years had one teacher (2%) and 26-30 years consisted of three teachers (6%), lastly, in 31 years to 35 and 36 years above, had zero number of teachers.

**Figure 4. Demographic Profile of the Respondents in Terms of Years in Service**

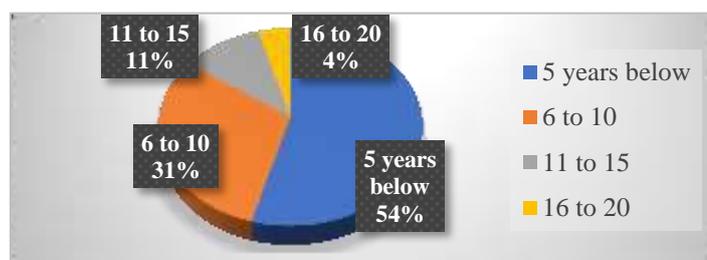


Figure 5 presents the demographic profile of the respondents in terms of educational attainment. Thirty five out of fifty respondents (70%) had a bachelor degree; five (10%) had Master of Education degree; no one had a doctorate degree and others ten (20%).

**Table 2. Demographic Profile of the Respondents in Terms of Specialization / Non-specialized**

Specialization	frequency	Percentage
<b>Non-Specialized</b>	<b>50</b>	<b>100%</b>

The table above presents the demographic profile of the teacher-respondents indicating their specialization. It was stated that the teacher respondents were fifty (50) in frequency, one hundred 100% non-specialized teacher-respondents.

**Table 3. Presents the Coping Mechanism of the Non- specialized Teachers in Terms of Time Management**

Indicator	Mean	SD	Verbal Interpretation
<b>1. Set goals and prepare lesson early.</b>	4.38	0.60	Very Frequently
<b>2. Organize and set priorities in teaching to achieve the daily objectives in my lesson exemplar.</b>	4.50	0.54	Very Frequently
<b>3. Make use of differentiated instruction in every component of MAPEH in teaching.</b>	4.26	0.60	Very Frequently
<b>4. Maximize the time allotted in teaching my lesson.</b>	4.32	0.62	Very Frequently
<b>5. Prepare lesson ahead of time.</b>	4.42	0.73	Very Frequently
Weighted Mean: SD	<b>4.38: 0.62</b>		
Verbal Interpretation	<b>Very frequently</b>		

Table 3 presents the level of coping mechanism in terms of time management. Teachers set goals and prepared lesson early, (M=4.38, SD= 0.60) with verbal interpretation of *Very Frequently*. The teachers organized and set priorities in teaching to achieve the daily objectives of the lesson (M=4.50, SD= 0.54) with verbal interpretation of *Very Frequently*. They prepared lesson ahead of time (M= 4.42, SD= 0.73). Teachers also made differentiated instruction in teaching every component of MAPEH (M=4.26, SD=0.60). The weighted mean (WM=4.38, SD=0,62) implied that non-specialized teachers of MAPEH applied strategies to cope with the challenges in teaching. They maximized time, set goal and priorities for the preparation of the lessons. The overall interpretation in all indicators was *Very Frequently*.



Table 4. Presents the Coping Mechanism of the Non- specialized Teachers in Terms of Academic Advice and Mentoring

Indicator	Mean	SD	Verbal Interpretation
1. Usually invite my Head Teacher to hear and observe in my class.	3.88	0.90	Often
2. Follow my mentor's advice for the improvement of my personal and professional growth in teaching MAPEH.	4.58	0.57	Always
3. Perform collaborative discussions with my co-teachers.	4.36	0.75	Always
4. Consult my colleagues / mentors about my plan for the subject which I do not understand much.	4.32	0.77	Always
5. Allow myself to do my mentors advice to develop my strategies in teaching MAPEH.	4.38	0.70	Always
Weighted Mean: SD	<b>4.30: 0.77</b>		
Verbal Interpretation	<b>Always</b>		

Table 4 presents the level of coping mechanism of the non-specialized teachers in MAPEH in terms of academic advice and mentoring. The indicator included the teachers usually invited the head teacher to hear and observe their classes (M=3.88, SD=0.90) interpreted as Often. The teachers followed their mentor's advice for the improvement of their personal and professional growth in teaching MAPEH (M=4.58, SD=0.57) with verbal interpretation of Always. The teachers performed collaborative discussions with their co-teachers, (M=4.36, SD=0.75) with verbal interpretation of Always. The teachers consult their colleagues/mentors about their plan for the subject which they did not understand much (M=4.32, SD=0.77) with verbal interpretation of Always. The teachers allowed themselves to do their mentors' advice to develop their strategies in teaching MAPEH (M=4.38, SD=0.70) with Always as the verbal interpretation. The Weighted Mean 4.30 and SD= 0.77 with an overall verbal interpretation of Always.

Table 5. Presents the Coping Mechanism in Terms of Appraisal Focused

Indicator	Mean	SD	Verbal Interpretation
1. Think carefully about the decision making to make.	4.42	0.61	Always
2. Consult my colleagues for proper solution to the problem I encountered in teaching MAPEH.	4.42	0.50	Always
3. Tend to not react immediately in time of my students' trouble or problem.	4.10	0.97	Often
4. Apply sense of humor in teaching.	4.28	0.78	Always
5. Let my student evaluate my teaching at the end of the class.	4.04	0.86	Often
Weighted Mean: SD	<b>4.25: 0.77</b>		
Verbal Interpretation	<b>Always</b>		

Table 5 presents the level of coping mechanism in terms of appraisal focused. The indicators included that the teachers thought carefully about the decision making to make (M=4.22, SD=0.61) with verbal interpretation as Always. The teachers consulted their colleagues for proper solution to the problem they encountered in teaching MAPEH (M=4.42, SD=0.50) with verbal interpretation of Always. Teachers tended not to react immediately in times of their students trouble or problem (M=4.10, SD=0.97).verbal interpretation of Often. The teachers applied sense of humor in teaching (M=4.28, SD=0.78) interpreted as Always. They let the students evaluate the teachers in their teaching at the end of the class (M=4.04, SD=0.86) with verbal



interpretation of often. The weighted mean resulted as 4.55 and SD of 0.77 with overall verbal interpretation of Always.

Table 6. Presents the Coping in Terms of Emotion-focused

Indicator	Mean	SD	Verbal Interpretation
<b>1. Practice the maximum tolerance in my profession.</b>	4.42	0.54	Always
<b>2. Find time to do some doings that makes me relax.</b>	4.36	0.69	Always
<b>3. Have time to spend with my family and friend for some small talk to ease stress.</b>	4.34	0.80	Always
<b>4. Eat a lot in time of hectic schedule.</b>	3.46	0.99	Often
<b>5. Refuse to talk about my problem because I believe I can find ways to solve it.</b>	3.92	1.01	Often
Weighted Mean: SD	<b>4.10: 0.90</b>		
Verbal Interpretation	<b>Often</b>		

Table 6 presents the level of coping mechanism of teachers in terms of emotion-focused coping. The five indicators and results were the following: The teachers practiced maximum tolerance in their profession (M=4.42, SD=0.54), verbal interpretation of Always. They find time to do some doing to make them relax (M=4.46, SD=0.69) always as its verbal interpretation. The teachers spent time with family and friends for some small talk to ease the stress (M=4.34, SD=0.80) also with Always as verbal interpretation. The teachers ate a lot in times of hectic schedules (M=3.46, SD=0.99) as Often. Lastly, the teachers refused to talk about their problems because they believed that they could find ways to solve them, (M=4.92, SD=1.01) with the verbal interpretation of Often.

Table 7. Presents the Coping in Terms of Occupation-focused

Indicator	Mean	SD	Verbal Interpretation
<b>1. Capable to work at my own.</b>	4.20	0.73	Often
<b>2. Confident to teach MAPEH. I can positively influence my students physically, mentally, emotionally and spiritually.</b>	4.10	0.74	Often
<b>3. Satisfied to the result of the outputs of my students.</b>	4.12	0.69	Often
<b>4. Able to execute the activities in teaching the four components in MAPEH.</b>	4.18	0.69	Often
<b>5. Sure that my strategies use is effective in teaching MAPEH.</b>	4.16	0.79	Often
Weighted Mean: SD	<b>4.15: 0.72</b>		
Verbal Interpretation	<b>Often</b>		

Table 7 consists of the results in the level of coping mechanism in terms of occupation-focused. It was stated that the teachers were capable to work at their own (M=4.20, SD=0.73). The teachers were confident to teach MAPEH, they could positively influence the students physically, mentally, emotionally and spiritually (M=4.10, SD=0.74). The teachers were satisfied to the results of the outputs of their students (M=4.12, SD=0.69). The teachers were able to execute the activities in teaching the four components in MAPEH (M=4.18, SD=0.69). The teachers were sure that their strategies used were effective in teaching MAPEH (M=4.16, SD=0.79). The weighted mean result was 4.15, with standard deviation of 0.72 and the overall interpretation results as Often.



Table 8. Performance of the Non-specialized Teachers in MAPEH as Classroom Managers

Indicator	Mean	SD	Verbal Interpretation
<b>As a Classroom Manager/ Adviser</b>			
1. <b>Have rules and regulations inside the classroom and I clearly explain the consequences and occasionally review the rules and regulations to make sure they clearly understand and keep them reminded.</b>	4.32	0.65	Always Performed
2. <b>Create routines most especially during outdoor activities in Physical Education Class such as entering the gym or in play area, getting and putting back all the equipment and in the beginning, during and after of the activities/games to avoid unnecessary accidents</b>	4.38	0.64	Always Performed
3. <b>Give verbal positive reinforcement to the class.</b>	4.44	0.67	Always Performed
4. <b>Do health background interview to students and parents and have an intact data of my students for future references.</b>	4.30	0.71	Always Performed
5. <b>Effectively organize and provide maximum specific activity time in every component of MAPEH within the class period.</b>	4.26	0.69	Always Performed
Weighted Mean: SD	<b>4.34: 0.67</b>		
Verbal Interpretation	<b>Always Performed</b>		

Table 8 shows the indicators about the performance of the non-specialized teachers in MAPEH as a classroom manager or as an adviser. As to their performance in the classroom teachers had their rules and regulations inside the classroom and they clearly explained the consequences and occasionally review the rules and regulations to make sure they clearly understand and keep them reminded (M=4.32, SD=0.65). The teachers created routines most especially during outdoor activities in Physical Education Class such as entering the gym or in play area, getting and putting back all the equipment and in the beginning, during and after of the activities/games to avoid unnecessary accidents (M=4.38, SD=0.64). Teachers were able to give verbal positive reinforcement to the class (M=4.44, SD=0.67). The teachers did health background interview to students and parents and have an intact data of my students for future references (M=4.30, SD=0.71). They effectively organized and provided maximum specific activity time in every component of MAPEH within the class period (M=4.26, SD=0.69) the weighted mean was 4.34 and the standard deviation was 0.67. All indicator were interpreted as Always. It was evident the non-specialized teachers of MAPEH were performing as a classroom managers or advisers.

Table 9. Performance of the Non-specialized Teachers in MAPEH in Terms of Coaching and Training

Indicator	Mean	SD	Verbal Interpretation
<b>As a Coach and Trainer</b>			
1. <b>Attend Seminars in the specific sports where I am assigned to coach/handle.</b>	3.98	1.10	Often Performed
2. <b>Capable to coach/ train my student/player.</b>	3.82	1.08	Often Performed
3. <b>Create training programs to follow by the players and set proximity control to my players to ceased undesirable behavior especially during training and competitions.</b>	3.76	1.13	Often Performed
4. <b>Teach skills and activities that students/player may adopt in real life situation and even outside competition.</b>	3.66	1.08	Often performed
5. <b>Motivate my students/player to be active and encourage them to win the competition.</b>	4.14	0.90	Often Performed
Weighted Mean: SD	<b>3.87: 1.07</b>		
Verbal Interpretation	<b>Often Performed</b>		



Table 9 indicates the data collected from the respondents with regards to the performance of the non-specialized teachers in MAPEH in terms of coaching and training. The teachers attended seminars in the specific sports where they were assigned to coach/to handle (M=3.98, SD=1.10). They were capable to coach/ to train the students/players (M=3.82, SD=1.08, the teacher create training programs to follow by the players and set proximity control to their players to cease undesirable behavior especially during training and competitions (M=3.76, SD=1.13). The teacher taught skills and activities that students/players may adopt in real life situation and even outside competition (M=3.66, SD=1.08). Lastly, the teachers motivated their students/players to be active and encourage them to win the competition, (M=4.14, SD=0.90). The weighted mean and standard deviation is (M=3.87, SD=0.90), the verbal interpretation was Often Performed.

Table 10. Performance of the Non-specialized Teachers in MAPEH in term of Handling Ancillary Task

Indicator	Mean	SD	Verbal Interpretation
<b>As part of my ancillary task</b>			
1. Committed to my duty even outside the school hours.	4.32	0.65	Always Performed
2. Plan my schedule to avoid conflicts.	4.36	0.60	Always Performed
3. Can submit reports on time or ahead of time.	4.34	0.63	Always Performed
4. Accept all assignments assigned to me such as; coordinator, project leader, or non-teaching related.	4.30	0.76	Always Performed
5. Perform very satisfactory in my performance rating.	4.40	0.70	Always Performed
Weighted Mean: SD		<b>4.34: 0.67</b>	
Verbal Interpretation		<b>Always Performed</b>	

Table 10 shows the result in the performance of the non-specialized teachers in MAPEH in terms of ancillary task. The indicators were as follows: As part of the teacher's handling ancillary task, they were committed to their duties even outside of the school hours (M=4.32, SD= 0.65); they planned their schedule to avoid conflicts ( M=4.36, SD=0.60); they submitted reports on time or ahead (M=4.34, SD: 0.63); they accepted all assignments assigned such as; coordinator, project leader, or non-teaching related(M= 4.30, SD=0.76). The teachers performed Very Satisfactorily in their performance rating (M= 4.40, SD= 0.70). The weighted mean was 4.34 and standard deviation was 0.67, with overall interpretation of *Always Performed*. It was evident that the teachers were dedicated to their duties and being flexible was also one of the best characteristics of teachers

### Effect of Coping Mechanism to the Performance of the Non-Specialized Teachers

Table 11. Effect of Coping Mechanism to the Performance of the Non-specialized Teachers

Coping Mechanism	Performance of the Non-specialized Teachers	F-value	p-value	Analysis
Time Management	Classroom Manager	2.318	0.030	Significant
	Coach and Trainers	2.322	0.030	Significant
	Ancillary Task	3.138	0.005	Significant
Academic Advice and Mentoring	Classroom Manager	2.779	0.015	Significant
	Coach and Trainers	1.883	0.089	Not Significant
	Ancillary Task	3.114	0.008	Significant
Appraisal Focused	Classroom Manager	10.908	0.000	Significant
	Coach and Trainers	6.584	0.000	Significant
	Ancillary Task	4.010	0.001	Significant
Emotion Focused	Classroom Manager	4.023	0.001	Significant
	Coach and Trainers	3.871	0.001	Significant
	Ancillary Task	3.963	0.001	Significant
Occupation-focused Coping	Classroom Manager	4.147	0.001	Significant
	Coach and Trainer	2.144	0.048	Significant
	Ancillary Task	5.865	0.000	Significant



Table 11 shows the result on the Effect of Coping Mechanisms; ; Time Management, Academic Advice and Mentoring, Appraisal Focused, Emotion-focused and Occupation focused to the Performance of the Non-specialized teachers. The time management as one of the coping mechanisms of the non- specialized teacher in MAPEH significantly effect on their performance as classroom manager ( $F= 2.318, p= 0,030$ ), coach and trainer ( $F=2.322, p= 0.30$ ) and handling ancillary task ( $F= 3.3138, p= 0.005$ ), the analysis were Significant. The academic advice and mentoring its effect on performance of non- specialized teachers in MAPEH as classroom managers ( $F= 2.779, p=0.015$ ), coach and trainer ( $F=1.883, p=0.089$ ), and handling ancillary task ( $3.114, p=0.008$ ) were Not Significant. In the appraisal focused on the performance of the non-specialized teachers in MAPEH as classroom managers ( $F=10.908, p=0.000$ ), coach and trainer ( $F=6.584, p=0.000$ ), handling ancillary task ( $F=4.010, p=0.001$ ), effects of emotion-focused coping on the performance of teachers as classroom managers ( $F= 4.023, p=0.001$ ), as coach and trainer ( $F=3.871, p=0.001$ ) and handling ancillary task ( $F=3.963, p=0.001$ ), occupation focused on the performance of teachers as classroom managers ( $F=4.147, p=0.001$ ), as coach and trainer ( $F= 2.144, p= 0.048$ ) and in handling ancillary task ( $F= 5.865, p= 0.000$ ) were Significant. Lastly, the p-value is lower than 0.05 level of significant, therefore the null hypothesis was rejected.

## V. CONCLUSION

Based on the data collected, the researcher concluded that the performance of the non-specialized had a significant effect on the teachers teaching MAPEH.

The non-specialized teachers studied MAPEH concepts and prepare themselves before facing the learners. They were able to cope with the challenges and performed their roles as classroom managers, trainers/coaches, and handlers of ancillary tasks. They gained knowledge in teaching MAPEH through specialized trainings and post-graduate study, especially the non-specialized teachers who perform this job.

## Recommendation

In the light of the findings and conclusion of the study, the following recommendations were drawn.

1. The non-specialized teachers may need to have an adequate knowledge and skills in teaching a subject by through trainings to further improve their strategies in teaching the four components of MAPEH.
2. The task may be assigned to a teacher who may have a clear consultation in terms of coaching and training the student athletes and attending to orientation regarding other ancillary tasks to visualize and come up with favorable outcome.
3. The coping mechanism may be enhanced by means of the activities that could develop camaraderie and stress reliever, teaching them to become positive in all aspects.
4. The school may have program for LAC session or learning action cell training to develop fashion in the teaching profession, such as Refresher Training Course for Coaches and Trainers, Honing Teaching Strategies in teaching the 4 components of MAPEH in the simplest yet effective way.
5. Future researches may discover better approaches that could have more coping mechanisms to help teachers struggling in teaching the 4 components of MAPEH and in coaching and training the student athletes.

## REFERENCES

1. Anbar A. and M. Eker, "Work Related Factors That Affect Burnout Among Accounting and Finance Academicians," *Journal of Industrial Relations and Human Resources*, vol. 10, no. 4, pp. 110–137, 2018.
2. Ansari, A., Purtell, K., & Gershoff, E. (2016). Classroom Age Composition and the School Readiness Of 3- And 4-Year-Olds in The Head Start Program. *Psychological Science*, 27, 53–63. doi:10.1177/0956797615610882
3. Bailliard, A. (2016). Justice, Difference, And The Capability To Function. *Journal of Occupational Science*, 23, 3–16. <https://doi.org/10.1080/14427591.2014.957886>.
4. Baillien, E., Neyens, I., De Witte, H., & De Cuyper, N. (2010). A Qualitative Study On The Development Of Workplace Bullying: Towards A Three Way Model. *Journal Of Community & Applied Social Psychology*, 19, 1–16.
5. Biesta, G. (2015) What Is Education For? On Good Education, Teacher Judgement, and Educational Professionalism, *European Journal Of Education*, 50(1), 75–87.
6. Biyani, A.A., Bagheri H., Bayani A. Influence of Gender, Age and Years of Teaching Experience on Burnout. *Annals of Biological Research*, 2013 4(4): 239- 243.
7. Charles, S. T., Luong, G., Almeida, D. M., Ryff, C., Sturm, M., & Love, G. (2010). Fewer Ups And Downs: Daily Stressors Mediate Age Differences in Negative Affect. *The Journals of Gerontology: Series B: Psychological Sciences And Social Sciences*, 65(3), 279–286. doi:10.1093/geronb/gbq002
8. Charles, S. T., Leger, K. A., & Urban, E. J. (2016). Emotional Experience and Health: What we know, And Where to go from here. in A. D. Ong, C. E. Lo'ckenhoff, A. D. Ong & C. E. Lo'ckenhoff (Eds.), *Emotion, aging, and health* (pp. 185–204).



9. Chen, Y., Peng, Y., Xu, H., & O'Brien, W. H. (2017). Age Differences in Stress and Coping: Problem Focused Strategies Mediate the Relationship Between Age and Positive Affect. *The International Journal of Aging and Human Development*, 86(4), 347–363. doi:10.1177/0091415017720890
10. Darling-Hammond, L. (2006). Constructing 21st century teacher education. *Journal of Teacher Education*, 57(3), 300-314. <https://doi.org/10.1177/0022487105285962>
11. Darling-Hammond, L., Furger, R., Shields, P. M., & Sutcher, L. (2016). Addressing California's Emerging teacher shortage: An analysis of sources and solutions. Palo Alto, CA: Learning Policy Institute Day, C. (2019). How teachers' Individual Autonomy May Hinder Students' Academic Progress and Attainment: Professionalism in practice. *British Educational Research Journal*. doi:10.1002/berj.3577
12. De Leon, J., & Balila, E. (2014). Filipino adolescents' coping strategies: A Confirmatory factor analysis. *Adventist University of the Philippines Research Journal*, 18(2), 73–81. Retrieved from <http://www.aup.edu.ph/alumni/wp-content/uploads/R7.pdf>
13. Delahaij, R., & Van Dam, K. (2016). Coping style development: The role of Learning Goal Orientation And Metacognitive Awareness. *Personality and Individual Differences*, 57, 57–62.
14. Delahaij, R., & Van Dam, K. (2017). Coping with acute stress in the military: The influence of coping Style, coping self-efficacy and appraisal emotions. *Personality and Individual Differences*, 119, 13–18. doi:10.1016/j.paid.2017.06.021
15. F. Subon and M. M. Sigie, "Burnout among primary and secondary school teachers in Samarahan District," *IOSR Journal of Humanities and Social Science*, vol. 21, no. 8, pp. 28–41, 2016.
16. Flores, M. A. (2019). "Unpacking Teacher Quality: Key Issues for Early Career Teachers." In *Attracting And Keeping the Best Teachers*, edited by A. Sullivan, J. Johnson, and M. Simmons, 15–38. Singapore: Springer
17. Flores, Maria Assunção (2020): Learning to teach: knowledge, competences and support in initial teacherEducation and in the early years of teaching, *European Journal of Teacher Education*, DOI: 10.1080/02619768.2020.1733828
18. Fowler, J. L. (2017). Academics at work: mentoring in research, teaching, and Service. *International Journal for Academic Development*, 22(4), 319–330. doi:10.1080/1360144x.2017.1310105
19. Goldrick, L. (2016). Support from the Start: A 50-State Review of Policies on New Educator Induction And Mentoring. Retrieved April 7, 2016, from <http://newteachercenter.org/wpcontent/uploads/2016CompleteReportStatePolicies.pdf>
20. Guo, Y., Tompkins, V., Justice, L., & Petscher, Y. (2014). Classroom age Composition and vocabulary Development among at-risk preschoolers. *Early Education and Development*, 25, 1016–1034. doi:10.1080/10409289.2014.893759
21. Gustems–Carnicer, J., & Calderón, C. (2013). Coping strategies and Psychological wellbeing among Teacher education students. *European Journal of Psychology of Education*, 28(4), 1127–1140. doi:10.1007/s10212-012-0158-x [Crossref], .
22. Hegelund, E. R., GrønkJær, M., Osler, M., Dammeyer, J., Flensburg-Madsen, T., & Mortensen, E.L. (2020). The influence of educational attainment on intelligence. *Intelligence*, 78, 101419. doi:10.1016/j.intell.2019.101419
23. Hodgen, J. Francis, B., Craig, Taylor, N., B., Archer, L., Mazonod, A. Connolly, P. (2019). Teacher "Quality" and attainment grouping: The role of within-school teacher deployment in social and educational inequality. *Teaching and Teacher Education*, 77, 183–192. doi:10.1016/j.tate.2018.10.001
24. Jamaludin, I. I., & You, H. W. (2019). Burnout in relation to Gender, Teaching Experience, and Educational Level among Educators. *Education Research International*, 2019, 1–5. doi:10.1155/2019/7349135
25. Khan, Kifayat, Tahir Tehsin, Ishfaq Umbreen, Khan Asad: *Journal of Business and Tourism* December, 2017: A Study to Examine Teachers' Classroom Time Management Strategies at Secondary School Level, Volume 3 ISSN 2520 – 0739 <https://www.awkum.edu.pk/jbt/downloads/Volume-03-Number-02-July-Dec-2017/71-83.pdf>
26. Killion, Joellen; Bryan, Chris; Clifton, Heather (2020). *Coaching Matters*, 2nd Edition Learning Forward. 504 South Locust Street, Oxford, OH 45056. Tel: 513-523-6029; Fax: 513-523-0638; e-mail: [office@learningforward.org](mailto:office@learningforward.org); Web site: <http://www.learningforward.org>
27. Kraft, M. A., Blazar, D., & Hogan, D. (2018). The Effect of Teacher Coaching on Instruction and Achievement: A Meta-Analysis of the Causal Evidence. *Review of Educational Research*, 88(4), 547–588. doi:10.3102/0034654318759268
28. Le Maistre, C., & Pare, A. (2008). Whatever it takes: How beginning teachers learn to survive. *Teaching and Teacher Education*, 559-564. Retrieved from <http://www.sciencedirect.com>
29. Manship, K., Farber, J., Smith, C., & Drummond, K. (2016). Case studies of Schools implementing Early elementary strategies: Preschool through third grade alignment and differentiated instruction. Washington, DC: Office of Planning, Evaluation and Policy Development, US Department of Education.
30. Mohammed Mahmoud Baba (2015), Teachers as Classroom Managers: Counselling Psychological Perspective. *J. of Education and Policy Review*, Vol. 7, No. 2, Pp. 47 – 54.
31. Okoro, E. (2018). Assessment of stress related issues & coping mechanisms Among college Students (Unpublished Masters Thesis). Minnesota State University, Mankato, Minnesota
32. Pereira, R. B. (2017). Towards inclusive occupational therapy: Introducing the CORE approach for
33. Inclusive and occupation-focused practice. *Australian Occupational Therapy Journal*, 64(6), 429–435. doi:10.1111/1440-1630.12394



34. Ramunė Čiarnienė (2014): *The Conceptual Model of Time Management*, Kaunas University of Technology Conference Proceedings MCSER Publishing-Rome, Italy Volume 1  
<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.666.8794&rep=rep1&type=pdf#page=42>
35. Reissland, J., & Manzey, D. (2016). *Serial or overlapping processing in Multitasking as individual Preference: Effects of stimulus preview on task switching and concurrent dual-task performance*. *Acta Psychologica*, 168, 27–40.
36. Rilveria, John Robert C. (2018). *University of the Philippines–Diliman The Development of the Filipino Coping Strategies Scale: Asia-Pacific Social Science Review* 18(1) 2018, pp. 111–126
37. Robotham, D. (2008). *Stress among higher education students: Towards a Research agenda*. *Higher Education*, 56(6), 735–746. doi:10.1007/s10734-008-9137-1 [Crossref],
38. Sreeramareddy, C. T., Shankar, P. R., Binu, V. S., Mukhopadhyay, C., Ray, B., & Menezes, R.G. (2007). *Psychological morbidity, sources of stress and coping strategies among undergraduate medical students of Nepal*. *BMC Medical Education*, 7. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/17678553>
39. Thi Thu Trang Tran & Truong Xuan Do (2020): *Student evaluation of teaching: Do teacher age, Seniority, Gender, and qualification matter? Educational Studies*, DOI: 10.1080/03055698.2020.1771545
40. Van den Brande, W., Baillien, E., De Witte, H., Vander Elst, T., & Godderis, L. (2016). *The role of Work Stressors, coping strategies and coping resources in the process of workplace bullying: A systematic review and development of a comprehensive model*. *Aggression and Violent Behavior*, 29, 61–71.
41. Van den Brande, W., Baillien, E., Elst, T. V., De Witte, H., & Godderis, L. (2019). *Coping styles and Coping resources in the work stressors–workplace bullying relationship: A two-wave study*. *Work & Stress*, 1–19. doi:10.1080/02678373.2019.1666433
42. Webster, J. R., Beehr, T. A., & Love, K. (2011). *Extending the challenge Hindrance model of Occupational stress: The role of appraisal*. *Journal of Vocational Behavior*, 79, 505–516.
43. Zhang, Y., Zhang, Y., Ng, T. W. H., & Lam, S. S. K. (2019). *Promotion- and Prevention focused coping: A meta-analytic examination of regulatory strategies in the work stress process*. *Journal of Applied Psychology*, 104(10), 1296–1323. <https://doi.org/10.1037/apl0000404>
44. Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer. [GoogleScholar]



# **CORRELATION OF SOCIAL DEPRIVATION ON THE MENTAL HEALTH AMONG THE CLUSTER 7 TEACHERS IN CALAMBA CITY, LAGUNA, SCHOOL YEAR 2020-2021**

**Mart Albert A. De Guzman**

*MAED Students, Laguna State Polytechnic University*

Article DOI: <https://doi.org/10.36713/epra7290>

DOI No: 10.36713/epra7290

## **ABSTRACT**

*This study aimed to analyze the relationship of social deprivation on the mental health among the Cluster 7 teachers in Calamba City, Laguna. Specifically, this study sought to answer the following questions: (1) Level of social deprivation on the mental health among the Cluster 7 teachers in Calamba City Laguna in terms of Social Isolation and Interpersonal Communication. (2) Level of mental health of Cluster 7 teachers in Calamba City, Laguna in terms of State of mind, Behavior, Thinking, and Self-Esteem. (3) Is there a significant relationship between social deprivation and the mental health among the Cluster 7 Teachers in Calamba City, Laguna?*

*The descriptive method of research design was used in this study to arrive at more conclusive proof and primarily to analyze the data systematically. The online questionnaire checklist which is composed of thirty (30) questions, where five (5) question for social interaction, five (5) question for personal communication, five (5) question for state of mind, five (5) for behavior, five (5) Thinking, five (5) self-esteem. The data collected was treated with the used of weighted mean level and standard deviation as basis for the statistical treatment of data to analyze the relationship of social deprivation on the mental health among the Cluster 7 teachers in Calamba City, Laguna. The weighted mean and standard deviation were computed by the average of the response in the self-made online survey. The Pearson-R for the correlated mean was used in order to find out the strength of the relationship between two variables and their association with each other are jointly significant especially on the correlation on social deprivation on the mental health among the Cluster 7 teachers in Calamba City, Laguna.*

*Based on the data, it is shown that there is “a relationship between the social deprivation to the mental health among the Cluster 7 teachers in Calamba City” at 0.05 level of significance. It shows that the null hypothesis stating that “There is no significant relationship between the social deprivation to the mental health among the Cluster 7 teachers in Calamba City” is rejected, it can infer that there is “significant” relationship between them.*

*Based on the findings and conclusions the following recommendations were made; The Public Schools may be encouraged to better promote Mental Health awareness to all the school personnel; The Teachers may be encouraged more to be open minded and be aware in taking care their mental being; The DepEd may provide training and seminars for the school guidance counselor in adapting societal change and promote Mental Health awareness; The future researcher may have further study on the relationship and effect of social deprivation on the mental health of a person and to have a better understanding on how social deprivation be diminish in the society; The researcher suggested to have further study about the social deprivation or about on the same field and promote the care for our mental well-being.*



## INTRODUCTION

Health is a concept influenced by a set of complex factors such as biological, psychological, social, cultural, economic and spiritual, it should be acknowledged that health and mental illness do not simply have biological or psychological aspects, but also have concurrent social dimensions and nature. Social factors, which can play an important role in creating, maintaining, and promoting health, have been a major role in incidence, prevalence and persistence of the disease. On the other hand, it is very important to pay attention to social factors influencing mental health, and perceived social support is one of those factors. Social support represents the amount of support that a person perceives and reports receive it. Social sustenance is a phenomenon that involves interactions of people so that when a person offers social interaction, it has an important role in his health. Social support provides physical and psychological advantages for people faced with stressful physical and psychosocial events, and is considered as a factor reducing the psychological distress when faced with stressful events.

COVID-19 outbreak in the Philippines resulted operation freeze in some agency of the government as well as schools and educational institutions. Many industries even government agencies that provide public services were also affected by this pandemic especially the Department of Education. Due to the threat of the pandemic, people are being deprive to have a social and personal interaction to people whom they regularly interacted with that contributes to who they are as a person. Thus, being socially and personally confined inside their homes, this is affecting their overall mental and emotional health. Due to quarantine and lockdown of the various places, people were prevented to go out and ordered to stay inside their homes and they were unable to socialized and interact to their family, friends, and co-workers that causes psychological disturbance such as mental stress, anxiety, and depression. According to Hawlky cited by Amy Novotney (2019) points to evidence linking perceived social isolation with adverse health consequences including depression, poor sleep quality, impaired executive function, accelerated cognitive decline, poor cardiovascular function and impaired immunity at every stage of life. According to (Holt-Lunstad, Smith, & Layton, 2017) A robust body of scientific evidence has indicated that being embedded in high-quality close relationships and feeling socially connected to the people in one's life is associated with decreased risk for all-cause mortality as well as a range of disease morbidities. According to David White (2016) disconnection from the larger society is known as social deprivation, and it can have serious consequences for those who experience it. Social deprivation is a broad and somewhat poorly defined umbrella term that refers to the combination of factors that prevent a person from having easy and frequent access to the many different aspects of their culture and society. Thus, social deprivation and isolation affects persons' over-all health especially this time of the global pandemic. Hence, this research intends to analyze the relationship of social deprivation on the mental health of Cluster 7 teachers in Calamba City, Laguna. The Cluster 7 teachers will be the respondents of this study. Thus, the researcher aims to help the school in Cluster 7 in Calamba City, Laguna to analyze the effect of social deprivation on the mental health of Cluster 7 teachers in Calamba City, Laguna.

## MATERIALS AND METHODS

Descriptive research design was used in this study because this was intended to prove or test an idea to analyze the relationship of social deprivation on the mental health of Cluster 7 teachers in Calamba City, Laguna.

The first step was the identifying the problem. After the problem, was identified the researcher collected the information about the variables of the problem. The researcher prepared a self-made online survey that run for reliability test and used thirty public school teachers from different school in Calamba City, Laguna. After the reliability test was done the questionnaire undergone validation of three licensed Psychometrician. Then the researcher made a letter of permission that was signed by the principal of the different schools in Cluster 7, Calamba City, Laguna. After that, the researcher gathered the necessary data that will be tabulated and computed.

The researcher used 30% of the teacher's population per school in Cluster 7 in Calamba City, Laguna as the respondent of the self-made research survey, which consist of 6 Elementary School and 1 High School with the total of 91 teachers.

As a researcher's instrument, a self-made online survey questionnaire was used to gather the necessary data to analyze the relationship of social deprivation on the mental health among the Cluster 7 teachers in Calamba City, Laguna and this were rated with the used of Likert Scale.

The data collected was treated with the used of weighted mean level and standard deviation as basis for the statistical treatment of data to analyze the relationship of social deprivation on the mental health among the Cluster 7 teachers in Calamba City, Laguna.



The weighted mean and standard deviation were computed by the average of the response in the self-made online survey.

The Pearson-R for the correlated mean was used in order to find out the strength of the relationship between two variables and their association with each other are jointly significant especially on the correlation on social deprivation on the mental health among the Cluster 7 teachers in Calamba City, Laguna.

## RESULT AND DISCUSSION

### Level of social deprivation on the mental health among the Cluster 7 teachers in Calamba City Laguna in terms of Social Isolation.

Based on the teachers' perceptions, the level of social deprivation on the mental health with regard to social Isolation was generally high. Feeling connected with the person you love ( $M=4.16$ ,  $SD=1.128$ ) and have this feeling of social connection with their friends ( $M=3.73$ ,  $SD=1.126$ ). The teachers are able to do the things you want to do ( $M=3.38$ ,  $SD=1.200$ ); this item got the lowest rating. All item indicators got a verbal interpretation of moderately of high to high, as disclosed by the overall mean of 3.72 and supported with standard deviation of 1.147.

This meant that the teachers were able to manage the mental health at a high extent. This is done by doing things with the person you want to work on and to be connected with your friends.

**Table 1. Level of social deprivation on the mental health among the Cluster 7 teachers in Calamba City Laguna in terms of Social Isolation**

During this time of home quarantine	Mean	SD	Remarks
Feeling of socially connected.	3.70	1.130	Agree
I have this feeling of social connection with my friends.	3.73	1.126	Agree
Feeling connected with the person you love.	4.16	1.128	Agree
Being able to do the things you want to do.	3.38	1.200	Moderately Agree
There's a sense of delight and warmed of other people company.	3.64	1.028	Agree
<b>Overall Mean = 3.72</b>			
<b>Standard Deviation = 1.147</b>			
<b>Verbal Interpretation = High</b>			

Legend:

Scale	Range	Remarks	Verbal Interpretation
5	4.20-5.00	Strongly Agree	Very High
4	3.40-4.19	Agree	High
3	2.60-3.39	Moderately Agree	Moderately High
2	1.80-2.59	Disagree	Low
1	1.00-1.79	Strongly Disagree	Very Low

### Level of social deprivation on the mental health among the Cluster 7 teachers in Calamba City Laguna in terms of Interpersonal Communication.

**Table 2. Level of social deprivation on the mental health among the Cluster 7 teachers in Calamba City Laguna in terms of Interpersonal Communication**

The teachers observed that the social deprivation showed a high level of mental health with regard to Interpersonal Communication in terms telling easily your feelings to your immediate family ( $M=3.76$ ,  $SD=1.119$ ). And at a high level, the teacher is emotionally connected with their relatives ( $M=3.74$ ,  $SD=1.031$ ). The teachers are able to talk to other people cautiously ( $M=3.60$ ,  $SD=1.104$ ); this item got the lowest rating.

The level of social deprivation with regard to Interpersonal Communication was generally high, as evidenced by the overall mean of 3.68 and supported with standard deviation of 1.048. This means that the teachers guided all participants in moving in the direction of excellence based on homegrown and global standards. To keep



abreast with the changing times, the schools subject their coordinators to have a social activity with all the stakeholders.

During this time of home quarantine	Mean	SD	Remarks
Being able to talk to other people cautiously.	3.60	1.074	Agree
Being able to get in touch with your friends and neighbors.	3.64	1.049	Agree
Telling easily your feelings to your immediate family.	3.76	1.119	Agree
Preferring to have sincere conversation to co-teachers.	3.68	0.976	Agree
Being emotionally connected with your relatives.	3.74	1.031	Agree
<b>Overall Mean = 3.68</b>			
<b>Standard Deviation = 1.048</b>			
<b>Verbal Interpretation = High</b>			

Legend:

Scale	Range	Remarks	Verbal Interpretation
5	4.20-5.00	Always Observed	Very High
4	3.40-4.19	Often Observed	High
3	2.60-3.39	Sometimes Observed	Moderately High
2	1.80-2.59	Seldom Observed	Low
1	1.00-1.79	Never Observed	Very Low

### Mean Level of mental health of Cluster 7 teachers in Calamba City, Laguna in terms of State of mind.

The teachers showed a high level of mental health with regard to state of mind. They did this by analyzing the pros and cons of every actions you have made (M=3.99, SD=1.159) and by rationally understanding others people reasoning (M=3.87, SD=1.166). Although verbally interpreted as high, the item with the lowest rating pertains to calmly assess the sudden change of events (M=3.76, SD=0.874).

The level of mental health with regard to state of mind was generally high, as evidenced by the overall mean of 3.85 and supported with standard deviation of 1.015. This meant that state of mind is a mental health where decisions are set, resources wisely utilized, and the action was properly guided toward the consciousness of structural goals. The teachers must clearly comprehend others cognitive and be quick to response to changing environments.

**Table 3. Level of mental health of Cluster 7 teachers in Calamba City, Laguna in terms of State of mind**

During this time of home quarantine	Mean	SD	Remarks
Able to calmly assess the sudden change of events.	3.76	0.874	Agree
Able to reflect on the action and decision that you had made.	3.86	0.921	Agree
Capable of giving good and just reason.	3.78	0.940	Agree
Rationally understand others people reasoning.	3.87	1.166	Agree
Analyze the pros and cons of every actions you have made.	3.99	1.159	Agree
<b>Overall Mean = 3.85</b>			
<b>Standard Deviation = 1.015</b>			
<b>Verbal Interpretation = High</b>			

Legend:

Scale	Range	Remarks	Verbal Interpretation
5	4.20-5.00	Always Observed	Very High
4	3.40-4.19	Often Observed	High
3	2.60-3.39	Sometimes Observed	Moderately High
2	1.80-2.59	Seldom Observed	Low
1	1.00-1.79	Never Observed	Very Low

**Mean Level of mental health of Cluster 7 teachers in Calamba City, Laguna in terms of Behavior.****Table 4. Level of mental health of Cluster 7 teachers in Calamba City, Laguna in terms of Behavior**

During this time of home quarantine	Mean	SD	Remarks
Maintaining good appetite.	3.89	1.052	Agree
Sleeping safe and sound during night hours.	3.73	1.086	Agree
Still motivated to do assigned tasked.	3.88	1.009	Agree
Having mood-swing.	3.41	1.064	Agree
Having perseverance and being driven even things went wrong.	3.77	0.932	Agree
<b>Overall Mean = 3.73</b>			
<b>Standard Deviation = 1.040</b>			
<b>Verbal Interpretation = High</b>			

Legend:

Scale	Range	Remarks	Verbal Interpretation
5	4.20-5.00	Always Observed	Very High
4	3.40-4.19	Often Observed	High
3	2.60-3.39	Sometimes Observed	Moderately High
2	1.80-2.59	Seldom Observed	Low
1	1.00-1.79	Never Observed	Very Low

The teachers highly maintaining good appetite ( $M=3.89$ ,  $SD=1.052$ ) and still motivated to do assigned tasked ( $M=3.88$ ,  $SD=1.009$ ). Through sleeping safe and sound during night hours ( $M=3.73$ ,  $SD=1.086$ ), the teachers became highly aware of the behavior being used. The item indicator with the lowest rating covered having mood-swing ( $M=3.41$ ,  $SD=1.064$ ).

Generally, the behavior was highly observed at the teachers as indicated by the overall mean of 3.73 and supported with standard deviation of 1.040. This meant that the teacher was highly aware about their mental health and the benefits connected with the good behavior, and provided other behavioral openings for them.

**Mean Level of mental health of Cluster 7 teachers in Calamba City, Laguna in terms of Thinking.****Table 5. Level of mental health of Cluster 7 teachers in Calamba City, Laguna in terms of Thinking**

During this time of home quarantine	Mean	SD	Remarks
Still cautious of the things happening around.	4.05	1.015	Agree
Can still focus on doing daily activities.	3.88	0.998	Agree
Giving right decision needed in everyday life.	3.91	0.962	Agree
Reflecting on the effects of situation.	4.00	0.943	Agree
Maintaining presence of mind in doing the assigned tasked	4.02	0.966	Agree
<b>Overall Mean = 3.97</b>			
<b>Standard Deviation = 0.975</b>			
<b>Verbal Interpretation = High</b>			

Legend:

Scale	Range	Remarks	Verbal Interpretation
5	4.20-5.00	Always Observed	Very High
4	3.40-4.19	Often Observed	High
3	2.60-3.39	Sometimes Observed	Moderately High
2	1.80-2.59	Seldom Observed	Low
1	1.00-1.79	Never Observed	Very Low

The mental health of developing teachers' thinking was done at a high extent in the schools. The teacher is highly cautious of the things happening around ( $M=4.05$ ,  $SD=1.015$ ) and maintaining presence of mind in doing the



assigned tasked (M=4.02, SD=0.966). However, the teachers can still focus on doing daily activities (M=3.88, SD=0.988). This item indicator got the lowest rating but still garnered a verbal interpretation of high.

The teachers were exposed to the thing happenings in the workplace. Generally, the teacher was highly empowered in maintaining presence of mind as evidenced by the overall mean of 3.97 and supported with standard deviation of 0.975. The teachers knew that the group brought out the best in them, and when learning occurs without meddling with individual thinking.

**Mean Level of mental health of Cluster 7 teachers in Calamba City, Laguna in terms of Self-Esteem**

**Table 6. Level of mental health of Cluster 7 teachers in Calamba City, Laguna in terms of Self-Esteem**

During this time of home quarantine	Mean	SD	Remarks
Feeling accomplished in spite of any circumstances.	3.85	0.965	Agree
Feeling worth of oneself.	3.84	1.057	Agree
Feeling a sense of belongingness.	3.89	1.027	Agree
Staying good and confident about oneself.	3.93	1.020	Agree
Realizing the meaningful purpose of life.	4.09	0.996	Agree
<b>Overall Mean = 3.92</b>			
<b>Standard Deviation = 1.013</b>			
<b>Verbal Interpretation = High</b>			

Legend:

Scale	Range	Remarks	Verbal Interpretation
5	4.20-5.00	Always Observed	Very High
4	3.40-4.19	Often Observed	High
3	2.60-3.39	Sometimes Observed	Moderately High
2	1.80-2.59	Seldom Observed	Low
1	1.00-1.79	Never Observed	Very Low

The teacher was highly empowered by realizing the meaningful purpose of life (M=3.92, SD=1.013) and by staying good and confident about oneself (M=3.93, SD=1.020). However, the teachers feeling worth of oneself (M=3.84, SD=1.057), as this item indicator got the lowest rating. The teachers were highly successful in promoting mental health in terms of self-esteem, as shown by the overall mean of 3.92 and supported with standard deviation of 1.013. The teachers were exposed in their field of work and know how to become productive that they can readily apply in the workroom. The teachers were highly successful in promoting mental health in terms of self-esteem, as shown by the overall mean of 3.92 and supported with standard deviation of 1.013. The teachers were exposed in their field of work and know how to become productive that they can readily apply in the workroom.

**Analysis on the relationship of social deprivation to the mental health among the Cluster 7 teachers on social interaction.**

**Table 7. Analysis on the relationship of social deprivation to the mental health among the Cluster 7 teachers on social interaction**

Mental Health	beta	r-value	p-value	Interpretation	Analysis
<i>State of Mind</i>	0.581	0.768	0.0270	high correlation	<i>Significant</i>
<i>Behavior</i>	0.644	0.724	0.4518	Not significant	
<i>Thinking</i>	0.672	0.723	0.0005	high correlation	<i>Significant</i>
<i>Self-Esteem</i>	0.720	0.736	0.0044	high correlation	<i>Significant</i>

**Legend**

<b>Scale</b>	<b>Interpretation</b>
±0.00	no correlation, no relationship
±0.01 – ±0.20	very low correlation, almost negligible relationship
±0.21 – ±0.40	slight correlation, definite but small relationship
±0.41 – ±0.70	moderate correlation, substantial relationship
±0.71 – ±0.90	high correlation, marked relationship
±0.91 – ±0.99	very high correlation, very dependable relationship
±1.00	perfect correlation, perfect relationship

Table 7 shows the analysis on the relationship of social deprivation to the mental health among the Cluster 7 teachers on social interaction.

The social deprivation that has a relationship to the teacher's social interaction include state of mind ( $\beta=0.581$ ), thinking ( $\beta=0.672$ ), and self-esteem ( $\beta=0.720$ ). The beta coefficients indicate that for every standard unit increase in the teacher's social deprivation to the mental health there is a corresponding unit increase in social interaction.

The r-values for social interaction with state of mind ( $r=0.768$ ,  $p=0.0270$ ), thinking ( $r=0.723$ ,  $p=0.0005$ ), and self-esteem ( $r=0.736$ ,  $p=0.0044$ ) are significant at probability level. This means that the mental health has a high correlation or marked relationship to the social interaction in terms of state of mind, thinking, and self-esteem of the teachers.

**Analysis on the relationship of social deprivation to the mental health among the Cluster 7 teachers on interpersonal communication.**

**Table 8. Analysis on the relationship of social deprivation to the mental health among the Cluster 7 teachers on interpersonal communication**

Mental Health	beta	r-value	p-value	Interpretation	Analysis
<i>State of Mind</i>	0.588	0.735	0.0063	high correlation	<i>Significant</i>
<i>Behavior</i>	0.697	0.740	0.2383	Not significant	
<i>Thinking</i>	0.719	0.732	0.0000	high correlation	<i>Significant</i>
<i>Self-Esteem</i>	0.733	0.709	0.0011	high correlation	<i>Significant</i>

**Legend**

<b>Scale</b>	<b>Interpretation</b>
±0.00	no correlation, no relationship
±0.01 – ±0.20	very low correlation, almost negligible relationship
±0.21 – ±0.40	slight correlation, definite but small relationship
±0.41 – ±0.70	moderate correlation, substantial relationship
±0.71 – ±0.90	high correlation, marked relationship

Table 8 shows the analysis on the relationship of social deprivation to the mental health among the Cluster 7 teachers on interpersonal communication.

The social deprivation that had a relationship to the teacher's interpersonal communication included state of mind ( $\beta=0.588$ ), thinking ( $\beta=0.719$ ), and self-esteem ( $\beta=0.733$ ). The beta coefficients indicated that for every standard unit increase in the teacher's social deprivation to the mental health there was a corresponding unit increase in interpersonal communication.

±0.91 – ±0.99	very high correlation, very dependable relationship
±1.00	perfect correlation, perfect relationship



The r-values for social interaction with state of mind ( $r=0.735$ ,  $p=0.0063$ ), thinking ( $F=0.732$ ,  $p=0.0000$ ), and self-esteem ( $F=0.709$ ,  $p=0.0011$ ) are significant at probability level. This meant that the mental health had a high correlation or marked relationship to the interpersonal communication in terms of state of mind, thinking, and self-esteem of the teachers.

Based on the data, it is shown that there is “a relationship between the social deprivation to the mental health among the Cluster 7 teachers in Calamba City” at 0.05 level of significance. It shows that the null hypothesis stating that “There is no significant relationship between the social deprivation to the mental health among the Cluster 7 teachers in Calamba City” is rejected, it can infer that there is “significant” relationship between them.

## CONCLUSION

The r-values for social interaction are significant at probability level. This means that the mental health has a high correlation or marked relationship to the social interaction in terms of state of mind, thinking, and self-esteem of the teachers. Based on the data, it is shown that there is “a relationship between the social deprivation to the mental health among the Cluster 7 teachers in Calamba City” at 0.05 level of significance. It shows that the null hypothesis stating that “There is no significant relationship between the social deprivation to the mental health among the Cluster 7 teachers in Calamba City” is rejected, it can infer that there is “significant” relationship between them.

## ACKNOWLEDGEMENTS

The researcher would like to extend his deepest gratitude with immeasurable joy to those who guided and supported him during the accomplishment of this research study.

First and foremost, to the greatest **Almighty God**, for giving him knowledge, strength, self-confidence and for the spiritual guidance that made this study possible.

**Dr. Mario R Briones**, President of Laguna State Polytechnic University, for his excellent leadership that made the university globally competitive.

**A/P. Josephine H. Consebido, LPT, Rpm**, his thesis adviser, for the valuable insights, providing brilliant ideas and for the enormous guidance that made the researcher realize that he must make this study better.

**Dr. Albina S. Bunyi**, his subject specialist, for her broad knowledge and patience in giving constructive criticism to improve the study and providing in-dept insight in the construction of the self-made questionnaires.

**Dr. Julie Rose P. Mendoza**, his technical editor, for encouragement and ultimate enthusiasm in checking the study and providing support during the title defense till the completion of the research study.

**Dr. Harold Origenes**, his internal statistician, for all the support and guidance on his statistical treatment to come up a well understood research study.

**Dr. Bengamin O. Arjona**, his external statistician, for all the statistical treatments applied in the analysis of the gathered data.

**A/P. Violeta Rana**, his language critic, for the grammatical corrections that made the research better.

**Ms. Abegail Viar, RGc**, his external subject specialist, for her support and insightful recommendation and comments during the final defense of the research study.

**Mr. Ralph Randel R. Rivera, Rpm, and Mr. Wilfredo Fautisno, Rpm**, his questionnaire validator, for their comprehensive knowledge in helping a better construction of the self-made questionnaire and in making sure that the questionnaires are in lined on the purpose of the study.

**Mrs. Edilberta A. De Guzman**, his mother for giving him so much love and moral support.

His siblings, **Mark Alfred A. De Guzman, Emelda DG. Olvida and Cecilia DG. Hernandez** for supporting him financially and giving him strength and inspirations to finish the research study.

**Mrs. Sandra B. Estimada** his school head, for extending her hands in initiating in communicating the seven school heads of the target schools for the dissemination of the approval letters and dissemination of online questionnaires.

The **School Division Superintendent, Susan DI. Oribiana**, and the **Seven School Heads** for their approval and indorsement in administering the online survey questionnaires to all randomly pic ninety-one teachers in Cluster 7, also for those official **Ninety-one teachers** as the respondents of the online survey questionnaires for their valuable cooperation of this study.



Finally, all those people who prayed, inspired, and give piece of advice, and supported the researcher in coming up with the study.

## REFERENCES

1. Adam Felman,(2020). Medically reviewed by Timothy J. Legg, Ph.D., CRNP. What is mental health? <https://www.medicalnewstoday.com/articles/154543#risk-factors>
2. Faherty, Anna(2016) *States of Mind: Experiences at the Edge of Consciousness*. Kindle Edition, 256 pages Published February 4th 2016 by Profile Books. <https://www.goodreads.com/book/show/28182895-states-of-mind>
3. Hess E. (2016) *Psychological States*. In: *Acting and Being*. Palgrave Macmillan, London. [https://doi.org/10.1057/978-1-349-95106-2\\_4](https://doi.org/10.1057/978-1-349-95106-2_4)
4. Kendra, Cherry,(2021). Medically reviewed by Carly Snyder, MD.The Psychology of Flow. <https://www.verywellmind.com/what-is-flow-2794768>
5. N., Pam M.S., "SELF-ESTEEM," in *PsychologyDictionary.org*, April 13, 2013, <https://psychologydictionary.org/self-esteem/> (accessed May 17, 2021).
6. Naumovski, Vladimir & Dana, Léo-Paul & Pesakovic, Gordana & Fidanoski, Filip. (2017). Why interpersonal communication is important in public administration?. *Współczesne Problemy Ekonomiczne*. 14. 55-77. 10.18276/wpe.2017.14-04.
7. Ormrod, J. E. (2017). *Educational Psychology Developing Learners*. Boston: Pearson. <https://joerperez.wordpress.com/2014/11/29/behaviorism-and-social-cognitive-theory/#:~:text=Behaviorism%20focuses%20on%20how%20a,they%20do%20in%20the%20process.>
8. Rigby,Amy(2017). How to improve your interpersonal communication skills. <https://www.fingerprintforsuccess.com/blog/4-types-of-interpersonal-communication>
9. Sarita, Robinson(2019). Isolation Has Profound Effects On The Human Body And Brain. <https://www.sciencealert.com/isolation-has-profound-effects-on-the-human-body-and-brain-here-s-what-happens>
10. Shradha Bajracharya, "Interpersonal Communication," in *Businesstopia*, April 18, 2018, <https://www.businesstopia.net/communication/interpersonal-communication-examples>.
11. U.S. Department of Health & Human Services, 200 Independence Avenue, S.W. Washington, D.C. 20201. <https://www.mentalhealth.gov/basics/what-is-mental-health>
12. *Understanding Social Interaction*. (2021, February 20). Retrieved May 18, 2021, from <https://socialsci.libretexts.org/@go/page/8023>
13. Zawadzki, M. J., Smyth, J. M., Costigan, H. J. (2015). Real-time associations between engaging in leisure and daily health and well-being. *Annals of Behavioral Medicine*, 49, 605–615.
14. 4.1D: Deprivation and Development - Social Sci LibreTexts
15. 61,653 Search Results - Keywords(social deprivation) - ScienceDirect
16. Behavior Change - an overview | ScienceDirect Topics
17. Behavioral Health: How Habits Affect Your Mental And Physical Health | Betterhelp
18. Behaviorism | Simply Psychology
19. Childhood violence exposure and social deprivation predict adolescent amygdala-orbitofrontal cortex white matter connectivity | Elsevier Enhanced Reader\
20. Difference Between Social Cognitive Theory and Behaviorism | Difference BetweenHappy Brain, Happy Life | Psychology TodayHealth Behavior | Encyclopedia.com
21. How thinking affects your mind and life - The Hindu
22. How Thoughts Affect Mind and Body | Cognitive Healing
23. [http://www.inrein.com/ijshr/IJSHR\\_Vol.5\\_Issue.2\\_April2020/IJSHR003.pdf](http://www.inrein.com/ijshr/IJSHR_Vol.5_Issue.2_April2020/IJSHR003.pdf)
24. <https://blog.smarp.com/interpersonal-communication-definition-importance-and-must-have-skills#:~:text=Interpersonal%20communication%20is%20the%20process,expressions%2C%20body%20language%20and%20gestures.>
25. <https://courses.lumenlearning.com/boundless-sociology/chapter/types-of-social-interaction/>
26. <https://dictionary.apa.org/thinking>
27. <https://journals.sagepub.com/doi/10.1177/0265407517691366>
28. [https://link.springer.com/chapter/10.1057/978-1-349-95106-2\\_4](https://link.springer.com/chapter/10.1057/978-1-349-95106-2_4)
29. <https://onlinelibrary.wiley.com/doi/full/10.1111/jocn.15290>
30. <https://positivepsychology.com/self-esteem/>
31. <https://psychcentral.com/lib/how-to-raise-your-self-esteem/>
32. <https://psychcentral.com/lib/what-really-strengthens-self-esteem/>
33. [https://psychology.wikia.org/wiki/Introduction\\_to\\_thinking](https://psychology.wikia.org/wiki/Introduction_to_thinking)



34. [https://psychology.wikia.org/wiki/Social\\_deprivation#:~:text=Social%20deprivation%20is%20a%20form%20of%20deprivation%20in,to%20social%20groups%20pursuing%20hobbies%20and%20interests%20etc](https://psychology.wikia.org/wiki/Social_deprivation#:~:text=Social%20deprivation%20is%20a%20form%20of%20deprivation%20in,to%20social%20groups%20pursuing%20hobbies%20and%20interests%20etc)
35. <https://psychologydictionary.org/behavior/>
36. <https://psychologydictionary.org/selfesteem#:~:text=Psychology%20Definition%20of%20SELFESTEEM%3A%20the%20degree%20to%20which,reflects%20a%20person%27s%20image%20of%20themselves%20and%20their>
37. <https://psychologydictionary.org/thinking#:~:text=Psychology%20Definition%20of%20THINKING%3A%20noun.%20mental%20behavior%20wherein,components%20of%20thought%20are%20experienced%20or%20manipulated.%20I>  
n
38. [https://socialsci.libretexts.org/Bookshelves/Sociology/Book%3A\\_Sociology\\_\(Boundless\)/05%3A\\_Social\\_Interaction/5.01%3A\\_Understanding\\_Social\\_Interaction/5.1A%3A\\_Understanding\\_Social\\_Interaction](https://socialsci.libretexts.org/Bookshelves/Sociology/Book%3A_Sociology_(Boundless)/05%3A_Social_Interaction/5.01%3A_Understanding_Social_Interaction/5.1A%3A_Understanding_Social_Interaction)
39. <https://study.com/academy/lesson/behavior-definition-lesson-quiz.html>
40. <https://study.com/academy/lesson/social-deprivation-definition-index.html>
41. <https://www.apa.org/monitor/2019/05/ce-corner-isolation>
42. <https://www.apa.org/pubs/journals/releases/amp-amp0000103.pdf>
43. <https://www.betterhelp.com/advice/behavior/what-is-behavior-modification-psychology-definition-techniques-applications/>
44. <https://www.bing.com/search?q=what+is+interpersonal+interaction&q=SC&pq=what+is+interperson+interaction&sc=131&cvid=9D6A6DF6DE2A42F89FCADB73939F413D&FORM=QBRE&sp=1>
45. <https://www.bing.com/search?q=what+is+social+interaction&q=EP&pq=what+is+social+intera&sc=821&cvid=F>  
E6CC489B1EE43D09BCAE50D7D480634&FORM=QBRE&sp=1
46. <https://www.britannica.com/topic/human-behavior>
47. <https://www.businessstopia.net/communication/interpersonal-communication-examples>
48. <https://www.fingerprintforsuccess.com/blog/4-types-of-interpersonal-communication>
49. <https://www.frontiersin.org/articles/10.3389/fpsyg.2014.00435/full>
50. <https://www.goodreads.com/book/show/28182895-states-of-mind>
51. <https://www.medicalnewstoday.com/articles/154543>
52. <https://www.medicalnewstoday.com/articles/154543#risk-factors>
53. <https://www.mentalhealth.gov/basics/what-is-mental-health>
54. <https://www.mentalhealth.gov/basics/what-is-mental-health>
55. <https://www.merriam-webster.com/dictionary/analysis>
56. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4471980/>
57. <https://www.nytimes.com/2017/06/12/well/live/having-friends-is-good-for-you.html>
58. <https://www.psychologydiscussion.net/thinking/thinking-types-development-and-tools-psychology/2058>
59. <https://www.psychologytoday.com/us/blog/fixing-families/201410/whats-your-state-mind>
60. <https://www.psychologytoday.com/us/blog/the-voices-within/201008/what-do-we-mean-thinking>
61. [https://www.researchgate.net/publication/261992861\\_Interpersonal\\_relationships\\_at\\_work](https://www.researchgate.net/publication/261992861_Interpersonal_relationships_at_work)
62. [https://www.researchgate.net/publication/319476845\\_Why\\_interpersonal\\_communication\\_is\\_important\\_in\\_public\\_administration](https://www.researchgate.net/publication/319476845_Why_interpersonal_communication_is_important_in_public_administration)
63. <https://www.skillsyouneed.com/ips/interpersonal-communication.html>
64. <https://www.southuniversity.edu/news-and-blogs/2018/05/why-being-social-is-good-for-you>
65. <https://www.verywellmind.com/what-is-flow-2794768>
66. <https://www.verywellmind.com/what-is-selfesteem2795868#:~:text=In%20psychology%2C%20the%20term%20self, beliefs%2C%20emotions%2C%20and%20behaviors.>
67. *Isolation Has Profound Effects on The Human Body And Brain. Here's What Happens* (sciencealert.com)
68. *Like It or Not, Emotions Will Drive the Decisions You Make Today | Psychology Today* proponent of symbolic interaction theory - Bing
69. *What Are the Factors That Affect Human Behavior?* (reference.com)
70. *What Is The Behavioral Learning Theory?* (wgu.edu)
71. *What Is the Social Learning Theory?* (thoughtco.com)



# ONLINE TEACHING LEARNING: ITS RELATIONSHIP ON PERSEVERANCE AMONG PRIVATE HIGH SCHOOL TEACHERS IN LUCBAN, QUEZON

**Melchie Palmado Veluz**

*Faculty of Graduate Studies and Applied Research, Laguna State Polytechnic University, Main Campus, Sta. Cruz, Laguna*

Article DOI: <https://doi.org/10.36713/epra7284>

DOI No: 10.36713/epra7284

## ABSTRACT

*As a result of outbreak and new transition of online education system, the researcher will find-out and determine the relationship of online teaching learning to teacher's perseverance. To analyze the difficulties and solution on the new normal of education. To be aware to the enhancement and improvement of the online teaching learning. Specifically, it sought to answer the following questions; What is the level of online teaching learning among private high school teachers in Lucban, Quezon in terms of; instructional strategies, challenges, support; What is the level of teachers' perseverance among private high school in Lucban, Quezon in terms of; adaptability of virtual technology, learning interest, motivation; and Is there a significant relationship between online teaching learning and teachers' perseverance among private high school in Lucban, Quezon?*

*The research design used in this study was descriptive survey method of research. The population of the study was made up of the total population of Private High School Teachers in Lucban, Quezon. Online survey questionnaire were the main instruments used to gather information needed for descriptive presentation of data, weighted mean and standard deviation were used, for the hypothesis presentation of data, the researcher used Pearson r Correlation.*

*Based on the data, it is shown that there is "a partial relationship between online teaching learning and teacher's perseverance among private high school in Lucban, Quezon" at 0.05 level of significance. It showed that the null hypothesis stating that "There is no significant relationship between online teaching learning and teachers' perseverance among private high school in Lucban, Quezon" was **partially rejected**, it could be inferred that there was "**significant relationship between them**".*

*Based on the findings and conclusions made, the following recommendations are given; Triangular efforts to be made by the school principal, teachers and students in upgrading the virtual skills of teachers as an intervention perspective as an action plan for them as well for the benefit of the students; Continuous enhancement of training/webinar program on online teaching learning may be conducted for sustainability of the skills of teachers;*

*Continuous support of the administration financially to better equip skills and knowledge for smooth implementation of online teaching learning; and follow – up studies of similar nature and wiser magnitude must made in other areas in Quezon in order to countercheck the veracity of the findings in this study.*

## INTRODUCTION

As of the outbreak across the world, almost all aspects of our life were changed and were affected. As human being, we never expected such things and not prepared at the same time. Educational system is not exempted for these changes. Students, parents and teachers were critically hit by the unprecedented changes. In order to implement the

requirements of no suspension of learning consequently no suspension of teaching. The educational institutions organize the largest e-learning and online instructions. Therefore, all of the courses are implemented online without enough preparation for both teachers and students. It is a big challenge for everyone especially for the teachers, who get to use the lecture and discussion on face-to-face basis of learning.



Having enough knowledge with the changes in online teaching and learning process, teachers tend to adapt and adjust to the new systems of education. Online teachers play an important role in the success or failure of the online teaching and learning method. They must be technically educated and well trained in order to enhance the quality of online teaching and learning. Teachers should possess flexibility towards the changes that they encountered through online teaching learning, and how to respond rightfully to the demand of the new normal education.

In this field, the researcher intended to determine the relationship of the online teaching learning and the teachers' perseverance. If there is a correlation to the given variables.

The reason why the researcher focuses on the "Online teaching learning: its relationship on perseverance among private high school teachers in Lucban, Quezon", to analyze the range of online teaching learning through instructional strategies. Online teaching learning emphasizes internet-based courses that can offered synchronous and asynchronous method, and to some subject matter as to design into display on LMS, Moodle, email systems, and blogs in online discussions and other online platform. The challenges that the online teachers encountered usually technical glitches, condition of the students, parents, administrators and financial availability to support the online teaching learning process. Online teachers' perseverance can be affected, that's why the researcher wants to know the relationship of online teaching learning and how can they adapt to virtual technology, and to quantity the teacher's willingness to learn the new system and how motivated in doing the new online system.

Through this study, the researcher will find out and determine the relationship of online teaching learning to the teachers' perseverance. To be aware to the enhancement and improvement of the online teaching learning.

## MATERIALS AND METHODS

The research design used in this study was descriptive survey method of research. It aimed to determine the relationship of the online teaching learning and the teachers' perseverance among private high school teachers in Lucban, Quezon.

The population of the study was made up of the total population of Private High School Teachers in Lucban, Quezon. Private High School Teachers were used for the study because the researcher believed that these group of people are one of the affected on the online teaching learning.

Online survey questionnaire were the main instruments used to gather information needed for descriptive presentation of data, weighted mean and standard deviation were used. For the hypothesis presentation of data, Pearson r Correlation, to

measure the strength of association between two variables and the direction of the relationship.

## RESULTS AND DISCUSSION

Table 1 Level of online teaching learning among private high school teachers in terms of Instructional Strategies. To a *very high* interpretation, the teachers used photos, charts, models, videos, etc. during online lectures for making learning more joyful and effective for the students with ( $M = 3.73$ ,  $SD = 0.45$ ) and had the preference to use google classroom, google forms, zoom, worksheets, WhatsApp, YouTube in delivering learning material with ( $M = 3.55$ ,  $SD = 0.50$ ). Although also observed to a *high* interpretation, the item with the lowest rating was the teacher gave students online projects instead of book-based objectives question-answer with ( $M = 3.09$ ,  $SD = 0.64$ ).

The overall mean of 3.48, standard deviation of 0.560, indicated the level of online teaching learning among private high school teachers in terms of instructional strategies had a remark of *strongly agree* and verbally interpreted as *very high*.

The finding showed that the online teaching learning among private high school teachers in terms of instructional strategies using instructional media, method, step, teaching time, learning tools, students' assessment is very evident.

As reflected on the finding, it means that the private high school teachers in Lucban, Quezon are ready to the new instructional method, step, teaching time, learning tools and student's assessment.

Table 2, level of online teaching learning among private high school teachers in terms of Challenges. To a *very high* interpretation, the teachers preferred to have a training, webinar and faculty professional development with ( $M = 3.55$ ,  $SD = 0.50$ ) and have the sufficient computer knowledge and IT skills to conduct online lectures with ( $M = 3.28$ ,  $SD = 0.70$ ). Although also it was observed to a *high* interpretation, the item with the lowest rating was the teacher had the possibility of an obstacles to attention from other family members during online lectures and their online classroom gives students sense of autonomy as it intrinsically motivates them with ( $M = 3.16$ ,  $SD = 0.78$ ,  $0.51$ ).

The overall mean of 3.27, standard deviation of 0.665, indicated the level of online teaching learning among private high school teachers in terms of challenges have a remark of *strongly agree* and verbally interpreted as *very high*.

The finding shows that the online teaching learning among private high school teachers in terms of challenges like technical barriers, student participation, students' conditioning, and experience on teaching is very apparent.

It means that they clearly understood that online teaching learning is a big challenge for the



private high school teachers, these include, time management, suitability of online teaching technology platforms, issue of conducive environment, self-motivation, virtual communication and consultation.

Table 3. Level of online teaching learning among private high school teachers in terms of Support. To a *very high* interpretation, the teachers are requiring to attend webinar and professional development with ( $M = 3.61, SD = 0.49$ ) and the School Principal gives encouraging feedback and comments to motivate the teachers to teach online classes with ( $M = 3.48, SD = 0.62$ ). Although also observed to a *high* interpretation, the item with the lowest rating was the administration allots funds for the teachers for their online classes' expenses with ( $M = 3.25, SD = 0.71$ ).

The overall mean of 3.43, standard deviation of 0.599, indicate the level of online teaching learning among private high school teachers in terms of support have a remark of *strongly agree* and verbally interpreted as *very high*.

The finding shows that the online teaching learning among private high school teachers in terms of support from the Administrator, School Principal, Co-teachers, Parents, Student, and Administration is well manifested.

As reflected on the finding, that the teachers believe that they proved online teaching learning were supported by the school, school administration, school principals, co-worker, students and parents.

Table 4 shows the rank the online teaching learning among private high school teachers in terms of *instructional strategies* have the highest ( $OM = 3.48, SD = 0.560$ ) and verbally interpreted as *very high*. Followed by the *Support* with ( $OM = 3.43, SD = 0.599$ ) and verbally interpreted as *very high*. While the *Challenges* have the lowest ( $OM = 3.27, SD = 0.665$ ) and verbally interpreted as *very high* also.

The total mean of 3.39, standard deviation of 0.616, indicate that the online teaching learning among private high school teachers is verbally interpreted as *very high*.

The finding shows that the online teaching learning among private high school teachers in Lucban, Quezon is well exhibited.

Table 5. Level of teachers' perseverance among private high school in terms of Adaptability of Virtual Technology. To a *very high* interpretation, the teacher easily performs file management tasks on the computer such as copying, moving, renaming and deleting files on folders with ( $M = 3.48, SD = 0.56$ ) and uses variety of online teaching strategies to help students to learn with ( $M = 3.44, SD = 0.66$ ). Although also observed to a *very high* interpretation, the item with the lowest rating was the teacher knows the different kinds of online platform that can use on online classes with ( $M = 3.31, SD = 0.59$ ).

The overall mean of 3.38, standard deviation of 0.607, indicate the level of teachers' perseverance among private high school in terms of adaptability of virtual technology have a remark of *strongly agree* and verbally interpreted as *very high*.

The finding shows that the teachers' perseverance among private high school in terms of adaptability of virtual technology is very obvious.

It means that the private high school teachers can easily adapt to the new form of online platform of education system.

Table 6. Level of teachers' perseverance among private high school in terms of Learning Interest. To a *very high* interpretation, the teacher collaborates with other teachers regarding instructional strategies, method and step with ( $M = 3.61, SD = 0.49$ ) and attends online training about online teaching and learning methodology, management, knowledge, skills and delivery with ( $M = 3.55, SD = 0.50$ ). Although also observed to a *high* interpretation, the item with the lowest rating was the teacher feels well-equipped and well-trained on the use of tools for online teaching learning with ( $M = 3.19, SD = 0.66$ ).

The overall mean of 3.45, standard deviation of 0.563, indicate the level of teachers' perseverance among private high school in terms of learning interest have a remark of *strongly agree* and verbally interpreted as *very high*.

The finding shows that the teachers' perseverance among private high school in terms of learning interest is well demonstrated.

As reflected on the finding, the teachers proved that they are interested to learn new knowledge and skills about online teaching learning.

Table 7. Level of teachers' perseverance among private high school in terms of Motivation. To a *very high* interpretation, the teacher has the access to and opportunity to use technology/gadgets in the school with ( $M = 3.52, SD = 0.50$ ) and innovative online teaching learning with ( $M = 3.42, SD = 0.50$ ). Although also observed to a *high* interpretation, the item with the lowest rating was the teacher give the extra financial incentives, reduced number of online teaching, additional training hours and additional ICT equipment for the online classes with ( $M = 3.13, SD = 0.75$ ).

The overall mean of 3.36, standard deviation of 0.603, indicate the level of teachers' perseverance among private high school in terms of motivation have a remark of *strongly agree* and verbally interpreted as *very high*.

The finding shows that the teachers' perseverance among private high school in terms of motivation is well established.

Teachers in private high schools are well motivated, it means that no matter what they



encountered difficulties in online teaching learning they are being motivated to teach the students.

Table 8 shows that the teachers' perseverance among private high school teachers in terms of *Learning Interest* have the highest ( $OM = 3.45$ ,  $SD = 0.563$ ) and verbally interpreted as *very high*. Followed by the *Adaptability of Virtual Technology* with ( $OM = 3.38$ ,  $SD = 0.607$ ) and verbally interpreted as *very high*. While the *Motivation* have the lowest ( $OM = 3.36$ ,  $SD = 0.603$ ) and verbally interpreted as *very high* also.

The total mean of 3.40, standard deviation of 0.592, indicate that the teachers' perseverance among private high school teachers is verbally interpreted as *very high*.

The finding shows that the teachers' perseverance among private high school teachers in Lucban, Quezon is well revealed.

It shows that they are persistence in doing something despite of difficulties and failures.

Table 9 shows the significant relationship between online teaching learning and teachers' perseverance among private high school in Lucban, Quezon

The Online Teaching Learning that has relationship to the Teachers' Perseverance includes *Adaptability of Virtual Technology*, *Learning Interest* and *Motivation*.

The Instructional Strategies, Challenges and Support for *Adaptability of Virtual Technology*, *Learning Interest* and *Motivation* are significant at probability level. This means that the online teaching learning has a slight correlation or definite but small relationship to high correlation or marked relationship to the teachers' perseverance among private high

Based on the data, it is shown that there was "a partial relationship between online teaching learning and teachers' perseverance among private high school in Lucban, Quezon" at 0.05 level of significance. It shows that the null hypothesis stating that "*There is no significant relationship between online teaching learning and teachers' perseverance among private high school in Lucban, Quezon*" was partially rejected, it could be inferred that there is "significant" relationship between them.

## CONCLUSIONS

It was therefore concluded that there is "a partial" relationship between online teaching learning and teachers' perseverance among private high school teachers in Lucban, Quezon at 0.05 level of significance. It showed that the null hypothesis stating that "*There is no significant relationship between online teaching learning and teachers' perseverance among private high school teachers in Lucban, Quezon*" was partially rejected, it could be inferred that there was "significant" relationship between them.

## Recommendations

Based on the findings and conclusions made, the following recommendations are given;

1. Triangular efforts to be made by the school principal, teachers and students in upgrading the virtual skills of teachers as an intervention perspective as an action plan for them as well for the benefit of the students.
2. Continuous enhancement of training/webinar program on online teaching learning may be conducted for sustainability of the skills of teachers.
3. Continuous support of the administration financially to better equip skills and knowledge for smooth implementation of online teaching learning.
4. Follow – up studies of similar nature and wider magnitude must made in other areas in Quezon in order to countercheck the veracity of the findings in this study.

## Acknowledgement

To Almighty God Father, thank you for all the guidance and help, for giving knowledge and wisdom to complete and finish this research study successfully.

**MARIO R. BRIONES, Ed. D** University President of Laguna State Polytechnic University for providing quality graduates in the field of education.

**A/P JOSEPHINE H. CONSEBIDO, LPT, Rpm Research Adviser** for giving me the opportunity to do research and providing invaluable guidance throughout this research.

**FLORHAIDA V. PAMATMAT, Ed. D** Dean College of Teacher Education for kindness and words of encouragement.

**ALBINA S. BUNYI, Ed. D** Subject Specialist for inspiring and motivating to finish this research study.

**HAROLD V. ORIGINES, Ed. D** Statistician for valuable time and effort in sharing his expertise in Statistics.

**JULIE ROSE P. MENDOZA, Ed. D** Technical Expert providing valuable guidance throughout this research.

**VIOLETA RANA, Language Critic** for valuable time and effort in sharing her expertise in editing the manuscript.

**Abigail Viar RGC, External Panelist** for sharing her knowledge throughout this research.

**Benjamin Arjona, Ed. D** External Statistician for valuable effort and time to taught the methodology to carry out the research and to present the research works as clearly as possible.



To all **School Principals**, to make this study possible namely: **Mrs. Lydia R. Dean**, Lucban Academy; **Mrs. Fe S. Oblea**, Banahaw View Academy; **Rev. Msgr. Antonio L. Obeña**, Casa Del Niño Jesus de Lucban; and **Antonio C. Lozano**, Lucban Christian School.

To all **private high school teachers in Lucban, Quezon** for their kindness and genuine support throughout this research work.

**Mr. and Mrs. Raymundo and Silveria Palmado**, her parents for the unconditional love and support. For preparing and educating to be the best person. Mostly to her husband **Ric A. Veluz**, for the loved, support and understanding and her sons/daughter; **Christian Paul, Christine Rica** and **Christmel Ric** for continuing believing and loving unconditionally.

To **Doña Consuelo Eleazar Perez, Dra. Eliza Mei P. Francisco** and **Dr. Lionel D. Francisco**, **Board of Trustees and President of Lucban Academy** for the genuine support and scholarship to complete this Masteral Degree.

Finally, thank you to all the people, friends, and classmates who supported to complete this research study work directly and indirectly.

## REFERENCES

1. Alea, Lapada Aris, Fabrea, Miguel Frosyl, Robledo, Dave Arthur R. and Faroogi, Alam Zeba, June 2020. Teachers' COVID 19 Awareness, distance learning education experiences and perceptions towards institutional readiness and challenges. *International Journal of Learning, Teaching and Educational Research*, Vol. 19, No. 6, pp. 127-144. Retrieved from <https://doi.org/10.268031>.
2. Ahmad, Saghir Ch., Dr. Batrol, Ayesha and Bashir, Majid, 2020. Pandemic COVID-19 Source of Online Digital Learning Platform for Learning Management and Psychological Dynamics Disorders of Students. *Hamdardislamicus*, Vol. 43, No. 3, pp. 101-116. Retrieved from <https://hamdardfoundation.org/hamdard-islamicus>.
3. Bernet, Sue, Priest, Ann-Marie and Macpherson, Colin, 1999. Learning about Online Learning: An approach to staff development for University Teachers. *Australian Journal of Educational Technology*, Vol. 15, No. 3. Retrieved from <https://doi.org/10.14742/ajet.1858>.
4. Chang, Chiu-Lan and Fang, Ming, 2020. E-learning and Online Instructions of Higher Education during the 2019 Novel Coronavirus Diseases (COVID-19) Epidemic. *Journal of Physics: Conference Series* 1574 (2020). Retrieved from doi10.1088/1742-6596/1574/012166.
5. Chung, E., Noor, N.M., & Vloreen Nity Matthew, 2020. Are you ready? Assessment of Online Learning Readiness among University Students. *International Journal of Academic Research in Progressive and Development*, Vol. 9, No. 1, pp. 301-317.
6. Chung, Ellen, Subramaniam, Geetha and Dass, Laura Christ, July 2020. Online Learning Readiness among University Students in Malaysia Amidst COVID-19. *Asian Journal of University Education (AJUE)*, Vol. 16, No. 2. Retrieved from <https://doi.org/10.24191/ajue.v16.2.10294>.
7. Cuthrell, Kristen, Lyon, Anna, Dec 2007. Instructional Strategies: What do Online Students Prefer? *MERLOT Journal of Online Learning and Teaching*, Vol. 3, No. 4.
8. Cutri, Ramona Maile, Mena, Juanjo and Whiting, Erin Feinauer, Sept. 2020. Faculty Readiness for Online Crisis Teaching: Transitioning to online Teaching during the COVID-19 Pandemic. *European Journal of Teacher Education*, Vol. 43, No. 3, pp. 523-541. Retrieved from <https://doi.org/10.1080/02619768.2020.1815702>.
9. Darling-hammond, L., & Rothman, R., 2015. *Teaching in the flat world: Learning from high-performing systems*. New York, NY: Teachers College Press.
10. Malaysian Ministry of Higher Education, 2020. Press Release by the Malaysian Ministry of Higher Education. Retrieved from <https://www.nst.com.my/education/2020/06/599586/overseas.dream-put-hold>.
11. Nafisah, S. B., Alamery, A. H., Al Nasfesa, A., Aleid, B., & Brazanji, N. A., 2018. School Closure during Novel Influenza: A systematic review. *Journal of Infection and Public Health*, Vol. 11, No. 5, pp. 657-661.
12. Nambiar, Deepika, 2020. The Impact of Online Learning during COVID-19: Student's and Teachers's Perspective. *The International Journal of Indian Psychology*, ISSN 2348-5396 (online)/ISSN: 2349-3429 (print), Vol. 8, Issue 2, April-June, 2020. Retrieved from <http://www.ijip.in>.
13. O'neil, Harold F., 2006. *Web-Based Learning: Theory, Research, Practice*. Lawrence Erlbaum Associate, Inc. Publishers, 10 Industrial Avenue Mahwah, New Jersey.
14. Perez, H.S, Fernandez, S.R, & Braojos, C.G, 2010. Methodologies that optimize Communication in virtual learning environment. *Communicate: Ibero-American Scientific Journal of Communication and Education*, Vol. 17, No. 34, pp. 163-171.
15. Phan, Than Thi Ngoc and Dang, Ly Thi Thao, 2017. Teacher Readiness for Online Teaching: A Critical Review. *Ijodel*, Vol. 3, No. 1.
16. Radford, A.W., & Weko, T., 2011. Learning at a distant: Undergraduate Enrollment in Distance Education Courses and Degree Program. (NCE 2012-154), Washington, D. C. National Center for Education Statistics.
17. Rasmitadila, R., Rachmadtullah R., Rusi Rusmiati, A., and Samsudin, A., 2020. The Perceptions of Primary School Teachers of



- Online Learning during the Covid-19 Pandemic Period: A Case Study in Indonesia. Journal of Ethnic and Cultural Studies, Vol. 7, No. 2, pp. 90-109.*
18. Republic Act. No. 10650, July 28, 2014. An Act Expanding Access to Educational Service by Institutionalizing Open Distance Learning in level of Tertiary Education and Appropriating Funds. [www.officialgazette.gov.ph](http://www.officialgazette.gov.ph).
  19. Reyes, M.R., Brackett, M.A., White, M., & Salovey, P., 2012. Classroom Emotional Climate, Student Engagement and Academic Achievement. *Journal of Educational Psychology, Vol. 104, No. 3, pp. 700-712.*
  20. So, Simon, 2009. The Development of a SMS Based Technology and Learning System. *Journal of Education Technology Development and Exchange (JETDE), Vol. 2, Iss. 1, Article 8, pp. 99-112.*
  21. Ventayin, R.J., 2018. Teachers' Readiness in Online Teaching Environment: A case of Department of Education Teachers. *Journal of Education, Management and social Studies, Vol. 2, No. 1. Retrieved from [www.psurj.org/jemss](http://www.psurj.org/jemss).*
  22. Yang, Y., & Cornelius, L.F., 2004. Students' Perceptions towards the quality of Online Education: A qualitative approach. *Association for Educational Communications and Technology, Vol. 27, pp. 861-877.*
  23. Zweig, J., Stafford, E., 2016. Training for Online Teachers to Support Student Success: Themes from a Survey Administered to Teachers in Four Online Learning Programs. *Journal of Online Learning Research, Vol. 2, No. 4, pp. 399-418.*



# DEVELOPMENT AND VALIDATION OF SUPPLEMENTAL MATERIAL ON OPERATION ON INTEGERS

**Serlie G. Cruz**

*Faculty, Suba National High School Gagalog Annex*

## ABSTRACT

*This study aims to assess the level of validity and acceptability of the Developed Supplemental Material on Operation on Integers. Specifically, this study seeks to attain the following objectives: determine if the supplemental material on integer is acceptable in terms of objectives, content, presentation and evaluation; Assess the level of validity of the supplemental material on operation on integers in terms of: usability, consistency and curriculum alignment and; determine if there is a significant relationship between the parts of the supplemental material on operation on integers and extent of validation of its usability, consistency and curriculum alignment.*

*The respondents of the said study were selected thirty (30) Mathematics teachers of Majayjay District who evaluated the learning module. The supplemental materials compose of four (4) lessons were as follows: Addition of Integers Using Number Line and Algebra Tiles, Subtraction of Integers, Multiplication and Division of Integers, and Problems involving Integers. The researcher utilized the weighted mean and Pearson r as statistical treatment of the study.*

*The results are as follows: in terms of objectives, the respondents strongly agree on each indicated statement which gathered an average weighted mean of 4.13 (highly acceptable); as for content, the respondents strongly agree on the five statements, resulting to an average weighted mean of 3.99 (highly acceptable); as for presentation, the respondents strongly agree on each statement, resulting to an average weighted mean of 4.41 (highly acceptable); and for evaluation, the respondents strongly agree on each statement, having an average weighted mean of 4.09 (highly acceptable). In terms of the validity of the learning module: as for usability, the respondents strongly agree on the four indicated statements, garnering an average weighted mean of 4.21 (highly acceptable); when it comes to consistency, the respondents strongly agree on the four indicated statements, having an average weighted mean of 4.11 (highly acceptable); as for the curriculum alignment, the respondents strongly agree on the four statements, making up to a 4.24 (highly acceptable) average weighted mean. It is shown that the null hypothesis stating that "there is no significant relationship between or among the parts of the supplemental material on operation on integers and extent of validation" is rejected, it can be inferred that there is a "significant" relationship between them.*

*Based on the data gathered and its findings, the researcher further concludes that; the Supplemental Material on Operation on Integers could help explore student's knowledge and skills, which could therefore help them solve problems involving operation integers; that the supplemental material on Operation on Integers serve as an aid in enhancing learner's analytical skills, provides additional information, discussing the different rules to follow in computing integers, and that it adds a sense of challenge for students to perform well. Since the supplementary material is acceptable in terms of having specific, simple, attainable and measurable objectives and it captures the interest of learners in the lesson taught; it could be used independently, to serve as a tool for deepening learning. Since the supplemental material focuses on the main goal, it has relevant experiences for the students to grow which is set and aligned to the DepEd standards and competencies which must strictly follow.*



## INTRODUCTION

Mathematics among the academic subjects is being considered as challenging. In the Philippine schools, learners encounter difficulties in Mathematics especially when the COVID 19 pandemic experienced all over the globe. Distance learning was implemented as the Department Education mandated to reduce the spread of the COVID 19 among schools to protect children. Intensified by the global pandemic, supplemental materials have been more vital than before in order to aid the students as support to the distance learning be it modular, online or broadcast platforms. Mathematics is challenging and become more challenging because of the current situation. Learners are required to study on their own with the help teachers through messenger, facebook, google meet and other platform guided with learner's parent.

In line with this, additional resources on learning is needed; due to this fact, educational sector and other private institution such as publishing companies are offering various supplemental materials as additional learning resources aside from the provided materials prescribed by the department.

With this, it shows the significance of supplemental materials in the process of teaching and learning. This is further proven by the studies of Thakur (2015) which stated that supplemental materials help teachers produce learners who are able to go beyond the textbook into real life. Supplemental materials add to the information in the textbook and carefully follow the content.

Tracing back, Suba National High School Gagalog Annex students from school year 2009-2010 up to present has shown difficulties in the area of integers under number sense. After performing root cause analysis, the researcher finds out the summative and periodical test results were affected with integer involving problems. Learners encounter challenges with integers from Grade 7 until these student reach in college. Misconceptions on operation with integers affects the student's learning in solving a certain problems.

Attempting to address this mentioned problem, this study aim to develop a supplemental material on Operation in Integers.

## RESEARCH METHODOLOGY

The study is about the development and validation of supplemental material on operation on integers of Grade 7 students. The population consists of selected Mathematics teacher who are experts in evaluating instructional material from different public schools in the district of Majayjay.

### Sampling Techniques

The researcher has used purposive sampling technique by purposely selecting the Mathematics teachers in Majayjay district as evaluators and respondents of the study.

### Data Gathering Procedure

A letter of request will be submitted to the Schools Division Superintendent, through the Division Education Program Secondary to seek permission to conduct the study. Immediately after the approval, with permission of School Principals, schedules in distributing the questionnaires to the Mathematics Teachers in District of Majayjay are arrange. Data are going to tabulate, analyze and compute applying the needed statistical treatment.

### Research Procedure

A permit is secured from the office of the Schools Division Superintendent before the conduct of the study. The proponent will undergo the difficult stages and then monitored the development until the completion of the study.

### Research Instrument

The data for the study are going to gather by means of a questionnaire. A researcher-made questionnaire is also employed as a part of the instrument in gathering the data.

The questionnaire aims to generate assessment among the Mathematics teacher. It has two parts. The first part is composed of the parts of supplemental material in terms of objectives, content, presentation and evaluation.

The last part is dedicated to the criteria to be evaluated by the respondents: usability, consistency, and curriculum alignment.

### Ranges of Statistical Treatment

Table 2. presents various ranges in the statistical treatment.



Rating	Range	Verbal Interpretation
5	4.20-5.00	Highly Acceptable
4	3.60-4.19	Acceptable
3	2.40-3.59	Moderately Acceptable
2	1.80-2.39	Slightly Acceptable
1	1.00-1.79	Not Acceptable

### Validation

In the process, the questionnaire undergoes the process of validation to determine the degree of its effectiveness to which set of survey instrument accurately measure what it should intend to measure as well as its capability to achieve the specific objectives of the study.

Content validity is the measure that going to undertake. It is the analysis of the extent to which set of variables/concepts expressed in each item is going to make. Consultation with experts and adviser will going to undertake to assure that no items will overlap and that all items reflect the sub topic with much clarity and understanding.

### Statistical Treatment

Once the measuring instruments have been retrieved, the researcher processed the raw data into quantitative forms. Data processing involves input, this involves the responses to the measuring instrument of the subjects of the study.

To reveal the level of acceptability and validity of Supplemental Material on Operation on Integers, the weighted mean was used. The formula is:

$$WM = \frac{4f + 3f + 2f + f}{N}$$

Wherein:

WM = Weighted mean value  
f = frequency of responses  
N = total number of cases

To reveal the relationship between or among the parts of the supplemental material on operation on integers and extent of validation, the Spearman rho was used. The formula is:

$$\rho = 1 - \frac{6 \sum d^2}{n(n^2 - 1)}$$

Wherein:

d = difference in ranks  
n = number of pairs of data  
 $\sum$  = Sigma = sum of  
 $\rho^2$  = Spearman's Rank Correlation Coefficient

## RESULTS AND DISCUSSIONS

The researcher utilized the computed mean, standard deviation, and weighted mean in determining whether the acceptability and validity of Supplemental Material on Operation on Integers are in accordance to objective, content, presentation and evaluation. A four-point Likert scale was employed to verbally interpret the computed mean and weighted mean.

On the other hand, to determine its relationship, the researcher has utilized Pearson r as treatment.

**Supplemental Material on Operation on Integers****Table 1. Level of acceptability of the Supplemental Material in terms of Objectives**

<i>The Developed Supplemental Material is...</i>	Mean	SD	Verbal Interpretation
specific and detailed	4.23	0.73	Strongly Agree
measurable so it can be objectively assessed	4.23	0.68	Strongly Agree
attainable and time bounded	4.03	0.72	Agree
realistic	4.00	0.64	Agree
in line with most essential learning competencies	4.13	0.63	Agree
<b>Overall Mean = 4.13</b>			
<b>Standard Deviation = 0.629</b>			
<b>Verbal Interpretation = Acceptable</b>			

Legend:

Range	Verbal Interpretation
4.20-5.00	Highly Acceptable
3.40-4.19	Acceptable
2.60-3.39	Moderately Acceptable
1.80-2.59	Less Acceptable
1.00-1.79	Not Acceptable

The teacher perceived that the developed supplemental material with regards to as specific, detailed and measurable and can be objectively assessed got a descriptive rating of *strongly agree* with the *mean of 4.23 and standard deviation of 0.73*. The other statements, *the developmental material is in line with most essential learning competencies*, *it is measurable so it can be objectively assessed*, and *realistic* achieved the results of (M=4.13, SD=0.63), (M=4.03, SD=0.72), and (M=4.00, SD=0.64), respectively.

The level of acceptability of the supplementary material in terms of objectives was disclosed with the overall mean of 4.13 and the standard deviation of 0.629. This means that the activities involved in achieving the goal of the developed supplemental material is met. The specific actions and measurable outcome are achieved.

This is to address the claim of Shields (2010) that learning objectives are the heart of every lesson since it these serves as foundations for lesson planning. The mentioned researcher inculcate that objectives provide the criteria for evaluating students' achievement.

**Table 2. Level of acceptability of the Supplemental Material in terms of Content**

<i>The Developed Supplemental Material is...</i>	Mean	SD	Verbal Interpretation
interesting and suitable to learners	4.13	0.63	Agree
contributing to the acquisition of concepts and theories	4.07	0.69	Agree
achievable in a given time frame	4.00	0.69	Agree
addresses the needs of the learners	4.00	0.83	Agree
engaging and consistent with the activities	3.73	0.64	Agree
<b>Overall Mean = 3.99</b>			
<b>Standard Deviation = 0.640</b>			
<b>Verbal Interpretation = Acceptable</b>			

Legend:

Range	Verbal Interpretation
4.20-5.00	Highly Acceptable
3.40-4.19	Acceptable
2.60-3.39	Moderately Acceptable
1.80-2.59	Less Acceptable
1.00-1.79	Not Acceptable

The data presented above reveal that the supplemental material are interesting and suitable to learners with the highest rating of (M=4.13, SD=0.63). The respondents were satisfied with the supplemental material that, *it is contributing to the acquisition of concepts and theories* on Operation on Integers (M=4.07, SD=0.69).



The overall mean of 3.99, standard deviation of 0.640 indicated the level of acceptability of the Supplemental Material in terms of Content is acceptable. This means that the content of the supplementary material is aligned to the students' needs and interest.

The results on this table is essential as stated to the study of Liboon (2011), the content of the learning packages is the answer to the needs of the developing country like the Philippines for the curricular motivation of the educational system.

**Table 3. Level of acceptability of the Supplemental Material in terms of Presentation**

<i>The Developed Supplemental Material is...</i>	Mean	SD	Verbal Interpretation
simple yet detailed	4.60	0.50	Strongly Agree
readable and easy to understand	4.60	0.50	Strongly Agree
making the photographs simple and clear	4.40	0.67	Strongly Agree
motivates/captures the interest of the learners	4.23	0.68	Strongly Agree
giving positive attitude towards operation on integers	4.20	0.61	Strongly Agree
<b>Overall Mean = 4.41</b>			
<b>Standard Deviation = 0.610</b>			
<b>Verbal Interpretation = Highly Acceptable</b>			

Legend:

Range	Verbal Interpretation
4.20-5.00	Highly Acceptable
3.40-4.19	Acceptable
2.60-3.39	Moderately Acceptable
1.80-2.59	Less Acceptable
1.00-1.79	Not Acceptable

As shown in table 3, the respondents agreed that the supplemental material is simple yet detailed, readable and easy to understand. This statement has the highest rating of M=4.60, SD=0.50. Also, the respondents rated the statement *making the photographs simple and clear* with M=4.40, SD=0.67.

The overall mean of 4.41 and the standard deviation of 0.610 indicated the level of acceptability of the Supplemental Material in terms of Presentation is highly acceptable. This means that the demonstrations or the information conveys can be adapted.

This is further proven by the study of Gunaydin & Karamete, (2016) which describes that great presentation can help the learner visualize a certain object by providing them supporting images from the materials developed by teachers. The images should follow certain criteria such as "pleasing to the eye and reflecting visual integrity".

**Table 4. Level of acceptability of the Supplemental Material in terms of Evaluation**

<i>The Developed Supplemental Material is</i>	Mean	SD	Verbal Interpretation
Assesses what is stated in the learning objectives	4.27	0.69	Strongly Agree
Evaluation should motivate the student to learn	4.07	0.74	Agree
Practical and realistic	4.00	0.64	Agree
It provides feedback that stimulates learning	3.93	0.69	Agree
Different versions of an exam must be at the same level	4.17	0.70	Agree
<b>Overall Mean = 4.09</b>			
<b>Standard Deviation = 0.699</b>			
<b>Verbal Interpretation = Acceptable</b>			

Legend:

Range	Verbal Interpretation
4.20-5.00	Highly Acceptable
3.40-4.19	Acceptable
2.60-3.39	Moderately Acceptable
1.80-2.59	Less Acceptable
1.00-1.79	Not Acceptable



The data above reveal that the developed supplemental material in terms of assessing what is stated in the learning objectives and has a different versions of exam that must be in the same level garnered the result of (M=4.27, SD= 0.69) and (M=4.17, SD=0.70) respectively.

The remaining statements, evaluation should motivate the student to learn, practical and realistic, and it provides feedback that stimulates learning acquired M=4.07, SD=0.74, M=4.00, SD= 0.64 and M=3.93, SD=0.69 respectively.

The overall mean of 4.09 standard deviation of 0.699 indicated the level of acceptability of the Supplemental Material in terms of Evaluation is acceptable. This means that the judgement or the assessment about the materials is worthy and significant using criteria governed by a set of standards.

The obtained data is needed for evaluation plays a significant role in providing useful and relevant information towards the improvement of teaching (Salandanan, 2001). An evaluation of a learning material can be a way to heighten effectiveness of teaching and learning process.

**Table 5. Level of validity of the Supplemental Material in terms of Usability**

<i>The Developed Supplemental Material is helpful since it...</i>	Mean	SD	Verbal Interpretation
can be used independently	4.43	0.50	Strongly Agree
offers various activities that learner helps to grow.	4.33	0.55	Strongly Agree
uses terms that can be understood easily	4.10	0.31	Agree
could be a substitute for modules	4.03	0.67	Agree
serves as a supplemental tool for understanding math	4.17	0.65	Agree
<b>Overall Mean = 4.21</b>			
<b>Standard Deviation = 0.648</b>			
<b>Verbal Interpretation = Highly Acceptable</b>			

Legend:

Range	Verbal Interpretation
4.20-5.00	Highly Acceptable
3.40-4.19	Acceptable
2.60-3.39	Moderately Acceptable
1.80-2.59	Less Acceptable
1.00-1.79	Not Acceptable

The statement, *the developed supplemental material is helpful since it can be used independently and offers various activities that learner helps to grow* obtained the result of (M=4.43, SD=0.50) and (M=4.33, SD=0.55), respectively.

The respondents also agreed in the statements, *the supplemental material is helpful since it serves as a supplemental tool for understanding math, it uses terms that can be understood easily, and it could be a substitute for modules* acquired the results of (M=4.33, SD=0.55), (M=4.10, SD=0.31), and (M=4.03, SD=0.67), respectively.

The overall mean of 4.21, standard deviation of 0.648 indicated the level of validity of the Supplemental Material on operation on integers in terms of Usability is highly acceptable. This means that the context or design achieved a defined goal effectively, efficiently and satisfactorily.

This data in the table answers to the claims of Alafareet et al., (2009) in which usability is the effectiveness, efficiency and satisfaction with which specific users can achieve a specific set of tasks in a particular environment. In essence, a system with good usability is easy to use and effective.

**Table 6. Level of validity of the Supplemental Material in terms of Consistency**

<i>The Developed Supplemental Material is Consistent because...</i>	Mean	SD	Verbal Interpretation
it follows the prescribed curriculum set by DepEd	4.33	0.66	Strongly Agree
the activities are connected to the curricular standard	4.27	0.64	Strongly Agree
the performance standards are strictly followed	4.13	0.57	Agree
the competencies are thoroughly followed	4.20	0.66	Strongly Agree
the learning is achieved.	3.63	0.56	Agree
<b>Overall Mean = 4.11</b>			
<b>Standard Deviation = 0.556</b>			
<b>Verbal Interpretation = Acceptable</b>			



Legend:

Range	Verbal Interpretation
4.20-5.00	Highly Acceptable
3.40-4.19	Acceptable
2.60-3.39	Moderately Acceptable
1.80-2.59	Less Acceptable
1.00-1.79	Not Acceptable

Table 6 shows that the teachers agreed on the first statement that the developed supplemental material is consistent because it follows the prescribed curriculum set by DepEd ( $M=4.33$ ,  $SD=0.66$ ) and the activities are connected to the curricular standard ( $M=4.27$ ,  $SD=0.64$ ).

The table also shows the remaining statements which are: the developed material is consistent because the competencies are thoroughly followed, the performance standards are strictly followed, and the learning is achieved that gained the results of ( $M=4.20$ ,  $SD=0.66$ ), ( $M=4.13$ ,  $SD=0.57$ ), and ( $M=3.63$ ,  $SD=0.56$ ), respectively.

The overall mean of 4.11, standard deviation of 0.556 indicated the level of validity of the Supplemental Material on operation on integers in terms of Consistency is acceptable. This means that the condition of the quality is cohering or holding together and retaining firmness.

In the study of Granger (2008) consistency is the reliability or uniformity in the quality of being consistent. It is the agreement within the data or content of the material.

**Table 7. Level of validity of the Supplemental Material in terms of Curriculum Alignment**

<i>The Developed Supplemental Material is Aligned to the Curriculum because...</i>	Mean	SD	Verbal Interpretation
it adhere to the curriculum prescribed by DepEd	4.57	0.57	Strongly Agree
the most essential learning competencies are aligned	4.50	0.51	Strongly Agree
the performance standards are strictly implemented	4.30	0.53	Strongly Agree
the activities are connected to the curricular standard	4.20	0.61	Strongly Agree
the learning is attained.	3.63	0.49	Agree
<b>Overall Mean = 4.24</b>			
<b>Standard Deviation = 0.490</b>			
<b>Verbal Interpretation = Highly Acceptable</b>			

Legend:

Range	Verbal Interpretation
4.20-5.00	Highly Acceptable
3.40-4.19	Acceptable
2.60-3.39	Moderately Acceptable
1.80-2.59	Less Acceptable
1.00-1.79	Not Acceptable

As shown in table 7, the developed supplemental material is aligned to the Curriculum because it adheres to the curriculum prescribed by DepEd garnered the highest result of ( $M=4.57$ ,  $SD=0.57$ ) and followed by the statement, *most essential learning competencies are aligned* with the result of ( $M=4.50$ ,  $SD=0.51$ ).

The overall mean of 4.24, standard deviation of 0.490 indicated the level of validity of the Supplemental Material on operation on integers in terms of Curriculum Alignment is highly acceptable. This means that the process in which the developed materials address the changing needs of students.

In the book entitled "*Pathways to Results: Curriculum Alignment Module*" by Mordica, J., & Nicholson-Tosh, K. (2013), it noted the importance of connections between curricular alignment and improved student achievement.

**Table 8. Relationship between or among the parts of the supplemental material on operation on integers and extent of validation.**

	r value	p value	Degree of Correlation	Analysis
Content and Objective	0.852	0.000	Very Strong	Significant
Presentation and Content	0.395	0.031	Weak	Significant
Presentation and Objective	0.372	0.043	Weak	Significant
Evaluation and Objective	0.820	0.000	Very Strong	Significant
Evaluation and Content	0.869	0.000	Very Strong	Significant
Evaluation and Presentation	0.464	0.010	Moderate	Significant
Consistency and Usability	0.644	0.000	Strong	Significant
Curriculum Alignment and Usability	0.366	0.047	Weak	Significant
Curriculum Alignment and Consistency	0.474	0.008	Moderate	Significant

**Legend****Correlation Coefficient (r value)**

± 0.8 to ±1.0  
 ± 0.6 to ±0.79  
 ± 0.4 to ±0.59  
 ± 0.2 to ±0.39  
 ± 0.1 to ±0.19

**Indication**

Very Strong  
 Strong  
 Moderate  
 Weak  
 Very Weak

Table 8 presents the relationship between or among the parts of the supplemental material on operation on integers and extent of validation.

The content and objective, presentation and content, presentation and objective, evaluation and objective, evaluation and content, evaluation and presentation, consistency and usability, curriculum alignment and usability, and curriculum alignment and consistency shows a relationship have a verbal interpretation of significant at 0.05 level of significance. This means that between or among the parts of the supplemental material on operation on integers and extent of validation has a direct relationship.

Based on the data, it shows that the null hypothesis stating that “there is no significant relationship between or among the parts of the supplemental material on operation on integers and extent of validation” is rejected, it can inferred that there is a “significant” relationship between them.

**CONCLUSION**

In view of the aforementioned findings, the study has drawn the following conclusions:

1. The Supplemental Material on Operation on Integers based on the data result shows that the study output is highly acceptable.
2. Since the supplementary material is acceptable in terms of having specific, simple, attainable and measurable objectives and it captures the interest of learners in the lesson taught; it could be used independently, to serve as a tool for deepening learning.
3. Since the supplemental material focuses on the main goal, it has relevant experiences for the students to grow which is set and aligned to the DepEd standards and competencies which must strictly follow.

**RECOMMENDATIONS**

Based on the findings and the conclusions, the following are the recommendations are offered:

1. The teachers and students may use the supplementary materials for the purpose of continuity in learning during pandemic times;
2. Provide more differentiated activities so students could have more opportunities to learn new experiences;
3. It is recommended to test the supplemental material’s reliability and effectiveness.
4. It is recommended that the researcher submit a proposal to the District Mathematics Principal Coordinator to adapt the module for district implementation.

**REFERENCES**

1. Abott, J. (2014). "Development and Validation of Modules" *National Power Retrieved Journal Vol 6 May 2011* ISSN 2012 3981
2. Albert W. (2013). "Measuring the User Experience: Collecting, Analyzing, and Presenting Usability Metrics". *British Library Cataloguing in Publication Data 2013*
3. Barnum C. (2010). "Usability Testing Essentials: Ready, Set...Test!". *Library of Congress Cataloging-in-Publication Data 2010*
4. Beezly P. (2010). "Making Good Assessments: A Practical Resource Guide". *British Agencies for Adoption and Fostering, 2010*
5. Brookhart S. (2013). "How to Create and Use Rubrics for Formative Assessment and Grading". Website: [www.ascd.org](http://www.ascd.org)
6. Casem, R. Q. (2013). "Scaffolding Strategy Mathematics: Its Effects on Students' Performance and Attitudes". *Comprehensive Journal of Educational Research Vol.1(1), pp.9-19, May 2013* ISSN:2312-9421 Copyright 2013 Knowledge Base Publisher.
7. Crawford J. (2012). "Aligning Your Curriculum to the Common Core State Standards." *Library of Congress Cataloging-in-Publication Data. Crawford, Joe, 1946*
8. Cruz, E.D., Ed. D. (2014). "International Journal of Scientific and Research Publications". Volume 4, Issue, ISSN 2250-3153.
9. Dabbs, Lisa T. (2013), "Delivery of Instruction". *New Teacher Academy.*
10. Delgado-Rico, E., Carretero-Dios, H., & Ruch, W. (2012). Content validity evidences in test development: An applied perspective. *International Journal of Clinical and Health Psychology Espana, 12(3), 449-460.*
11. Dodd, A. R. (2015). "The Use of Supplementary Materials in English Foreign Language Classes in Ecuadorian Secondary Schools". *English Language Teaching; Vol. 8, No. 9; 2015. Published by Canadian Center of Science and Education.* <https://files.eric.ed.gov/fulltext/EJ1075463.pdf>
12. Ediger M. (2010). "Teaching Mathematics in Elementary School." *Discovery Publishing House New Delhi - 110002* <https://books.google.com.ph/books>
13. Fox C. et al. (2017). "An Introduction to Evaluation". *Printed and bounded by CPI Group (UK) Ltd, Croydon, CR0 4YY.* <https://books.google.com.ph/books>
14. Harrington, C., Wood, R., Breuer, J., Pinzon, O., Howell, R., Pednekar, M., ... & Zhang, J. (2011). Using a unified usability framework to dramatically improve the usability of an EMR module. In *AMIA annual symposium proceedings (Vol. 2011, p. 549)*. American Medical Informatics Association.
15. Hart G. (2012). "Five Ways that Consistency Matters". <https://intelligentediting.com/blog/five-ways-that-consistency-matters/>
16. Hattie, J.A.C.(2012). "Visible Learning for Teachers: Maximizing Impact on Learning". *New York Routledge. USA.*
17. Kharki TM. (2018). "Supplementary Resource Materials In English Language Classrooms:Development And Implementation." <file:///C:/Users/User/Downloads/24791-Article%20Text-75469-1-10-20190711.pdf>
18. Kortum P. (2016). "Human Factors and Ergonomics Society". *Human Factors and Ergonomics Society, 2016*
19. Lalo M. (2016). "Ensuring High-Quality Curriculum: How to Design, Revise, or Adopt Curriculum Aligned to Student Success." *Digital Content & Publications 2016*
20. Liakka E. (2016). "Consistency In Book Design". *LCCE® publications: Intoverkko Project 2016*
21. Liboon, M. P. (2011). "Learning Package in Araling Panlipunan for the 21<sup>st</sup> Century Learners". *Unpublished Master's Thesis, Laguna State Polytechnic University, Sta. Cruz, Laguna.*
22. Lo M. (2019) "The Arabic Classroom: Context, Text and Learners". *Published by Routledge 2 Park Square, Ilton Park, Oxon OX14 4RN 2019*
23. Male A. (2019). "A Companion to Illustration: Art and Theory". *2019 John Wiley & Sons, Inc.*
24. Masuhara, H. (2015). 'Anything goes' in task-based language teaching materials?-the need for principled materials evaluation, adaptation and development. *The European Journal of Applied Linguistics and TEFL, 4(2), 113-127.*
25. McGrath, I. (2013). *Teaching materials and the roles of EFL/ESL teachers: Practice and theory.* A&C Black.
26. Medianista, R. (2014). "Content Evaluation of Grade 8 learning package." *Undergraduate Thesis. Lucban, Quezon. Southern Luzon State University.*
27. Newmann, F.M., (2007). "The Significant and Sources of Student Engagement and Achievement in Ameerican and Secondary Schools". *New York: Teachers College USA.*
28. Nurjamin A. (2019). "Accuracy and the Consistency in Terminologies Used in an Elementary Textbook"[https://www.researchgate.net/publication/334419757\\_Accuracy\\_and\\_the\\_Consistency\\_in\\_Terminologies\\_Used\\_in\\_an\\_Elementary\\_Textbook](https://www.researchgate.net/publication/334419757_Accuracy_and_the_Consistency_in_Terminologies_Used_in_an_Elementary_Textbook)
29. Odder, M. (2008). "Communication Studies: Aguide to Reference Sources". *University Libraries, state Universities of New York.*
30. Pajak E. (2011). "Contemporary Issues in Curriculum". *Pearson 2011*
31. <https://books.google.com.ph/books>
32. Papajani A. (2017). "Elements of Content and Presentation of School History Textbooks for Vth Grade of Basic Education in Albania From 1946 to 1991".



- [https://www.researchgate.net/publication/319872361\\_Elements\\_of\\_Content\\_and\\_Presentation\\_of\\_School\\_History\\_Textbooks\\_for\\_Vth\\_Grade\\_of\\_Basic\\_Education\\_in\\_Albania\\_From\\_1946\\_to\\_1991](https://www.researchgate.net/publication/319872361_Elements_of_Content_and_Presentation_of_School_History_Textbooks_for_Vth_Grade_of_Basic_Education_in_Albania_From_1946_to_1991)
33. Parges, Ramil V. (2012). "Development and Validation of Worktext in Physics for High School Fourth Year Studebrs". Unpublished Master's Thesis, Laguna State Polytechnic University, Main Campus, Sta. Cruz, Laguna.
  34. Pitman G. (2014). "This Day in June". Magination Press, 2014
  35. Petroman C. (2013). "Improving the development of learning materials for open and distance learning." Published by Elsevier Ltd. Open access under CC BY-NC-ND license
  36. Preece, J. (2010). "Sociability and Usability in Online Communities in Determining and Measuring Success Behavior and Information Technology". Vol. 20, issue 5, November 10.
  37. Reiss E. (2012). "Usable Usability: Simple Steps for Making Stuff Better". Wiley, 2012
  38. Rubin J. (2011). "Handbook of Usability Testing: How to Plan, Design, and Conduct Effective Tests". Wiley Publishing, Inc. 10475 Crosspoint Boulevard Indianapolis, IN 46526
  39. Salandanan (2007). "Elements of Good Teaching" LORIMAR Publishing Company.
  40. Scheerens J. (2016). "Opportunity to Learn, Curriculum Alignment and Test Preparation: A Research Review". Springer International AG Switzerland 2016
  41. Shahrill M. (2014). "Identifying The Issues From History Textbooks Research". [https://www.researchgate.net/publication/266145063\\_IDENTIFYING\\_THE\\_ISSUES\\_FROM\\_HISTORY\\_TEXTBOOKS\\_RESEARCH](https://www.researchgate.net/publication/266145063_IDENTIFYING_THE_ISSUES_FROM_HISTORY_TEXTBOOKS_RESEARCH)
  42. Shields, M. (2011). "Effective Teaching". <http://www.teachers.net/wong/mat11/>
  43. Slobodanka Antic, Ivan Ivic, Ana Pesikan (2013). "Textbook Quality – A Guide to a Textbook Standards". V&R unipress in Gottingen/[www.vr-unioress.de](http://www.vr-unioress.de) Das Werk und seine Teitle sind urheberrechtlich geschützt.
  44. Suyitno (2017). "Development of Learning Materials Based on Realistic Mathematics Education Approach to Improve Students' Mathematical Problem Solving Ability and Self-Efficacy." *International Electronic Journal Of Mathematics Education*. <https://doi.org/10.29333/iejme/5721>
  45. Teukolsky R. (2013). "Picture World: Image, Aesthetics, and Victorian New Media - Page 150". Printed and bound by CPI Group (UK) Ltd. Croydon. CRO 4YY <https://books.google.com.ph/books>
  46. Tien-Chi Huang, Ting-Ting Wu, João Barroso (2020). "Innovative Technologies and Learning". *Third International Conference, ICITL 2020 Porto, Portugal, November 23-25, 2020 Proceedings*.
  47. Thakur R. (2015). "Using Supplementary Materials in the Teaching of English: Pedagogic Scope and Applications". Published by Canadian Center of Science and Education. <https://files.eric.ed.gov/fulltext/EJ1084305.pdf>
  48. Thakur, R. (2015). "The Development and Evolution of R2P as International Policy" <https://onlinelibrary.wiley.com/doi/full/10.1111/1758-5899.12258>
  49. Tomlinson, B (2011). "Materials Development in Language Teaching" Second Edition. Library of Congress Cataloguing Publication 2011
  50. Tomlinson, B. (2013). "Materials development". *The encyclopedia of applied linguistics*, 1-7.
  51. Tomlinson, B. (2014) "Developing Materials for Language Teaching". Printed and bound in Great Britain by Cromwell Press, Towerbridge, Wiltshire. 2014
  52. Utami ER. (2016). "Developing Supplementary Reading-Writing Materials For Enrichment Purposes For Grade X Students Of Senior High School". *English Education Study Programme Faculty Of Languages And Arts State University Of Yogyakarta*
  53. Wong, S. (2013). "The English Teacher's Companion". Third Edition North West Regional Educational Laboratory.
  54. Zeegeen L. (2010). "Complete Digital Illustration: A Master Class in Image-Making". Rotovision SA Route Suisse 9 Switzerland 2010. <https://books.google.com.ph/books>
  55. Zhou h. (2017). "Why Does Writing Good Learning Objectives Matter?" <https://learninginnovation.duke.edu/blog/2017/03/learning-objectives/>



# THE USAGE OF IRONY IN O. HENRY'S STORY "THE GIFT OF THE MAGI"

**Fayzulloyeva Zilola Zafarovna**

*Master's Degree Samarkand State Institute of Foreign Languages (Uzbekistan)*

## ABSTRACT

*American author of short stories O. Henry was outstanding writer in the history of the world literature. His writing is full of various stylistic devices as irony, paronomasia, metaphor, metonymy and exaggeration which make the story full of fun. He is a master of surprising endings, and his story plots are usually designed dramatically, and some unexpected changes at the end make people read and enjoy them. Tearful smile is another feature in his writing style, and it is the combination of comedy and tragedy. O. Henry's typical writing styles can be presented as follows: humorous language, surprising endings and tearful smile. The article deals with the problem of revealing the stylistic features of irony in the works of a well-known American writer. It describes the language features of realism in American literature.*

**KEYWORDS:** *O. Henry, writing styles, humorous Language, surprising Endings, Tearful Smile, rhetorical devices, unexpected ending, local colour, verbal irony, parallelism*

## 1. INTRODUCTION

O. Henry's unusual background influenced the plots for his tales and the characters of his stories depict the life of commoners of New York City. O. Henry's personages are only examples of his proficiency in creating a bright texture of language by generating native dialect. This linguistic sensitivity contributes to O. Henry's inconstancy as a local colorist. O. Henry was always well-known for his humorous narration ability to add some shade of light into tragedy and some sadness into comedy. Presenting such kind of effects in the stories was made with the help of stylistic devices and irony was one of essential among them. Extraordinary endings is another phenomenon of O. Henry's writing style. They were used to encourage low-class people to find a better life notwithstanding uncomfortable conditions.

## 2. O. HENRY'S WRITING STYLE

### 2.1 The role of stylistic devices in analyzing literary work

Linguistics as the science of studying languages gives information about what language stands out among other phenomena, what are its elements and units, how and what changes occur in the language. The research is devoted to the stylistic analysis, so before analyzing the works let's look through with stylistics, its origin, aim and meaning.

The stylistics is a branch of linguistics that investigates the principles and the usage of various resources for the transmission of thoughts and emotions in different conditions of communication. There are different types of stylistics like, for instance, the stylistics of language and the stylistics of speech or linguistic stylistics and literary stylistics. Stylistics belongs to the western traditional rhetoric and poetics of Europe. Style was a notion in the field of rhetoric in ancient Greece. It is considered as a method and art for producing texts. Ancient Greek philosophers like Socrates, Plato and Aristotle played essential role in writing about rhetoric. The notion of style comes from the use of rhetorical devices to catch certain effects in conversation. O. Henry uses many techniques and different styles in his writing like local colour, for example. As he was born in North Carolina, the cultural tradition had a great influence in his literary career as a result of his southern background. He is one of the most outstanding writers of the earlier twentieth century. The most famous technique in his short stories is using unexpected ending; for example in "The Gift of the Magi", the reader never expects the husband to sell his watch when the wife brings him a chain for it and the wife to cut her hair when her husband is buying her combs.

There are various stylistic devices the writer uses to enrich the aesthetic value of his text. Without the metaphorical language, writing would be ordinary



and flat. The more stylistic devices used, the more incomparable writing can be.

## 2.2 The function of irony in stylistic analysis of the text

Stylistic analysis of the text gives opportunity to understand more clearly the meaning of the words and expressions used by the author. The major objective of the first stage of the analysis is to define the structure of the text material and its semantic meaning and the most thorough study of all the details will be followed. But stylistic analysis is done with the help of diverse stylistic devices. In this article such a stylistic device as irony will be regarded.

Irony is such a stylistic device the meaning of which is the opposite of the literal meaning. Irony is very effective literary device and it influences on the reader's understanding of the situation. This device is grounded on the interaction of dictionary and contextual logical meanings. There are three types of irony in modern theories of rhetoric: verbal, dramatic and situational.

Verbal irony is an inequality of expression and intent: when a speaker says one thing but means another, or when a literal meaning is contrary to its intended effect. Dramatic irony is an inequality of expression and awareness: when words and actions have expressiveness understandable for the listener or when public understands, but the speaker or character has difficulty in understanding. In the situational irony intention and result can be different: when the result of an action is opposite to the desired or expected effect.

Irony can be comprehended in two senses: broad and narrow. In a narrow sense irony is presented with the word having positive connotative meaning in order to express a negative assessment of something. In a broad sense irony is thought ironical if asserting to a positive or neutral attitude of the speaker towards some fact it implies his negative evaluation of it. Some words and phrases have a definite ironical connotative meaning, which they preserve in all contexts. O. Henry used irony in his works to make his writing extraordinary and distinctive. Let's analyze irony in the short story «The Gift of the Magi».

## 2.3 The unusual ending in O. Henry's story «The Gift of the Magi»

The unusual ending distinguishes O. Henry's writing from many other outstanding short story writers. The plots of his stories attract readers' attention because at the end the stories normally change their direction unexpectedly and when the readers try to predict the ending it turns to something different. These surprising endings make the story reasonable, even if they are sad.

At first in «The Gift of the Magi» the author tells us how valuable was the watch for Jim and how precious was the hair for Della. In order to buy Christmas gifts, the poor young couple is sacrificing their best possessions. As a consequence, however, their two precious presents they bought all became unnecessary at the end of the story. However, they proved to each other how strong their love is. It makes readers smile and feel sad at the same time, but the most important thing is that we can feel the pure real love between the couple. This typical unusual ending is something specific in O. Henry's writing.

## 2.4 Parallel construction and irony used in the story «The Gift of the Magi»

Parallelism can be very effective means to underline the irony of definite descriptions or situations in literary works. Parallel construction is a device, which may be encountered not so much in the sentence. Identical syntactical structure in two or more sentences or parts of a sentence is important feature of parallel construction. Repetition of the words (lexical repetition), conjunctions and prepositions is used in parallel construction. Pure parallel construction, however, does not depend on any other kind of repetition but the repetition of the syntactical design of the sentence. It is widely shown in the story "The Gift of the Magi". "Pennies saved one and two at a time by bulldozing the grocer and the vegetable man and the butcher until one's cheeks burned with the silent imputation of parsimony that such close dealing implied." Using parallel constructions the author sneer at Della who put aside the money for her husband's gift. "In the vestibule below was a letter-box into which no letter would go, and an electric button from which no mortal finger could coax a ring."

Parallelism successfully shows the author's irony in describing the main characters' place of living. "Had the queen of Sheba lived in the flat across the airshaft, Della would have let her hair hang out the window some day to dry just to depreciate Her Majesty's jewels and gifts. Had King Solomon been the janitor, with all his treasures piled up in the basement, Jim would have pulled out his watch every time he passed, just to see him pluck at his beard from envy."

The author shows the irony when Della cuts her hair which is the most precious thing in order to buy a platinum chain for her husband's watch. At the same time Jim sells his watch to buy a comb made of the shell of a tortoise for Della's hair. They were taken aback when they met and decided that the gifts should be put aside for a while. When Henry described Della's appearance he used the word "wonderfully" to indicate a verbal irony in a comic exterior of his heroine. "Within forty minutes her head was covered with tiny, close-lying curls that



made her look wonderfully like a truant schoolboy. The irony aimed at the way how rapidly Della went out to sell her hair. "It was not anger, not surprise, not disapproval, not horror, not any of the sentiments that she had been prepared for." The writer skillfully managed to express situational irony using parallel constructions with the particle "not" while pointing out Jim's stressful condition after his revealing Della's Christmas present as a result of which his gift became useless. "I don't think there's anything in the way of a haircut or a shave or a shampoo that could make me like my girl any less."

The author uses irony in this story to oblige the reader to stop and think about love, sacrifice and what is really valuable. Ordinary human love, which O. Henry shows in the actions of his main heroes, elevates to a height of wisdom of the Magi. It is a wonderful gift to buy for any money. O. Henry approves the actions of the heroes by using humour. In this example, the author used irony to create a delicate expression of emotional tension.

### 3. CONCLUSION

O. Henry's style of writing can be distinguished by its brightness. First and foremost, it is humour used in his language in the form of paronomasia, metaphor, irony, parallelism and so on to capture readers' attention and make the story more interesting. Secondly, O. Henry's surprising endings are known as the most famous feature of his writing. Thirdly, despite funny situations shown in his stories we can feel a great sadness. The combination of tragedy and comedy creates the style of "tearful smile".

In conclusion, this article does not only indicate drawbacks, but also unmask unfair claims giving them ironic sense. Irony as a stylistic device has aesthetic function, increasing emotional tension and comic effect, and the author uses irony to deride some actions that you don't have to do, or the cases that can occur in the life of any person.

### REFERENCES

1. R. Galperin. *Stylistics, Высшая школа, 1981.*
2. O'Henry. *«The Gift of the Magi», 1906.*
3. Henry O. *100 selected stories (Wordsworth Classics). Wordsworth Editions, 2013.*
4. Cerf. B. A. & Cartmell Van H. (2010). *The best short stories of O. Henry, NY: The Modern Library of New York.*
5. <http://estylitics.blogspot.com/2010/10/parallel-construction.html>
6. <https://penandthepad.com/irony-used-the-gift-magi-20783.html>



# A STUDY ON CUSTOMER ATTITUDE TOWARDS THE USAGE AND PROBLEMS OF PLASTIC MONEY – WITH REFERENCE TO THE WOMEN CUSTOMERS OF SBI BANK OF MANGALORE CITY

**Dr. Sowmya Praveen K<sup>1</sup>, Dr. C.K. Hebbar<sup>2</sup>**

*<sup>1</sup>Post Doctoral Fellow in commerce, Srinivas University, Mangalore*

*OrcidID: 0000-0002-1124-8488,*

*<sup>2</sup>Research Professor, Srinivas University, Mangalore*

*OrcidID: 0000-0002-3711-9246,*

## ABSTRACT

*The term Plastic Money refers to the usage of plastic cards for the day to day transactions, in the place of currency notes. There are different types of plastic money, such as ATM cards, Credit cards, Smart cards, pre-paid cash cards, visa cards. In today's modern technology, customers prefer plastic money, instead of hard cash. This paper mainly highlights the pros and cons of the plastic money. The study concludes that people mainly prefer Plastic Money due to convenience, fast service and 24 hours service. The major challenges faced by the customers are technical issues, hidden charges and server problems. The data is collected from 25 women respondents from the Mangalore City. For the collection of data, structured questionnaires were prepared and circulated to the respondents. The statistical tools like percentage, frequency and mean are used to inference the data.*

**KEY WORDS:** *Plastic money, debit card, credit card, pros, cons*

## 1.0 INTRODUCTION

In today's modern technology, people prefer to use electronic gadgets for making the payments in the place of traditional banking systems. Plastic money is the one of the most famous electronic devices, which is preferred by most of the customers. Plastic money is an alternative to cash [1]. Plastic money is made out of plastic, which is the easier way of paying for the goods and services. There are different types of plastic money, such as debit cards, credit cards, charge cards, co-branded cards, diners club cards and so on [2]. In this study, the researcher is focusing on the usage of debit/ ATM card and the credit card [5].

The customer will get lot of benefits from plastic money, such as 24x7 service, saves time [6], convenience [7], improves the prestige, no need of carrying cash [4], easy to use [9] and so on. But these plastic cards are not free from limitations. The important limitations are fear of fraud [8], security issues, server problems, non-availability of up-to-date information and hidden charges.

## 1.1 OBJECTIVES

The objectives of the study are as follows;

- To study about plastic money
- To know about the usages of plastic money
- To study the challenges faced by the customers from plastic money.

## 1.2 METHODOLOGY

This study was undertaken based on primary and secondary data. This article is purely based on primary data and where ever necessary secondary data are used. The primary data was collected from structured questionnaire method and personal interview method. Secondary data was collected from websites and reputed journals. Random sampling method was used to collect the information from the respondents. The statistical tools used for the study are percentage, frequency and mean. The area chosen for the study is Mangalore city, 25 SBI bank women customers are selected to collect the data.

## 1.3 STATEMENT OF THE PROBLEM

In the present scenario technology plays a very important role. Due to the busy schedule people prefer plastic money for the daily transactions rather than cash payment [3]. Plastic money is very easy to



carry, without any fear one can carry the plastic cards. customers will be lot of advantages and disadvantages from plastic money. Hence it is very

important to study the customer Attitude towards the usage and problems of plastic money.

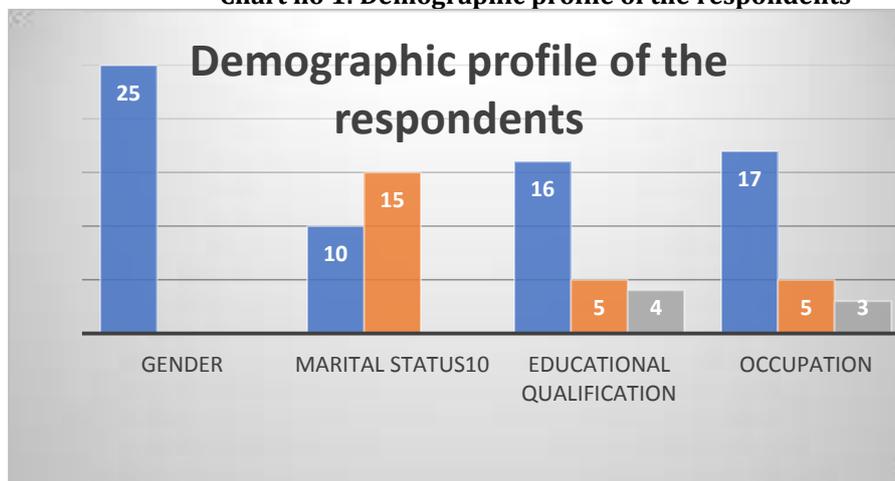
#### 1.4 DATA ANALYSIS AND INTERPRETATION

**Table 1: Demographic profile of the respondents.**

Particulars	No of respondents	Percentages
<b>A. GENDER</b>		
Female	25	100%
Total	25	100%
<b>B. Marital status</b>		
Single	10	40%
Married	15	60%
Total	25	100%
<b>C. Educational Qualification</b>		
Degree	16	64%
PG	5	20%
Others	4	16%
Total	25	100%
<b>D. Occupation</b>		
Salaried	17	68%
Profession	5	20%
Others	3	12%
Total	25	100%

Source: Primary Data

**Chart no 1: Demographic profile of the respondents**



The study covers 100% of the women respondents who uses plastic money for the payment, 60% of the respondents are married, 64% of the

respondents are degree holders and 68% of the respondents are salaried people.

#### 1.5 SURVEY QUESTIONNAIRE

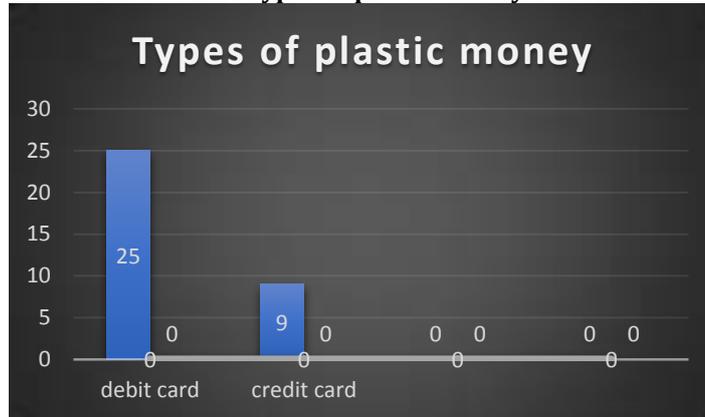
**Table 2: Types of Plastic Money used by the respondents.**

Particulars	No of respondents
Debit / ATM card	25
Credit card	9

Source: Primary data



**Chart no 2: Types of plastic money**



The study shows that all the 25 respondents were using debit /Atm card and only 9 respondents

were using credit cards. which shows that the debit card users are more than the credit card.

**Table 3: The different uses of plastic money**

Particular	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Mean
Convenience	20	5	--	--	--	4.8
Time saver	17	8	--	--	--	4.68
24 hours service	20	5	--	--	--	4.8
Fast service	22	3	--	--	--	4.88
Easy to carry	18	7	--	--	--	4.72
Increases the prestige	17	8	--	--	--	4.68
No need of carrying cash	19	6	--	--	--	4.76

Source: Primary data

The study shows that respondents strongly agree towards the different benefits of plastic money, with mean value are convenience (4.8), time saver (4.68), 24 hours service (4.8), fast service (4.88),

easy to carry (4.72), increases prestige in the society (4.68), no need of carrying cash (4.76).

**Table 4: Problems faced by the customers from plastic money**

Particular	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Mean
Fear of fraud	20	5	--	--	--	4.8
Security issues	19	6	--	--	--	4.76
Technical errors	25	--	--	--	--	5
Server problems	22	3	--	--	--	4.88
Non availability of up-to-date information	18	7	--	--	--	4.72
Hidden charges	21	4	--	--	--	4.84

Source: primary data

As per the data, the respondents are strongly agreed towards the following problems from plastic money and the mean values are as follows; fear of

fraud (4.8), security issues (4.76), technical errors (5), server problems (4.88), non-availability of up-to-date information (4.72), hidden charges (4.84).

**Table 5: Would you like to use plastic money in Future.**

Particulars	No of respondents	Percentages
Yes	25	100
No	0	0
Total	25	100

Source: Primary data



As per the data all the 25 respondents would like to use plastic money for the payment in the future as well. Even though there are some problems, the respondents would like to continue with the existing system. This shows that, the benefits are more effective, than the problems.

### 1.5 SUGGESTIONS

The following are the suggestions of the study:

- Customers are having the fear of frauds (hackers); hence the banking system should give awareness to the customers, not to share their banking details, pin numbers, OTP and so on.
- Most of the time customer faces the problems of server issues, technical problems, security issues, hence the bank needs to take serious steps to tackle these problems.
- Majority of the customers are not getting latest information about the schemes; hence bank should conduct some awareness programmes and need to give information to the latest updates.
- The number of credit card users are very less compared to debit card, because of the fear of hidden charges, hence the bank should give detailed instructions of the bank charges applicable to credit cards.

### 1.7 CONCLUSION

This paper highlights the customer Attitude towards the usage and problems of plastic money. The study shows that, plastic money provides lot of benefits to the users, but it is not free from problems. If the bank takes proper steps at the right time in an effective way, these problems can be easily tackled. The study also tells that all the 25 respondents would like to use plastic money for the payment in the future as well. Hence, we can conclude that plastic money is one of the wonderful technologies in the banking field for the usage of customer. The customers should get the benefits of these services in larger number.

### REFERENCE

1. Nehal Chhalani (2017), "Impact of plastic money on banking trends, with special reference to Uco Bank Tinsukia" published in IRJMESH, Vol 8, Issue 9.
2. K Neelavathi et.al, "A study on impact of usage of plastic money in India", IOSR Journal of business and Management, PP 64-69.
3. Dr Jaishu Antony (2018), "A study on the impact of plastic money on consumer spending pattern", Global Journal of Management and Business Research.
4. Tiwari Rajesh and Priyanka (2018), "Plastic money: Trends, Issues and Challenges" published in PEZZOTTAITE Journals.
5. Md Al Amin et.al (2019), "Customer perceptions about plastic money towards sustainable banking in Bangladesh: A Technological adoption", published in International business research.
6. Ramasamy et.al (2006), Development of E-money in Malaysia, in national statistical conference, Putrajaya, Malaysia.
7. Angelakopoulos G and Mihiotis, A (2011) "E-banking challenges and opportunities in Greek banking sector" Electronic Commerce Research Journal, 11(3):297-319.
8. G. Sudhakar (2014), Plastic Money: The rise of E-money, A monthly double blind peer reviewed refereed open access international e-journal.



# INNOVATIVE SUPPLY CHAIN SOLUTION FOR INDIAN AUTOMOBILE MANUFACTURING SECTOR: A CASE STUDY

**Sanjay Choudhary<sup>\*1</sup>, Deepanshu Arora<sup>\*2</sup>, Sunil Kumar Jakhar<sup>\*3</sup>,  
Krishna Nandan<sup>\*4</sup> Amogh Sharma<sup>\*5</sup>**

*, \*1,2,3,4,5 Assistant Professor, Department of Mechanical Engineering, Vivekananda Institute of  
Technology, Jaipur, Rajasthan, India*

Article DOI: <https://doi.org/10.36713/epra7336>

DOI No: 10.36713/epra7336

## ABSTRACT

*In Indian Automobile Industry for heavy & commercial vehicle segment, manufacturers always face the major problem of supply chain management. As manufacturer follows any kind of solution scheme, they do not find very improved results, so for Indian condition an innovative solution of supply chain is required. The study is based on using In Bound & Out Bound Strategy together providing an edge to come over the Supply chain management problem.*

## INTRODUCTION

Ashok Leyland is a commercial vehicle manufacturing company based in Chennai, India. Founded in 1948, the company is one of India leading manufacturer of commercial vehicles, such as trucks and buses, as well as emergency and military vehicle. Operating six plants, Ashok Leyland also makes spare parts and engines for industrial and marine application. It sells about 60000 vehicles and about 7000engine annually. It is a second largest commercial vehicle company in India the medium and heavy commercial vehicle segment with a market share of 28 % (2017-2018). Ashok Leyland is the second technology leader in the commercial vehicles sector of India behind Tata Motors; in 1997 the companies launch the country first CNG bus.

## NEED OF SUPPLY CHAIN MANAGEMENT

The company (Ashok Leyland) was facing the huge

task of integrating its entire supply chain and at the same time it had to reduce its costs, inventory, and improve customer satisfaction. Rising raw material cost was a serious concern for the company. Therefore, Ashok Leyland decided to streamline its supply chain process and the company started its SCM project OSCARS (Optimizing Supply chain And Rationalizing sourcing) to optimize its supply chain and rationalize its sources.

## IN BOUND SUPPLY CHAIN

To reduce costs and to improve the inbound supply chain Ashok Leyland introduced the project OSCARS (Optimizing Supply chain And Rationalizing sourcing) which includes supplier partnership, vendor base rationalization supply tiers, inventory optimization through JIT total cost management logistics initiatives sourcing and global sourcing.

**The Basic Principles of OSCARS**

1. Vendor base rationalization
2. Single window system
3. Supplier tier
4. Just in time (JIT)
5. Logistic initiative
6. E-sourcing

**Single window system:** The strategic sourcing and “Corporate Quality Engineering” (CQE) teams jointly formed the single window system bringing with them specialized commercial and technical knowledge. For the supplier this had created a convenient single point contact with AL for sharing drawing, for negotiating prices and long-term business volumes and consultancy on quality to management issues.

**Supplier tier** (any one of two or more competitors tie one another): AL pruned its panel of direct suppliers thorough tiring and system buying. Under this AL dealt directly with tier one suppliers who in turn were supported by tier two and tier three suppliers. Tear down studies and value engineering analyzed the constitution and composition of a part to prune cost through substitution reduction or elimination of material /sub-assemblies without affecting quality and performance.

**Just in time (JIT)** AL focused on JIT approach for high value /high volume items and low-cost logistics for low value high volume items. Project OSCARS brought about a few fundamental changes. The push system which means “let us make all we can just in case we need”. This system given a way to pull system which means “make what the customer need when he needs it”. Each stage produced only as much as the next stage needed. This resulted in saving of Rs. 8.5 crore a year and a lean supply chain.

**Logistic Initiative:** These initiatives included transport-based rationalization, enhancement of truckload, space and route optimization which has benefited the company by saving its transportation cost.

**E-sourcing:** E-sourcing included global benchmarking gain through bidding, identification of cost competitive sources, introducing best sourcing practices, increasing efficiencies, and minimizing costs, improving bottom line of the value chain. All these activities have saved 11.5% of total material cost.

**OUT BOUND SUPPLY CHAIN**

A customer survey and a study of benchmarks had

come out with three major parameters for service level targets which are order to delivery time, reliability of deliveries and availability of order status information. The customer could accept delivery in 5 days from the date of payment for regular models for multi axle vehicles the promised period was two to four weeks. Tight pipeline inventory norms were set for different models and markets and were met through a new three tier distribution network. Plant sales yards acted as national pools to hold rare models and excess of regional requirement. Next tier was made regional stock pools, which ensured just in time supplies to all regional sales offices. to understand customer needs and -assimilate the knowledge. AL also built a marketing information system (MIS) to monitor the trends and forecast demand from the input dealers and field executives. The Regional office worked towards continuous improvement in the products and marketing.

**Table 1: List of AL Regional Part Warehouses**

REGIONAL PART WAREHOUSES
Chennai
Bangalore
Hyderabad
Trivandrum
Pune
Ahmadabad
Delhi
Jaipur
Kanpur
Nagpur
Dhanbad

**Table 2: List of AL Regional Offices**

REGIONAL OFFICE
Gurgaon- (Middle India)
Jaipur (Rajasthan)
Lack-now (UP and Uttaranchal)
Calcutta (East)
Mumbai (Maharashtra and Goa)
Ahmadabad (Gujarat)
Nagpur (Central)
Chennai (Tamilnadu)
Bangalore (Andhra Pradesh)
Trivandrum (Kerala and Karnataka)

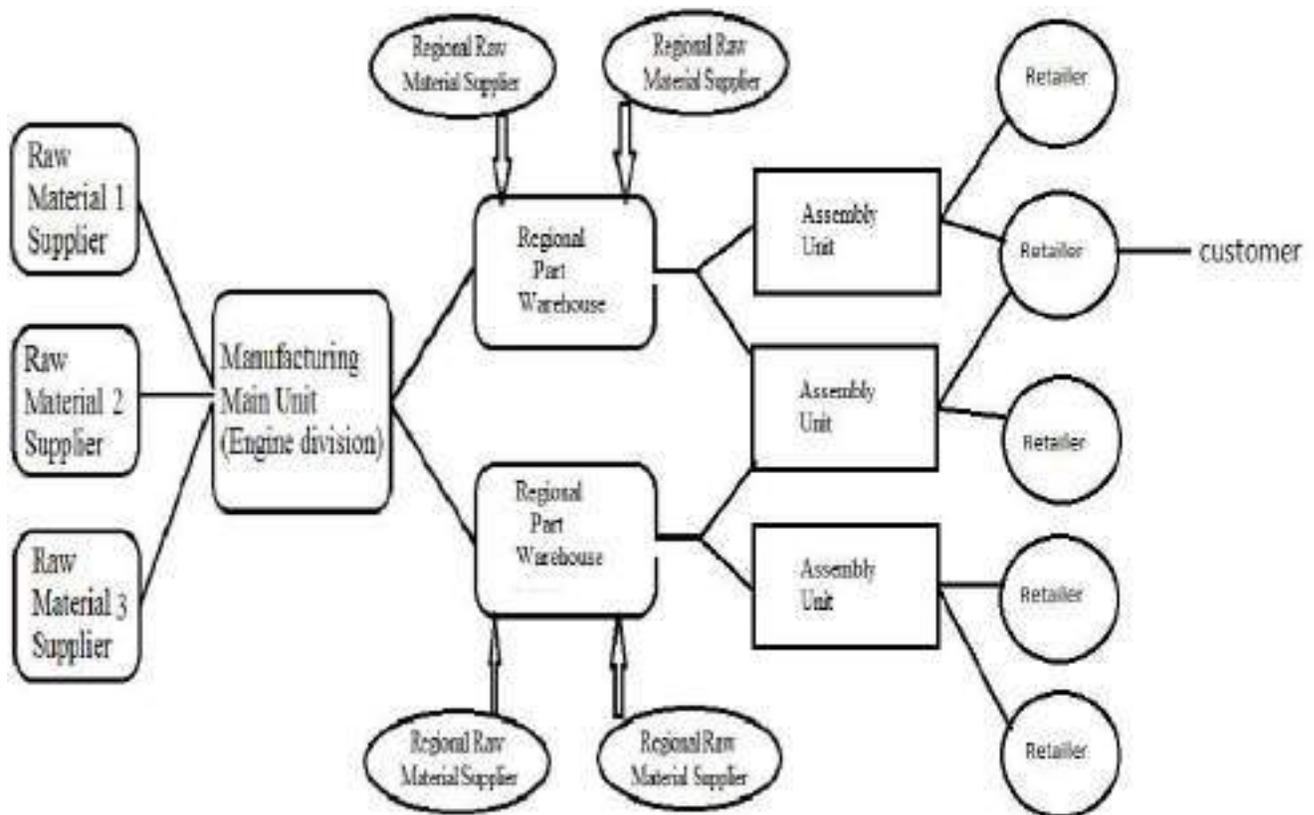


As the location constraints to deliver the end product at various location in all over India, AL required a solution scheme which should have a combination of traditional supply chain management system includes with some innovative solution. To follow such dynamic condition, a solution and innovative approach is proposed in this work. The detailed flow chart of supply chain is being representing in the following figure. The introduction and provision of regional parts warehouse is required to maintain such type of supply chain solution. Here the assembled products are required at various end location, the unique item is the engine is required to complete the full assembly. As the engine manufacturing is required a huge investment therefore it can be arranged at a single location. So that the one engine manufacturing unit is same as available in the case of AL.

The engine division deliver the engine to the regional part warehouse, same as the regional raw

material suppliers supply various raw material to the warehouse required to the product assembly. And the various Assembly units are being established to fulfil the local demand of the various region. The proposed structure of the full AL product supply chain is being represented in the following figure. The typically we can see the various locational distance to the center warehouse, and the distance to the warehouse to the assembly units are the main constraints of the problem. The optimum routing will be the focused target of the current study. So that, with the minimum investment all the deliveries can be conform.

The need of optimum routing is important to maintain the production cost for the market competition. Here the routing is the NP hard nonlinear structure due to the complexity and the dynamicity of the supply chain structure. To solve and optimize the proposed approach, evolutionary algorithms can be utilized.



### EVOLUTIONARY METHODS FOR OPTIMUM SCM SOLUTION

In the modern time, the algorithms based on evolutionary approach based on population and random selection are utilized to solve the non-linear

type of complex problem. Because of the functionality and the ability to handle the multi target and multi-objective optimization problem, such approaches have a huge scope in the field of finding optimum solution or supply route. The optimum



route guaranty to the minimum investment of time and money for fulfill all the demand on due time.

The Genetic Algorithm (GA), Particle Swarm Optimization (PSO), Ant colony optimization (ACO) are such kind of evolutionary approaches, using them we can optimize the results of the proposed supply chain solution. As the previous researchers done their research work with the application of GA with manufacturing scheduling one of the kinds of nonlinear problem. Their research work shoes the random selection criteria-based approach like GA provides vary attractive results, also integrate with the problem very easily though the use of MATLAB programming

## CONCLUSION

The present focused over the use of combination of traditional and modern methods for the promising supply chain in Indian sub-continent for the supply of heavy automobile products. The proposed approach focused over the use of regional warehouse at the center of inbound and outbound supply nodes, so that multiple regional warehouses can fulfill the need to multiple assembly units at constant rate and with fail. Furthermore, the for the optimum routing purpose the evolutionary algorithms can be used. The GA is one of the kinds of population based evolutionary optimization technique, can use to solve the routing problem of the proposed system. It has very great ability to integrate with the nonlinear type of problem, and the use of the problem is also very easy through the MATLAB platform. The final solution highlights the optimum requirement of the resources to fulfill the reginal demand of the AL heavy automobile. That will also help to the organization by minimizing the production cost and in increasing the revenue.

## REFERENCES

1. Ballou, R. H. (n.d.). "Logistics, Supply Chain & Transport Management Program".
2. Badenhorst-Weiss, I. M. "Strategic supply chain framework for the automotive industry". *African Journal Of Business Management* Vol. 4(10), pp. 2110-2120, (18 August, 2010).
3. D Arora, L Dhuria, M Choudhary, ' Use of Artificial Intelligence Techniques to Solve Multi-target Flow Shop Scheduling Problem', *International Journal of Research in Engineering, IT and Social Science* Vol. 9, No. 3, PP. 128-133, 2019.
4. Deepanshu Arora & Gopal Agarwal 'Meta-Heuristic Approaches for Flow Shop Scheduling Problems: A Review' *International Journal of Advanced Operations Management, Inderscience*, Vol. 8, No. 1, PP. 1-16 2016.
5. Deepanshu Arora & Gopal Agarwal 'Application of GA and PSO for Flow-Shop Scheduling Problem' *International Journal of Emerging Technologies and Innovative Research*. Vol.4, No. 9, PP.240-247, 2017
6. Koskela, R. V. (26-28 July 1999). "Roles of Supply Chain Management in Construction". *Proceedings IGLC-7, University of California, Berkeley, CA, USA*, 133-146.
7. Muriati Mukhtar, A. M. (n.d.), "Supply Chain Relationship Structures as Scenarios for Simulation".
8. Report, A. L. "Passion for Engineering". (2006-07).
9. Survey. (n.d.). "Driving on the Road to success - Ashok Leyland". 24x7learning
10. VijayR. Kannan, K. C. (Omega 33 (2005)). "Just In Time, Total Quality management, And Supply chain Management: Understanding Their Linkages and Impact on Business Performance". Elsevier, 153 – 162



# IMPROVING THE EFFECTIVENESS OF TREATMENT OF PATIENTS WITH BREAST CANCER BY OPTIMIZING MODERN METHODS OF RADIATION DIAGNOSTICS

**Isakova Shakari Isakovna**

*Master of the Department of Oncology and Medical Radiology,  
Andijan State Medical Institute Andijan, Uzbekistan*

## ABSTRACT

*A brief overview of the main methods of breast cancer screening is presented. The effectiveness of mammography as a screening method in reducing mortality from breast cancer is proved, and limitations of the method are indicated. The main trend of increasing the effectiveness of screening is the transition to digital technologies. Properly organized screening with the active participation of the population reduces breast cancer mortality by 30%.*

**KEYWORDS:** breast cancer, screening, mammography

## RELEVANCE

Over the past decades, breast cancer has consistently maintained its leading position in the oncological morbidity of the female population and is the leading cause of death of women in economically developed countries of the world, while in recent years there has been a steady increase in morbidity and mortality. The social significance of this form of cancer is so great that research on this problem occupies one of the leading places in modern oncology (Stenina M. B., 2005).

The problem of breast cancer is one of the priorities in oncology. Every year, more than 1 million new cases of breast cancer are registered worldwide. Over the past 20 years, breast cancer has been ranked first in the structure of cancer incidence in women worldwide, and second in terms of the number of deaths (V. G. Ostapenko 2011). In developed countries, breast cancer occurs in 1 in 10 women. In the United States and Western Europe, 8-12% of women develop breast cancer during their lifetime (Cheng H.D., Jigang Li., 2003). In Russia, breast cancer ranks 1st in morbidity in women aged 40-69 years (after cervical cancer) and 70 years and older (after colorectal cancer) (Petrova G. V. et al., 2007). In Belarus, breast cancer occurs with the same frequency as in Russia (41.2 per 100,000 women). In Azerbaijan, Kazakhstan and Kyrgyzstan, the incidence of breast cancer is 1.2-1.9 times lower. From 2000 to 2005, the increase in standardized

morbidity rates was minimal in Kazakhstan (3.4%) and Russia (7.0%), and the maximum – in Armenia (46.0%) (Davydov M. I., Aksel E. M., 2007).

In the Republic of Uzbekistan, breast cancer is also the most frequent and aggressive type of neoplasm in women with a tendency to increase the incidence. The incidence rate in 2005 was 6.3 people per 100 thousand population and ranks first among malignant tumors in women. In the city of Tashkent in 2011, 25.4 cases were detected per 100 thousand population in the Republic of Uzbekistan (Khodjaev A.V., Navruzov S. N., 2011)

ПредраковымиA large number of clinical, morphological, radiological and biochemical studies are devoted to precancerous diseases of the breast – benign tumors, mastopathies, cysts. At the same time, there are a number of controversial and unresolved issues, there is uncertainty in the etiology and pathogenesis of these diseases [3,7].

World statistics indicate that patients with stage I breast cancer have a 5-10-year survival rate of 82 to 92% [4,9]. However, clinical practice shows that the number of such patients does not exceed 11-20% of the total number of breast cancer patients treated. At the same time, the risk of developing breast cancer on the background of fibrocystic mastopathy increases by 4-37 times according to various data [2,4,5,7]. Based on the study of the ratio of proliferating fibroadenomatosis, intraductal and infiltrating breast cancer, it was shown that elements



of proliferating adenomatosis are constantly observed in the tumor growth zone аденоматоза, from пролифератов precancerous proliferates to structures of intraductal carcinoma [2,4]. Studies by V. P. Semiglazov showed that fibroadenomatous background was found in the overwhelming majority of breast cancer patients (from 45 to 60%) of reproductive age and only in 1/8-1/10 of persons older than 50 years [4,9].

## OBJECTIVE

To increase the effectiveness of treatment of patients with breast cancer by optimizing modern methods of radiation diagnostics.

## MATERIALS AND METHODS OF RESEARCH

The material of the study consisted of 110 first-time patients with breast tumors who were examined in the following conditions: EPA and in conditions from 2018 to 2021 years.

In accordance with the tasks set, all 110 patients with breast tumors were divided into 4 main groups according to the type of disease (Table 1.1).

**Table 1.1. Distribution of patients by type of malignated benign tumors, n=110**

Group of patients	Number of patients	
	with Abs	%
II. Fibroadenoma with malignancy	71	64.5
II. Malignated KA	15	13.6
III. Sg. in situ	19	17,3
IV. Malignated FFA	5	4.6
Total	110	100.0

As can be seen from Table 1.1, I Group I consisted of 71 (64.5%) patients diagnosed with fibroadenoma with malignancy. Specific ultrasound criteria for malignated fibroadenoma were an uneven contour of the tumor, an inhomogeneous internal structure, and central acoustic attenuation. Fibroadenoma malignancy was characterized by the following morphological changes: areas of intracanalicular proliferation appeared in the epithelium. The epithelium became multi-rowed with the formation of solid and cribriform histological

structures. интраканаликулярной Microscopic foci of cell polymorphism were also detected in the areas of intracanalicular proliferation, many proliferating areas had atypical signs; a lymphoplasmocytic reaction was expressed.

Group II included 15 patients (13.6%) with malignated cystic adenoma (Figure 1.1). X-ray detection of a filling defect or any deformation of the cyst contour during pneumocystography could indicate either cystadenopapilloma or papillary cancer in the cyst.

**Table 1.2. Distribution of patients with malignancies benign tumors by age**

The patients' age, years	the Number of patients in groups							
	I, n=71		II, n=15		III, n=19		IV, n=5	
	Abs.	%	Abs.	%	Abs.	%	Abs.	%
20	0	0	1	6,7	0	0	1	20,0
21-30	12	16,9	2	13,3	2	10,5	0	0
31-40	24	33,8	3	20,0	5	26,3	0	0
41-50	22	31,0	5	33,3	10	52,6	1	20,0
51-60	8	11,3	0	0	1	5,3	3	60,0
over 60	5	7,0	4	26,7	1	5,3	0	0

The distribution of patients with benign breast tumors with malignancy by age is presented in Table 2.1.2. As can be seen from the Table, the studied contingent of patients is in a wide age range. The majority of patients - 38 (34.5%) - were aged 41-50 years, 32 (29.1%) - 31-40 years, and 16 (14.5%) - 21-30 years.

The distribution of patients by age within the studied groups is shown in Figure 2.1.1. As can be seen from the figure, for fibroadenoma with malignancy, the largest number of patients falls on the age of 31-40 years - 24 (33.8%) patients, and 22 (31.0%) - on 41-50 years. For cancer in the cyst, the largest number of patients was detected in the age



groups 41-50 years-5 (33.3%) and over 60 years – 4 (26.7%). For c-r in situ the largest number of patients were aged 41-50 years-10 (52.6%), as well as at the age of 31-40 years – 5 (26.3%). In FFA with transition to sarcoma, the majority of patients were aged 51-60 years – 3 (60.0%).

## RESEARCH RESULTS

As has been shown in the previous Chapter, the patients were divided into the following groups with the following benign breast tumors: group I - 71 (64.5 per cent) patients with a diagnosis of fibroadenoma with malignancy; group II - 15 patients (13,6%) were diagnosed with malignization KA; group III - 19 patients (17,3%) with a diagnosis of c-r in situ; group IV - 5 patients (4,6%) with malignization FFA. In the majority of patients (83-75. 5%)<sup>1</sup>N, the T1N0-1M0 stage of the tumor process was determined by clinical and morphological methods. The control group included 50 patients with the same benign tumors without signs of malignancy: 36 with fibroadenoma, 8 with cystic adenoma, and 6 with PFA. The majority of patients - 38 (34.5%) – were aged 41-50 years, 32 (29.1%) – 31-40 years, and 16 (14.5%) – 21-30 years. When studying the contingent of patients depending on menstrual-ovarian function, it turned out that the majority of patients were at the reproductive age – 75 (68.2%), 20 (18.2%) had menopause for less than 5 years, and 15 (13.6%) had menopause for more than 5 years.

The duration of the disease varied, but the vast majority of women sought medical help in the first 3 months after the discovery of a node in the mammary gland. The duration of the disease up to 3 months was found in 71(64.5%) women, up to 6 months – in 19 (17.3%), up to 1 year – in 12 (10.9%), and over 2 years – in 8 (7.3%) women.

Almost all women – 87 (79.1%) found a node in the mammary gland independently, in 10 (9.1%) patients, the focus of compaction was established during mammographic examination, and in 13 (11.8%) – during preventive individual examination. The majority of patients sought medical help with referral-84 (76.4%), the rest – 26 (23.6%) patients applied independently.

**Conclusions.** Thus, the most informative clinical method in our studies is ultrasound (detection of the onset of malignancy in 86.3% of cases), followed by маммографическоеby mammography (70.3% of cases) and, finally, the primary examination reveals malignancy of a benign tumor in 43.6% of cases. At the same time, in the case of fibroadenoma, the presence of malignancy was determined by ultrasound in 85.7% of cases, mammography-in 73.8% and primary examination-in 47.9%. In кистoadenomeall 15 patients with cystic adenoma (100.0%), ultrasound was used to determine the presence of a malignant process in the cyst, while, mammography was used in 64.2% of cases ,

and initial examination allowed us to suspect malignancy of the cyst in 40.0% of cases. C-r in situ was diagnosed by ultrasound in 78.9,9%, mammography in 70.5% , and primary examination in 31.6% of cases. In FFA, ultrasound malignancy of the tumor was detected in 80.0%, mammography-in 40.0% , and primary examination-in 40.0% of cases.

## LIST OF LITERATURE

1. Zakharova N. A., Semiglazov V. F., Duffy S. W. *Breast cancer screening: problems and solutions [Kniga]. Moscow: GEO-TAR-Media Publ., 2011, p. 176.*
2. *Malignant neoplasms in Russia in 2012 (morbidity and mortality) [Kniga] / ed. КапринКаприн A.D.Starinsky V.V, Petrova G. V.- Moscow: Federal State Budgetary Institution "P. A. Herzen Moscow Scientific Research Institute" of the Ministry of Health of Russia, 2014. - p. 250.*
3. Krylov V. V., Tsyb A. F. *Radionuclide therapy in Russia: successes, problems and prospects [Journal]//Radiation oncology and nuclear medicine. - 2011-Vol. 1. - pp. 68-77.*
4. Levshin V. F. *Screening of breast cancerЖурнал//Bulletin of the N. N. Blokhin Russian Scientific Research Center. 1999, vol. 4, pp. 60-67.*
5. Levshin V. F., Mikhailov E. A. *Self-examination as a method of breast cancer screening [Zhurnal]//Questions of oncology. 2000, pp. 627-629.*
6. Mikhailov E. A. *Carrying out the program of the Russian Federation / WHO on training women in self-examination of mammary glands in Moscow [Book section]//Actual problems of prevention of non-communicable diseases. - 1995.*
7. Pak D. D., Rasskazova E. A., Ermoshchenkova M. V. *Breast cancer [Kniga]. - M: Triada-X, 2010. - p. 160.*
8. Petrova G. V., КапринКаприн A.D., Starinsky V. V., Gretsova O. P. *Morbidity with malignant neoplasms of the Russian population [Zhurnal]//Oncology. 2014, -Tvol. 5, pp. 5-10.*
9. Prizova N. S. *Methodological aspects, results and prospects of breast cancer screening in a large administrative regionДис. мед. наук. - Moscow., 2014-p. 114.*



# ACCEPTABILITY AND EFFECTIVENESS OF MELC-BASED SUPPLEMENTARY LEARNING MATERIALS IN PHYSICAL EDUCATION 9

Jeffrey A. Castillo, LPT

Article DOI: <https://doi.org/10.36713/epra7331>

DOI No: 10.36713/epra7331

## ABSTRACT

*This study answered the following questions: (1) What is the level of acceptability of the materials in terms of: (a) content; (b) objectives; (c) topics; and (d) activities?; (2) What are the mean scores of students in terms of pretest and posttest?; (3) Is there a significant difference between the pre-test and post-test mean scores? The study was conducted to prove that there was a significant difference in the pre-test and post-test among the respondents. The respondents of the study were composed of three (4) sections at Sampaguita Village National High School to test the effectiveness of using MELC-based Supplementary Learning Materials in Physical Education 9. In this study, random sampling method was used in choosing the respondents. The researcher made questionnaires validated by different experts from the same school where the study was conducted in the District of San Pedro, Schools Division of Laguna. Based on the data presented and interpreted in Chapter 4, the overall statistical data revealed that (1) The Level of Acceptability of Supplementary Learning Materials in Terms of Content, Objectives, Topics and Activities as perceived by the students was "Highly Acceptable". (2) During the pretest stage, the overall interpretation was Fairly Satisfactory; (3) During the posttest stage, the overall interpretation was Very Satisfactory; and (4) For the difference between the pretest and posttest it was found out that the mean difference between the pre-test and post-test of section Emerald was 3.30 with a t-value of 16.732 and p-value of 0.000 and with an analysis of Significant. For section Jade, the mean difference was 3.43 with a t-value of 16.997 and p-value of 0.000 and with an analysis of Significant. For section Jasper, the mean difference was 1.47 with a t-value of 16.323 and a p-value of 0.000 and with an analysis of Significant. For section Sunstone, the mean difference was 4.94 with a t-value of 26.876 and a p-value of 0.000 and with an analysis of Significant. Based on the findings, the following were conclusions derived from the data and results of the study presented, analyzed, and interpreted: (1) The MELC-based Supplementary Learning Materials had very effective contents, objectives, topics, and activities; (2) The students showed improved achievement after using MELC-based Supplementary Learning Materials; (3) The MELC-based Supplementary Learning Materials was an effective tool in teaching Physical Education during the new normal; (4) The Performance Level in Pretest of sections Emerald, Jade, Jasper and Sunstone was considered deficient before using the MELC-based Supplementary Learning Materials; (5) The Level of Performance in Posttest of sections Emerald, Jade, Jasper and Sunstone was described as Highly Acceptable. This meant that the use of MELC-based Supplementary Learning Materials helps the students in understanding the lessons in Physical Education based on the most essential learning competencies provided by the Department of Education; (6) There were overall significant difference in the result of the pretest and posttest using MELC-based Supplementary Learning Materials in Physical Education. The overall result in this study was highly significant; and (7) During the use of MELC-based Supplementary Learning Materials, the scores of the students were high showing that there was an improvement when it came to the learning outcomes of the respondents. Hence, the use of this MELC-based Supplementary Learning Materials was effective. Based on the conclusions formulated from the findings, the following recommendations were given; (1) For students' better academic performance, MELC-based Supplementary Learning Materials may be used as alternative mode learning delivery for students who are not capable of having high end gadgets for online modality. By using this, students need not go out of their houses in finding internet shops to search for the given activity instead the answers are incorporated in the reading materials attached to the supplementary learning materials; (2) Teachers may adopt this MELC-based Supplementary Learning Materials in handling students under Modular Distance Learning (MDL); (3) The School Administrators may provide allotted budget to produce these MELC-based Supplementary Learning Materials for students who are under Modular Distance Learning (MDL); (4) School Administrators may conduct seminars to assist teachers and make this kind of learning materials suited for each type of learners; and (5) Future Researcher may use this study to help improve the production of learning materials aligned in the New Normal Set Up of Education due to pandemic.*

**INDEX TERMS:** MELC (Most Essential Learning Competencies), Supplementary Learning Materials, Pretest, Posttest, and Activities.



## INTRODUCTION

### 1.1 Overview

Normal face-to-face interaction between teachers and students has been suspended due to the COVID-19 pandemic. This pandemic has paved the way to the implementation of Modular Distance Learning as an urgent response to ensure continuity of education here in the country. Our country as of this moment is in the process of adapting to the new normal form of education and continuous innovations of educators and active involvement of other stakeholders are the driving force for its success (Dangle & Sumaoang, 2020). The teacher takes the responsibility of monitoring the progress of the learners. The learners may ask assistance from the teacher via e-mail, telephone, text message/instant messaging, among others. Where possible, the teacher shall do home visitations to learners needing remediation or assistance (Llego, n.d.). Printed Modules and Supplementary Learning Materials will be delivered to students, parents, or guardians by the teachers or through the Local Government Units. But not all students who are now enrolled in the new normal set up education have the capacity to easily engage with the lessons written in the printed modules specifically, the video links which are not applicable to those students under Modular Distance Learning. This is the main problem why the researcher designed this kind of research to help the students under Modular Distance Learning. Therefore, this endeavor was conducted to offer solutions in improving the academic achievement of students in physical education during this time of new normal set up of education. The researcher would like to introduce the use of MELC- Based Supplementary Learning Materials as strategy in teaching physical education lessons based on the most essential learning competencies given by the Department of Education (DepEd). Supplementary materials help to motivate the learners (Dodd, 2015) by creating interests in learning and encouraging them to use the language in the class. They enable the learners to understand and grasp the information from a given text. The aim of Supplementary Learning Materials is to make students master the competencies based on the given most essential learning competencies prepared by the Department of Education (DepEd) for physical education. In doing so, once they mastered the concept, they could easily comprehend questions and answer the correctly, thus, better academic gain is achieved.

### 1.2 Problems

It sought to answer the following research problems:

- (1) What is the level of acceptability of the materials in terms of: (a) content; (b) objectives; (c) topics; and (d) activities?;
- (2) What are the mean scores of students in terms of pretest and posttest?;
- (3) Is there a significant difference between the pre-test and post-test mean scores?

### 1.3 Importance of the Problem

This research study is essential because it focused on the acceptability and effectiveness of using Supplementary Learning Materials in Physical Education 9 in the new normal.

### 1.4 Literature

As cited by Kuehn (2017), the pretest and posttest can be a valuable diagnostic tool for more effective teaching. It should be designed to measure the amount of learning a student has acquired in a specific subject. To do this, questions concerning all the topics covered during the quarter must appear on the test. To demonstrate the student progress has been made during the given quarter, the posttest score should be higher than the pretest score. Goldman (2014) emphasizes that the pretest and posttest are the quantifying of the knowledge attained in the class from a group of students with diverse learning styles and educational backgrounds. Corresponding to this, Danielson (2017) states that the summative evaluation flags the finish of a showing scene as a method of revealing the understudies' accomplishment in the instructing - learning procedure will exclusively depend on understudy cooperation during study hall conversation. In addition, Morisson (2010), said that evaluation is fundamental since it is the place all choice the instructor is going to make will originate from. Evaluation choices will coordinate and change understudies' learning results. If evaluations are utilized properly, understudies will unquestionably learn well. It ought to be intended to a particular reason and ought to be solid, legitimate, and reasonable. Surgenor (2010), emphasized that there are jobs of evaluation. Appraisal catches understudy's time and consideration, it produces suitable understudy learning action, it gives auspicious criticism which understudies focus, it causes understudies to disguise uniformity, it empowers the educators in choosing whether an understudy passed or fizzled, and it gives proof that principles in the subject is proper. As indicated by Jones (2010), an appraisal as a major aspect of study hall exercises is a key procedure required to advance learning and at last accomplishment. Evaluation for learning is tied in with advising students regarding their advancement to enable them to make the fundamental move to improve their exhibition. Instructors need to make learning openings where students can advance at their own pace and embrace solidification exercises were fundamental. Acero (2017), articulates that activities are kind of formative assessment to improve the conveyance of guidance inside the study hall. This is regularly the strategy for quality control. It is delineated to see whether needs are there int he handles of guidance with the goal that indispensable modification can be made for success. Mouly (2015) emphasizes the connotation of pre-test as a test given to measure the outcome of variable before the experimental manipulation is implemented. A pre-test is followed by a post-test, which is the same test as a pre-test, after the experimental manipulation has been implemented. This pre-test and post-test design allowed the experimenter to test what effect if any, the experimental manipulation had been assessing the differences in the pretest and posttest. If there are any differences, it is likely to be due to manipulation by the researcher either action or experimental mental of investigation. In the study of Ely (2012), it is stated that the foregoing view upon disclosure that after the discussion method utilized by teachers in the classroom, a pretest must be given to students in order to determine as to whether or not



they learn by thinking and talking together as a group through the group process as shared appreciation of the subject matter. Thus, a pretest is administered to determine the students baseline knowledge or preparedness for an educational experience or course of study. This must be done to assess the normality of students in acquiring creative thoughts by their own effort by making progress as a result of their own and others response to stimuli of questioning and volunteered expression during the class discussion. Marsden and Torgenson (2012) discuss the two illustrations of some of the factors that can influence findings from pre- and post-test research designs in evaluation studies, including regression to the mean (RTM), maturation, history and test effects. The first illustration involves a re-analysis of data from a study by Marsden, in which pre-test scores are plotted against gain scores to demonstrate RTM effects. The second illustration is a methodological review of single group, pre- and post-test research designs (pre-experiments) that evaluate causal relationships between intervention and outcome. As stated by Cole (2014), a pre-test of five to six students selected to study the topic in advance wherein each one of them must speak on some factors of the Science subject to the class and after which a general discussion follows to talks. In connection to this aside from managing and using the interests and energies of the learners promoting their own better learning, this method has a therapeutic function, important for real respect for others' sore spots and a greater involvement with the intellectual aspects of the topic under discussion. A parallel idea has been drawn by Dreeben (2014) that a pre-test must aim at determining students' baseline knowledge or preparedness for an educational experience most particularly when an organized small group discussion method is deployed in the classroom by a Science teacher. Most likely with this trending, maximum active student involvement is encouraged as well as interest in well-chosen topic for class discussion. Before a pre-test is given, time must be observed for a greater preparation of arguments when topics are specially challenging or require scientific technology information. This method is most valuable for teaching topics requiring series and thorough discussion which by all means call for a critical thinking and balanced arguments among students' participants. Based on the study of Acero (2007), exercises and activities are types of formative evaluation to improve the delivery of instruction in the classroom. This is the phase of evaluation where what the teacher does in the course of his teaching and what he is to do are given forms. This is the process of quality control. It is designed to examine whether deficiencies are there in the process of instruction so that necessary adjustment can be made for successful result. It is usually done in pilot stage or at any point in the various stages of instruction process. This will help not only to determine how much learning has been achieved through instruction but how to get rid of unintended outcomes if any. To this end it becomes a very important aspect of monitoring process. As stated by Lee (2005), exercises and activities from the "core" of the module set the input- processing of the output and input practice task sequence for each activity in turn. All in text questions self- assessment and feedback quizzes should be

included as part of the sequence. Exercises and activities are done during the application of concepts to enable students master and improve their performance and be able to identify the content that are to be improved. Bucjan (2011) states that varied activities and techniques used in modules were helpful to the learners, and the tandem of teaching and learning was evident allowing the students to work independently, the modules were very relevant and very useful for the use in the class because these answers the need of the students. When we think of student engagement in learning activities, it is often convenient to understand engagement with an activity as being represented by good behavior (i.e., behavioral engagement), positive feelings (i.e. emotional engagement), and, above all, student thinking (i.e., cognitive engagement) (Fredricks, 2014). This is because students may be behaviorally and/or emotionally invested in a given activity without actually exerting the necessary mental effort to understand and master the knowledge, craft, or skill that the activity promotes. In light of this, research suggests that considering the following interrelated elements when designing and implementing learning activities may help increase student engagement behaviorally, emotionally, and cognitively, thereby positively affecting student learning and achievement:: (1) make it meaningful, (2) foster a sense of competence, (3) provide autonomy support, (4) embrace collaborative learning, (5) establish positive teacher-student relationships, and (6) promote mastery orientations. Moreover, as stated by Oliveira (2018), in many cases, pedagogical concepts are universal. However, practical application and development of activities need (very much!) to consider the context of the classes and students' locality. Regarding the teaching material, she used to adapt the tourist sites that appeared in the books to the reality of the children. Instead of talking about the Statue of Liberty, she would take newspaper and magazine clippings of tourist sites from our city, presenting our region before other places. Majault (2015) claims the fact that a posttest is a gauge to determine the outcome of the learning tasks of large classes when committee project method is deployed as instructional service delivery within the four walls of the classroom. With the results of the posttest, science teachers will be able to determine as to whether or not the committee project method aroused participation in the learning tasks of the greatest magnitude of students for them to take responsibility to think out problems for themselves and to take initiative in tackling them, and coupled with the development of cooperative work as well as individual initiative by fostering a sense of responsibility among members of class in their respective committees so created for projected realization. More than ever as rectified by Stabler (2014), a posttest is basically a most viable measure to determine the outcome after laboratory method has been deployed in learning science. With the end results, learning by doing is within the sphere of teacher's direction by providing learning situations at first hand for students to translate theory into practice, to develop, to test and apply principles, and to learn methods of procedure with greater reliance on their own power, and with extensive restrictions which group work often imposes on the individual learner with the end in view that at the end of the day, the



teacher has the chance to observe the students in action, assess their work, correct their mistakes, and give ample time to guide them in the correct direction in avoiding wastages of the human and material resources. The bibliographical sinews of Stiles (2014) give much teeth to posttest as a most valid and reliable measure to the learning outcome of students when exposed to programmed learning wherein the infusion of mechanical self-teaching contrivances are capable of representing a course of instruction based on a pre-planned program consisting of the facts the students have to learn and study. More than ever, the rest of the posttest are feedbacks offered to materialize the pedagogic design in the very sequence of the learning frames presented therein. Stinnett (2013) strengthens further the aforementioned viewpoints by noted authorities upon strong disclosure that posttest is a most valid and reliable measure structuring the instruction of information, the arrangement of optimum sequences for learning, and by reflecting a new concern with the efficient use of the latest informational technology in teaching-learning process. Natrella (2015) comes up with the point stressing out the vital importance of pretest and posttest as used to measure knowledge gained from participating in a training course. The pretest is a set of questions given to participants before the training begins in order to determine their knowledge level of the course content. After the completion of the course, participants are given the posttest to answer the same set of question, or a set of questions of comparable difficulty. Comparing participants' posttest scores to their pretest scores enables ones to see whether the training was successful in increasing the participants' knowledge of the training content. Thus, in retrospect as confirmed strongly by Wine (2015), all pretest and posttest must be validated before they are considered reliable data collection tool. If participants get a question wrong, it should be because of lack of knowledge, not because a participant interpreted the question differently than it was intended because the question was poorly written and had one more correct answer, or because the question addressed content was not taught in the course. Instructional materials have been observed as a powerful strategy to bring about effective teaching and learning. The importance of quality and adequate instructional materials in teaching and learning can occur through their effective utilization during classroom teaching. Instructional materials here include all the tools that the teachers can use to make the learning more interesting and memorable (Tety, 2016). Instructional materials are essential tools in learning every subject in the school curriculum. They allow the students to interact with words, symbols and ideas in ways that develop their abilities in reading, listening, solving, viewing, thinking, speaking, writing, using media and technology (Bukoye, 2019). According to Faize and Dahan (2011), instructional materials are print and non-print items that are designed to impact information to students in the educational process. Instructional materials include items such as prints, textbooks, magazines, newspapers, slides, pictures, workbooks, electronic media, among others. According to Raw (2010), the first instructional material is the textbook. Various definitions of textbook emphasize the role of textbook as tool for

learning. Textbook is the nucleus to all the learning activities related to a particular curriculum. Textbook plays a vital role in imparting knowledge to the students in the third world countries. Instructional materials play a very important role in the teaching-learning process the availabilities of textbook, appropriate chalkboard, Mathematics kits, Science kit, teaching guide, science guide, audio-visual aids, overhead projector, among others are the important instructional materials (Yusuf, 2005). However many facilities are missing in approximately almost all secondary schools in the state. From Yusuf (2005) further says that, the next instructional materials are the chalkboards. The chalkboard is the teaching aid that teachers frequently used, particularly during the lectures and discussions. There are different kinds such as, blackboard, maker board, write board, felt board and magic board. The teachers use it in classrooms to write the important words, statement, to draw diagrams, figures, and maps. Other prominent instructional material includes mathematics kits. This is usually study kit; it is a box containing a variety of visual aids artistically assembles and displayed pertaining to a single topic (Nichollos, 2000). Omabe (2006) asserts that instructional materials are central in the teaching and learning of English language because they are used to compliment efficiency of a teacher, and effectiveness in lesson delivery. Esu, Eukoha and Umoren (2004) affirmed that instructional materials facilitate learning of abstract concepts by helping to concretize ideas and stimulate learners' imagination. Moreover, instructional materials help to increase active participation in the learning process while saving teacher's energy, reducing the teacher centeredness in teaching. In the same vein, Mathew (2012) states that the use of instructional materials make teaching effective as it enables learners to participate actively in classroom instruction. All these views suggest that the use of instructional materials can improved students' performance. Olumorin, Yusuf, Ajidagba and Jekayinfa (2010) also observe that instructional materials help teachers to teach conveniently and the learners to learn easily without stress. They assert that instructional materials have direct contact with all the sense organs of the students. Kochhar (2012) supports this view by saying that, instructional materials are very significant learning and teaching tools. He adds that there is need for teachers to find necessary and relevant instructional materials to complement classroom interaction and textbooks to broaden and arouse students' interests in the subject. Oluwagbohunmi and Abdu-Raheem (2014) acknowledge that instructional materials are such used by teachers to aid explanations and make learning of subject matter understandable to students during teaching learning process. Abdu-Raheem (2011) asserted that non availability and inadequacy of instructional materials are major causes of ineffectiveness of the school system and poor performance of students in schools. According to Abolade (2009), the advantages of instructional materials are that they are cheaper to produce, useful in teaching large number of students at a time, encourage learners to pay proper attention and enhance their interest. Isola (2010) also describes instructional materials as objects or devices that assist the teachers to present their lessons logically and sequentially to



the learners. Kochhar (2012) supports those instructional materials are very significant learning and teaching tools. He suggested the needs for teachers to find necessary materials for instruction to supplement what textbooks provide to broaden concepts and arouse students' interests in the subject. Afolabi and Adeleke (2010) identify non-availability, inadequacy and non-utilization of learning materials as a result of teacher's poor knowledge as factors responsible for the use of lecture method. They recommended that both the students, teachers, parents, Parents/Teacher Association, government and philanthropists should be involved in improvising instructional materials for the teaching and learning in schools. Ogbondah (2008) advocates for of teachers' resourcefulness and encouraged them to search for necessary instructional materials through local means to supplement or replace the standard ones. Oso (2011) also agrees that the best way for teachers to make use of their manipulative skills is to improvise to achieve their lesson objectives at least to a reasonable extent. Jekayinfa (2012) also identifies the importance of instructional materials as making learning concrete and real, substitutes one thing for another, allows the students to participate in the production of materials, economical and more teacher-student resource oriented. The Roles Played By Instructional Materials In Teaching— Learning Activities: Instructional materials play a very important role in the teaching-learning processes which include; (1) enhance the memory level of the students; (2) facilitate the teaching- learning process; (3) improve of student rate of accumulation; (4) serve as tools used by the teachers to correct wrong impression and illustration things that, learners cannot forget easily; (5) assist in giving sense of reality to the body of knowledge under discussions; (6) give lessons a personal look and encourages teacher's creativity; and (7) permit the students and teachers to experience in concrete terms the learning activities that can promote the idea of self-evaluation (Bukoye, 2019). Weimer (2012) enumerates the five characteristics of a learner-centered teaching. According to her learner-centered teaching engages students in the hard, messy work of learning, includes explicit skill instruction, encourages students to reflect on what they are learning and how they are learning it, motivates students by giving them some control over learning processes, and encourages collaboration. This clearly requires that science teachers to maximize their creativity to explore different strategies and approaches for better learning and understanding of students of the difficult concepts in science. According to Legaspi (2014), the Department of Education agrees that there have been delays in the delivery of learning materials such as activity sheets and modules for the pupils. The lack of learning materials is a perennial issue even before the change of the curriculum. The shortage of instructional materials and also teachers' lack of knowledge on material development is a persisting problem among the public and private elementary schools. Although DepEd boldly declared that all learning material shortages will be wiped out before the end of 2013 and even promised to have a one to one or 1:1 ratio for student to textbook within school year 2012 – 2013, but in the actual classroom setting, one textbook is

shared by two to three and even more pupils. According to Rodrigo (2015), reteaching the lessons which are not clear to the learners and help them gain mastery of the skills. The role of developing instructional and intervention materials in the teaching-learning process should not be undermined. It plays an integral role toward the achievement of a successful interplay of teaching and learning (Salvieto, et.al., 2014). As claimed by Olawale (2013), "the importance of Instructional Materials in any teaching learning process cannot be over emphasized." If properly prepared, these materials will be effective in terms of enhancing, facilitating, and making teaching learning easy, lively, and concrete. Moreover, the study of Anderson (2012) reveals that using intervention material had assisted the learners of Biology to improve their performance in understanding the concepts of photosynthesis, respiration, mendelian, and non-mendelian genetics. His use of computer-based materials and exercises on concept mapping allowed these students to improve their performance significantly in answering and understanding genetic problems and concepts. As cited by Quisumbing et.al. (2017), the development of effective instructional materials designed to enriched student learning. Teachers should begin by analyzing what the learner should know at the end of the course and how learning will be demonstrated. The teacher must have more knowledge and understanding of the learning process, particularly how individual learning. This will help them learn immensely in both the design and implementation of teaching that enhances learning (Sims & Sims, 1995). It is essential that teachers learn how to identify the needs of their students and their own professional learning needs. They also need to develop the self- regulatory skills that will enable them to monitor and reflect on the effectiveness of the changes they make to their practice (Timperley, Wilson, Barrar & Fung, 2008). Teachers provide opportunities for students to engage actively in meaningful communication, encourage them to take ownership of their own learning, and give them explicit instruction in the content and language skills they need and in strategies for gaining that knowledge skills they need and in strategies for gaining that knowledge and those skills (Peyton, Moore & Young, 2010). For effective teaching and learning to take place, Adbu-Raheem (2011) suggests that improvisation of local and simple instructional materials by the teachers has become necessary for the uplift of academic standard. Teaching with relevant instructional materials is an exceptional one, going into any class without these materials is a problem on its own. In the teaching of computer science, instructional materials perform such functions as an additional to the series of experience available to learners, an add-on to the teacher's voice explanations thereby making learning experience better- off and providing the teacher with interest into an extensive variety of learning activities (Bawa, 2016). The importance of instructional materials in the development of learners' intellectual abilities and attainment of teaching/ learning objectives cannot be over-emphasized. The students taught with instructional materials have excellent achievement scores compared with those taught without any material (Olayinka, 2016). Ball (2018) states that most people would agree that an understanding of content matters for teaching.



Yet, what constitutes understanding of the content is only loosely defined. In the mid-1980's, a major breakthrough initiated a new wave of interest in the conceptualization of teacher content knowledge. However, after two decades of work, this bridge between knowledge and practice was still inadequately understood and the coherent theoretical framework Shulmak (1986, p.9) called for remained undeveloped. This article builds on the promise of pedagogical content knowledge, reporting new progress on the nature of content knowledge for teaching. Although the term pedagogical content knowledge is widely used, its potential; has been only thinly developed. May seem to assume that its nature need, and content are obvious. Yet lacked definition and empirical foundation, limiting its usefulness. Frequently, for example, are broad claims about what teachers need to know. Such statements are often more normative than empirical. Only a few studies have tested whether there are, indeed, distinct bodies of identifiable content knowledge that matter for teaching. According to Wedger (2015), the objectives must be clear to students. They all must know what they are learning and why they are doing it. They also need to see the point of the objectives in the bigger picture; this is, how they relate to the last lesson's learning, the course they are following and the big overall goal. This means that one cannot simply write the objectives on the board and hope that the students copy them down. It implies that he/she has fully explained them in context; the students have engaged with them and can explain them to any observer. The objectives and outcomes must be differentiated for the individual student. All the learners should be able to see where they are and what they need to do to get to the next level. This should link into subject standards and progression where possible. It is crucial have high expectations of what can be achieved and engage the students with that belief. Success criteria for achieving the outcomes need to be negotiated with the students for optimum engagement to enable them to be clear about what it will look like and feel like and sound like when they have made that progress. In addition, a learning objective states specifically what a student should be able to do. In addition, Nic (2013) provides some examples of good learning objectives: Students will be able to: (1) identify different levels of data in new scenarios; (2) explain in context a confidence interval; (3) determine which probability distribution out of binomial, poisson or normal is most appropriate to model in unfamiliar situation; and (4) compare two time series models of the same data and evaluate which is more appropriate in a given context. Nic also mentioned that learning objectives need to be specific and measurable. Some things that people might think are learning objectives but are not: (1) students will understand the central limit theorem, (The term "understand" is not measurable), (2) students will learn about probability trees ("learn" is not measurable and does not specify the level. Do students need to be able to interpret or create probability trees?). Nic also added that there are vast numbers of resources on learning objectives online. Learning objectives tell students what is important. Without learning objectives, it is difficult for students to know what they are supposed to be learning. In a lecture, a teacher can talk extensively about a

case, but unless she states explicitly, it can be difficult for the students to know where to direct their attention. Do they need to know the details of that specific case or what principles they are supposed to glean from the example? Or was it just a "war-story" to entertain the troops? Students can waste a great deal of time studying things that are not necessary, to the detriment of their learning as a whole. The uncertainty also causes unnecessary anxiety. Learning objectives enable good assessment development. If they found it difficult to write a question to assess a learning objective, then they would think again about the learning objective, and what it is they really want the students to be able to do. It made it easier to write fair, comprehensive assessment. Everette (2017) states that no matter what standards teachers use, there is a constant in every lesson: the learning objective. Objectives are the basis of what one hopes to accomplish in any given lesson. A more powerful term, Student Learning Objectives (SLOs), are specific learning goal coupled with a specific way of to measure where students are in meeting that goal. SLOs can be large and meaty goals that teachers aim to meet over the course of a year of instruction, but mini-SLOs can happen each and every day in class. Everette adds that, there are many teachers who will say they write the objective on the board each day but see no real purpose or gain. "It is just one of those things we are told to do, so we do," a teacher told the researcher recently. The objective should be more than a check sheet item for teachers to satisfy administrators. So what should an objective do? (1) objectives focus the purpose of your lesson and subsequent planning, (2) objectives give you an outcome or goal, (3) objectives are smaller and more digestible than a full standard, (4) objectives can help students understand the lesson purpose, (5) combined with success criteria, objectives let you know when learning has happened and (6) objectives set the foundation for student-led academic discussion. According to Ravaglia (2020), typically, teacher development programmes tend to focus on enhancing pedagogy and classroom teaching skills and developing trendy 21st-century skills such as creativity and collaboration. Too often, teacher trainers forget that expert knowledge of a subject is as important as expert knowledge of how to teach. Teaching is, after all a process of interaction between teacher, student and subject matter. Effective teaching requires teachers to possess detailed subject matter knowledge intertwined with knowledge of pedagogy, curriculum, student behavior, learning objectives and outcomes. Unfortunately, most teachers lack adequate subject matter knowledge (SMK) and curiously this lacuna is tolerated by most Indian schools. However, although SMK is a necessary skill, per se it's insufficient for a teacher. But conversely there's no guarantee that a teacher with SMK will be effective because of the other intertwined pedagogical requisites of effective teaching. Sadly, the opportunities teachers have to self-learn are uneven and inadequate, as they are products of the same system. It is thus imperative that teachers stay ahead of their students by continual exposure to subject material that is deeper than what they are expected to teach. Without continuous learning, they run the risk of precocious students posing baffling questions which embarrass teachers and undermine their authority in the



classroom. In addition, a good SMK development programme incorporated into teachers daily regimen is the educational equivalent of an effective physical fitness programme. It should be woven into the professional lives of teachers throughout the academic year. It helps to continually measure teachers SMK and enables use of analytics to fill gaps or advance teachers. The single most important feature of an SMK programme is that it is a rich bouquet of high-quality problem-solving questions and solutions which exposes teachers to a wide variety of nuanced concepts and principles in their prime subjects. This is entirely in keeping with the tenets of learning through problem-solving. According to Richards (n.d.), an activity describes any procedures in which learners work towards a goal such as play a game or engaging in a discussion. Saxon, et.al. (2011), states that acceptability refers to a multi-faced construct on how people delivered or received a healthcare intervention, and considered it appropriate, based on anticipated or experienced cognitive and emotional responses in the intervention. As cited by Aguin (2011) in his study, the content of instructional materials and the way the content are presented, developed, and managed determine what kind of behavior will be shown by the learners. Andresen and Gronau (2010) describes adaptability as a feature of a system or of a process. This word has been used as a specialized term in different disciplines. The concept of adaptability has been widely recognized as a research field in recent years. Adaptability on a technical research field has been established in the last ten years. Adaptability is also understood as the ability of a system to adapt itself and fast to change circumstances. An adaptive system is therefore an open system that can fit its behavior according to changes in its environment. According to McTighe (2016), pre-assessments are the instruments or methods teachers use to determine students' knowledge, skills, or dispositions before instruction. Theoretically, pre-assessments help teachers determine where to begin instruction and provide teachers with baseline data from which to plot students' learning progress. Some pre-assessments are broad, addressing grade-level or course learning goals, and are administered at the beginning of an academic year or semester. Others are narrower in scope and are administered at the start of a specific unit, focusing on that unit's learning targets. Some advocates even recommend using pre-assessments at the beginning of every lesson. Likewise, Guskey, T. et.al. (2018), conclude that teachers can design pre-assessments to measure any type of learning goal: cognitive, affective, or behavioral. Cognitive pre-assessments address academic goals and focus on what students know and can do. For instance, a teacher may ask what students remember from a previous lesson or pose an initial question such as, "Why is it warm in summer and cold in winter?" Cognitive pre-assessments are the most common form used in classrooms today. According to Hale (2018), it is very important to have a pre-test for questionnaire. The main concern of pre-test is to have a reliable question format and also a good wording and other. By establishing a correct pre-test, the questionnaire will yield better results. Kuehn (2019), also mentions that pre/post-test functions as a teacher diagnostic tool in the following five

ways: (1) It Identifies the Very Weak Students in a Class; (2) It Identifies the strongest students in a class; (3) It identifies topics which the students already know; (4) It identifies topics which the students don't know; and (5) It identifies topics which the students have not learned. According to Fancher (2013) pretest-posttest designs are very common in scientific study. A characteristic common to true pretest-posttest designs is that two or more measurements are taken on each experimental unit. Subjects within each group receive a treatment of interest, no treatment, or a neutral treatment. Ideally, these experiments have a completely randomized design, whereby subjects are randomly assigned to the different levels of treatment. Through randomization, the effects of extraneous variables should be removed. Once the subjects are assigned to the groups, but before the actual treatment (if any) begins, each subject is measured on some characteristic to obtain his or her "Pretest" score. After the experiment has commenced, each subject is measured again one or more times to obtain his or her "Posttest" score or scores. When there are a number of such measurements taken at set periods of times for each subject, this is called a longitudinal or repeated measures study. Bhat (2012) states that instructional material is one of the valuable devices in the process of learning, there should be suitable supplementary materials for students so that they learn accordingly with the help of such learning materials. Macarandang (2009) suggests that the use of original self-instructional materials is particularly beneficial as a strategy in introducing basic information to an entire class, freeing the lecture discussion hours for more "discussions" and less "lecture", an enrichment activity for talented students; a strategy to make-up for a student who has been absent and a strategy for a student in need of remedial lectures. According to Hibek, J. (2015), Instructional Material is used as remediation materials by students who cannot cope up to their lessons, it comprises topics, discussions, and visual contents that give additional information relatively to specific lecture. Modules associated with images, and text are essentially usually having videos to complete the packages, and increase students understanding that may improve his/her skills and ability by their own. According Churchill (2013), Toch (2011), Wiggins & McTighe (2008) as cited by Orosco (2020), traditional assessments are limited in that they only provide a narrow view of student recall and they may not accurately reflect what students.

### 1.5 Time and Place of the Study

The study was started at the beginning of the Second Grading of School Year 2020-2021 and finished at the end of the same grading period in Sampaguita Village National High School, District of San Pedro, Division of Laguna.

### METHODOLOGY

The quasi-experimental design was used to determine the effectiveness of using MELC-Based Supplementary Learning Materials to students' academic performance in physical education from four (4) sections selected to be the respondents in this study. Quasi-experimental Design was



used because no randomization that happened in the formation of sections as participants of the study. Since the students had been grouped already by section before the start of experimentation, thus, could be regrouped. One hundred Twenty (120) grade 9 students were used as respondents in this research study. They were composed of four (4) sections already grouped/ sectioned before the study was made. Thirty (30) randomly selected respondents came from Grade 9-Emerald, Jade, Jasper and Sunstone within Sampaguita Village National High School categorized as one of the big schools in the District of San Pedro, Schools Division of Laguna. Random Sampling Technique was used by the researcher in this study. Sections under Modular Distance Learning (MDL) were chosen as participants in this study. They were the group of students who needed most intervention to cope with the physical education lessons in this new normal set- up of education. The scores in the pre- test, worksheet and post-test were the primary sources and instruments in collecting data. The pre- test and post-test questionnaires were validated by the MAPEH Head Teacher who is a physical education major and two (2) Teachers III, all were from Sampaguita Village National High School in San Pedro District, Schools Division of Laguna. This gave an advantage within the limited time allotted for the completion of the study. The research instrument of the study was described below. The research instrument underwent two (2) types of validation, the face validation, and the content validation. For face validation of research instrument, a research-made questionnaire was submitted to a MAPEH Head Teacher and MAPEH Teachers critic who checked the overall format of the test questions to make sure that they would earn good impressions from the respondents and that they would not be confusing to the respondents and not lose their interest in answering seriously the test questions. Likert Scale was also used to determine the acceptability and effectiveness of MELC-Based Supplementary Learning Materials in Physical Education. The research instrument was submitted to individuals who were involved in instructional supervision over teachers. These individuals were school administrators. These experts scrutinized the research instrument for the purpose of checking whether the items in the research instrument were appropriate; to check whether the items were sufficiently specific and appropriate for each heading; and whether the items were relevant to the study and important for each heading.

## RESULTS AND DISCUSSION

The data gathered on the given survey questionnaires whether the supplementary learning materials are effective or not and the data gathered from the given pretest and posttest to find out whether significant difference exists between the scores of the pretest and posttest after using the supplementary learning materials in physical education 9.

**Table 1. Level of Acceptability of the MELC-based Supplementary Learning Materials in terms of Content**

Statements	Mean	SD	Verbal Interpretation
All pictures, and definition are congruent to the MELC- Budget of Work for Physical Education provided by the DepEd Region IV-A CALABARZON	4.38	0.52	Strongly Agree
Contains topics that are practically related to each other;	4.18	0.48	Agree
States objectives, discussions and activities that are attainable;	4.25	0.52	Strongly Agree
Focuses on the main goal which is development of learners and skills in Physical Education 9;	4.33	0.64	Strongly Agree
Are clearly stated and can easily be understood by the students	4.39	0.65	Strongly Agree
<b>Overall Mean = 4.31</b>			
<b>Standard Deviation = 0.572</b>			
<b>Verbal Interpretation = Highly Acceptable</b>			

### Legend:

Scale	Range	Remarks	Verbal Interpretation
5	4.20-5.00	Strongly Agree	Highly Acceptable
4	3.40-4.19	Agree	Acceptable
3	2.60-3.39	Moderately Agree	Moderately Acceptable
2	1.80-2.59	Disagree	Less Acceptable
1	1.00-1.79	Strongly agree	Not Acceptable

To highly acceptable, the respondents agreed that the supplementary learning materials were clearly stated and could easily be understood by the students with (M=4.39, SD=0.65) and all pictures, and definition are congruent to the MELC- Budget of Work for Physical Education provided by the DepEd Region IV-A CALABARZON with (M=4.38, SD=0.52). Although also observed be acceptable, the item with the lowest rating was “contains topics that are practically related to each other” with (M=4.18, SD=0.48). The overall mean of 4.31, standard deviation of 0.572 indicated the level of acceptability of the MELC-based Supplementary Learning Materials in Terms of Content was highly acceptable. This meant that the supplementary learning materials contained significance in the study of the students. The number of



specified materials included in the supplementary learning materials was very practical.

**Table 2. Level of Acceptability of the MELC-based Supplementary Learning Materials in Terms of Objectives**

Statements	Mean	SD	Verbal Interpretation
Are clearly stated and can easily be understood by the students;	4.61	0.51	Strongly Agree
Express the knowledge and skills to be developed;	4.51	0.52	Strongly Agree
Are specific and attainable;	4.35	0.50	Strongly Agree
Are based on the Grade 9 MELC-Budget of Work;	4.33	0.54	Strongly Agree
Are related to the discussion and activities in the worktext/ worksheet.	4.41	0.54	Strongly Agree
<b>Overall Mean = 4.44</b>			
<b>Standard Deviation = 0.529</b>			
<b>Verbal Interpretation = Highly Acceptable</b>			

**Legend:**

Scale	Range	Remarks	Verbal Interpretation
5	4.20-5.00	Strongly Agree	Highly Acceptable
4	3.40-4.19	Agree	Acceptable
3	2.60-3.39	Moderately Agree	Moderately Acceptable
2	1.80-2.59	Disagree	Less Acceptable
1	1.00-1.79	Strongly agree	Not Acceptable

To highly acceptable, the respondents agreed that the supplementary learning materials were clearly stated and could easily be understood with (M=4.61, SD=0.51) and expressed the knowledge and skills to be developed with (M=4.51, SD=0.52). Although also observed to be highly acceptable, the item with the lowest rating was based on the Grade 9 MELC- Budget of Work with (M=4.33, SD=0.54). The overall mean of 4.44, standard deviation of 0.529 indicated the level of acceptability of the MELC-based Supplementary Learning Materials in Terms of Objectives was highly acceptable. This meant that the supplementary learning materials were not influenced by the personal feelings or opinions in considering and representing facts. The supplementary learning materials had achieved goal in expressing or dealing with the conditions as perceived without distortion by personal interpretations.

**Table 3. Level of Acceptability of the MELC-based Supplementary Learning Materials in Terms of Topics**

Statements	Mean	SD	Verbal Interpretation
Are appropriate to the students' comprehension level in physical activities;	4.31	0.48	Strongly Agree
Are parallel with the objectives and activities;	4.27	0.53	Strongly Agree
Contribute to the acquisition of concepts, understanding physical activities, knowledge, wellness and skills;	4.22	0.41	Strongly Agree
Provide a range of learners' interests and preferences;	4.30	0.56	Strongly Agree
Are sufficient to allow the students to learn independently.	4.28	0.51	Strongly Agree
<b>Overall Mean = 4.28</b>			
<b>Standard Deviation = 0.500</b>			
<b>Verbal Interpretation = Highly Acceptable</b>			

**Legend:**

Scale	Range	Remarks	Verbal Interpretation
5	4.20-5.00	Strongly Agree	Highly Acceptable
4	3.40-4.19	Agree	Acceptable
3	2.60-3.39	Moderately Agree	Moderately Acceptable
2	1.80-2.59	Disagree	Less Acceptable
1	1.00-1.79	Strongly agree	Not Acceptable

To highly acceptable, the respondents agreed that the module were appropriate to the students' comprehension level in physical activities with (M=4.31, SD=0.48) and provided a range of learners' interests and preferences with (M=4.30, SD=0.56). Although also observed to highly acceptable, the item with the lowest rating was to contribute to the acquisition of concepts, understanding physical activities, knowledge, wellness and skills with (M=4.22, SD=0.41). The overall mean of 4.28, standard deviation of 0.500 indicated the level of acceptability of the MELC-based Supplementary Learning Materials in Terms of Topics was highly acceptable. This meant that the topics included in the supplementary learning materials were very timely. Its instructional objectives in three domain classifications were met. It involved factual, knowledge, ideas, and intellectual abilities.



**Table 4. Level of Acceptability of the MELC-based Supplementary Learning Materials in Terms of Activities**

Statements	Mean	SD	Verbal Interpretation
Are in order to maintain the students' interest in each phase of the learning material;	4.31	0.50	Strongly Agree
Provide a variety of activities and opportunities for the improvement of students' concept in optimized wellness;	4.23	0.46	Strongly Agree
The exercises stimulate students' comprehension and learning ability;	4.37	0.55	Strongly Agree
Give direction in simple and comprehensible manner;	4.44	0.55	Strongly Agree
Are relevant to the expected outcomes of objectives.	4.43	0.50	Strongly Agree
<b>Overall Mean = 4.36</b>			
<b>Standard Deviation = 0.516</b>			
<b>Verbal Interpretation = Highly Acceptable</b>			

**Legend:**

Scale	Range	Remarks	Verbal Interpretation
5	4.20-5.00	Strongly Agree	Highly Acceptable
4	3.40-4.19	Agree	Acceptable
3	2.60-3.39	Moderately Agree	Moderately Acceptable
2	1.80-2.59	Disagree	Less Acceptable
1	1.00-1.79	Strongly agree	Not Acceptable

To highly acceptable, the respondents agreed that the supplementary learning materials gave direction in simple and comprehensible manner with (M=4.44, SD=0.55) and were relevant to the expected outcomes or objectives with (M=4.43, SD=0.50). Although also observed to highly acceptable, the item with the lowest rating was "provide a variety of activities and opportunities for the improvement of students' concept in optimized wellness" with (M=4.23, SD=0.46). The overall mean of 4.36, standard deviation of 0.516 indicated the level of acceptability of the MELC-based Supplementary Learning Materials in Terms of Activities was highly acceptable. This meant that the activities included in the supplementary learning materials were effective in the type of learners under Modular Distance Learning (MDL).

**Table 5. Mean Scores Performance of Students in Terms of Pretest**

Group	Lowest Score	Highest Score	Mean	Standard Deviation	Verbal Interpretation
<b>Emerald</b>	1	20	11.03	5.56	Fairly Satisfactory
<b>Jade</b>	4	18	11.60	4.33	Satisfactory
<b>Jasper</b>	2	18	10.33	4.32	Fairly Satisfactory
<b>Sunstone</b>	2	16	9.53	4.01	Fairly Satisfactory
<b>Overall</b>	<b>1</b>	<b>20</b>	<b>10.625</b>	<b>4.602</b>	<b>Fairly Satisfactory</b>

**Legend:**

**Scale**  
26 to 30  
18 to 23  
12 to 17  
6 to 11  
0 to 5

**Verbal Interpretation**

Outstanding  
Very Satisfactory  
Satisfactory  
Fairly Satisfactory  
Needs Improvement

Table 5 shows the mean scores performance of students in terms of pre-test. Out of 120 students, Jade received the highest (M=11.60, SD=4.33) and verbally interpreted as Satisfactory, followed by Emerald with (M=11.03, SD=5.56) and verbally interpreted as Fairly Satisfactory. While Jasper had (M=10.33, SD=4.32) and verbally interpreted as Fairly Satisfactory. Sunstone received the lowest (M=9.53, SD=4.01) and verbally interpreted as Fairly Satisfactory. With the weighted mean of 10.625 and supported value of standard deviation of 4.602 and the (Lowest Score = 1, Highest Score = 20) the mean scores performance of students in terms of pre-test had a descriptive equivalent of Fairly Satisfactory.

**Table 6. Mean Scores Performance of Students in Terms of Posttest**

Group	Lowest Score	Highest Score	Mean	Standard Deviation	Verbal Interpretation
<b>Emerald</b>	6	30	15.50	6.50	Satisfactory
<b>Jade</b>	5	30	19.97	7.16	Very Satisfactory
<b>Jasper</b>	7	30	16.87	7.47	Very Satisfactory
<b>Sunstone</b>	5	30	14.80	7.07	Satisfactory
<b>Overall</b>	<b>5</b>	<b>30</b>	<b>18.00</b>	<b>7.167</b>	<b>Very Satisfactory</b>

**Legend:**

**Scale**  
26 to 30  
18 to 23  
12 to 17  
6 to 11  
0 to 5

**Verbal Interpretation**

Outstanding  
Very Satisfactory  
Satisfactory  
Fairly Satisfactory  
Needs Improvement

Table 6 shows the mean scores performance of students in terms of post-test. Out of 120 students, Jade received the highest (M=19.97, SD=7.16) and verbally interpreted as Very



Satisfactory, followed by Jasper with (M=16.87, SD=7.47) and verbally interpreted as Very Satisfactory. Moreover, Emerald got a (M=15.50, SD=6.50) and verbally interpreted as Satisfactory. While Sunstone received the lowest (M=14.80, SD=7.07) and verbally interpreted as Satisfactory. With the weighted mean of 18.00 and supported value of standard deviation of 7.167 and the (Lowest Score = 5, Highest Score = 30) the mean scores performance of students in terms of post-test had a descriptive equivalent of Very Satisfactory.

**Table 7. Difference between Pre-test and Post-test Mean scores of Students using MELC-Based Supplementary Learning Materials**

Group	Mean		Mean Difference	t-value	p-value	Verbal Interpretation
	Pre-test	Post-test				
Emerald	11.03	14.30	3.30	16.732	0.000	Significant
Jade	11.60	15.03	3.43	16.997	0.000	Significant
Jasper	10.33	11.80	1.47	16.323	0.000	Significant
Sunstone	9.53	14.47	4.94	26.876	0.000	Significant

Table 7 presents the difference between pre-test and post-test mean scores of students using MELC-based Supplementary Learning Materials. The data were statistically treated using the t-test. The pretest was paired to the post test scores of students using Supplementary Learning Materials. The t-value of 7.4552 was greater than the critical t-value of 1.6557 and supported with p-value of 0.0000. it could be inferred that there was an increase in the performance and the analysis was Significant. Based on the data, it was shown that there was a significant difference between pre-test and post-test mean scores of students using MELC-based Supplementary Learning Materials at 0.05 level of significance. It showed that the null hypothesis stating that "There is no significant difference between pre-test and post-test mean scores of students using MELC-based Supplementary Learning Materials" was rejected, it can be inferred that there is "significant" difference between them.

## CONCLUSIONS AND RECOMMENDATIONS

The following were conclusions derived from the data and results of the study presented, analyzed, and interpreted: (1) The MELC-based Supplementary Learning Materials had very effective contents, objectives, topics, and activities; (2) The students showed improved achievement after using MELC-based Supplementary Learning Materials; and (3) The MELC-based Supplementary Learning Materials was an effective tool in teaching Physical Education during the new normal. There may be a lot of changes when it comes in teaching in this New Normal Set up of Education specifically in Physical Education. Based on the conclusions above, it is recommended that: (1) For students' better academic performance, MELC-based Supplementary Learning Materials

can be used as alternative mode learning delivery for those who are not capable of having high end gadgets for modular distance learning. By using this students need not to go out of their houses, finding internet shops to search for the given activity, instead the answer are incorporated in the reading materials attached to the supplementary learning materials; (2) Teachers may adopt this MELC-based Supplementary Learning Materials in handling students under Modular Distance Learning (MDL); (3) For the School Administrators, they may provide allotted budget to produce this MELC-based Supplementary Learning Materials for students who are under Modular Distance Learning (MDL); (4) School Administrators may conduct seminars to assist teachers in making this kind of learning materials suited for each type of learners; and (5) For the Future Researcher, this study may help to improve the production of learning materials aligned in the New Normal Set Up of Education due to pandemic for Modular Distance Learning. Moreover, for the next researcher who will study this kind of research, it is necessary to validate together with the parents if the worksheet or activity sheets are solely answered by the students or respondents of the study.

## REFERENCES

1. Abdu-Raheem, B.O. (2011). *Availability, Adequacy, and Utilization of Social Studies Instructional Materials in Ekiti State Secondary Schools. Journal of Current Discourse and Research*, pp. 242-255
2. Acero, V.O. et.al. (2012). *Principles and Strategies of Teaching (2012 Edition)*, Rex Bookstore, Inc
3. Aguin, J., (2011). *Teaching for Quality Learning at University (2nd Edition) The Society for Research into Higher Education Very Good Practical Handbook on Teaching*.
4. Ajoke, A. (2017). *The Importance of Instructional Materials in Teaching English as a Second Language*
5. Banghero, M. (2015). "Validation and Effectiveness of Modular Learning Instruction in Literacy figures of Speech to Selected Literature Teacher in Don Manuel Rivera Memorial National High School Pila, Laguna" *Unpublished Master's Thesis, Laguna State Polytechnic University, Main Campus, Santa Cruz Laguna.*
6. Ball, D. (2018). *Content Knowledge for Teaching What Makes It Special? School of Business Management, Ryerson University, 125 Victoria Street, Toronto, Ontario, Canada M5K 2K3*
7. Bucjac, M. (2011). *Development and Validation of Modules in English 2: Writing in the Discipline, National Power Reviewed Journal, Vol. 6 ISSN2012 3981.*
8. Bulusan, F. (2019). *Selecting Potential Instructional Materials for Literature Teaching in the 21st Century Milieu: Findings from a Systematic Review of Literature*
9. Bulusan, F. (2019). *Facilitating Learner- Centered Teaching, Rex Book Store, pages 35; 42- 43*
10. Capistrano, J.D. (2019). *Innovative Instructional Delivery Package in Learning Science among Grade 9 Students. Unpublished Master's Thesis, Laguna State Polytechnic University, Sta, Cruz, Laguna.*
11. Dahar, M. (2011). *Effect of the Availability and the Use of Instructional Material on Academic Performance of Students in Punjab Pakistan. Euro Journal Publishing Inc.*



12. Danielson, C. (2017). *Enhancing Professional Practice: A Framework for Teaching (2nd Ed.)* Alexandria, VA; Association for Supervision and Curriculum Development
13. Everette, M. (2017). *The Hidden Power of Learning Objectives*. College Press 123-4 Amsterdam Avenue, New York, NY 10027. Museum of Science.
14. Hale, D. (2018). *Why it is Important to Pretest the Questionnaire?*
15. Ibeneme, O.T. (2000). *Provision and Utilization of Instructional Equipment for Teaching and Learning Science and Technology*. *Issues in Educational Journal*, 1, 139-144.
19. Malik, T. (2019). *Comparative Analysis between Pre-Test/Post-Test Model and Post-Test-Only Model in Achieving the Learning Outcomes*
20. McTighe, J. & Guskey, T. (2016). *Pre-Assessments: Promises and Cautions* <https://tguskey.com/wp-content/uploads/Article-15-Guskey-PreAssessment.pdf>.
21. Nic, O. (2013). *Why Learning Objectives is so Important?* <http://www.aic.lv/ace/ace-disk/Bologna/contrib/ESIB/QAhandbook.pdf>.
22. Olayinka, A.R.B. (2016). *Effects of Instructional Materials on Secondary Schools Students' Academic Achievement in Social Studies in Ekiti State, Nigeria*. *World Journal of Education*, p. 32
23. Orosco, R. (2020). *Infographics: An Alternative Assessment Strategy to Improve Students' Academic Performance in Chemistry Unpublished Master 's Thesis, Laguna State Polytechnic University, main Campus, Santa Cruz, Laguna*. pp. 76-80.
24. Serton, M. et. al., (2017). *Acceptability of Healthcare Interventions: An Overview and Development of a Theoretical Framework*. *BMC Health Services Research BMC series- open, Inclusive and Trusted 2017*.
25. Shivaraju, P.T., Manu, G. & Savkar, Vinaya, M. & Savkar, M. (2017). *Evaluating the Effectiveness of Pre-Test and Post-Test Model of Learning in a Medical School*
26. Taip, E. (2018). *Acceptability of Validated Supplementary Learning Material in Physical Education Unpublished Master's Thesis, Laguna State Polytechnic University, Sta. Cruz, Laguna*.
16. Ikerionwu, J.C. (2000). *Importance of Aids and Resources in Classroom Teaching*. In A.M.Oyeneyin (Ed.), *Perspective of Classroom Teaching*. Abuja: Martmonic Investment Ltd.
17. Lucas, M.R. & Corpuz, B. (2013). *Facilitating Learning: A Metacognitive Process*, Lorimar Publisher pages 95- 99; 143-146.
18. Majault, J. (2015). *Posttest Subsequent to Teachers' Instructional Style*. Connecticut: District Educational Brochure.



# STUDY AND DETERMINATION OF ANTHELMINTIC ACTIVITY OF ETHANOLIC LEAF EXTRACT OF *PASSIFLORA EDULIS SIMS*

Prashant Singh<sup>1</sup>, Ayasha Singh<sup>2</sup>, Kush biswas<sup>3</sup>

<sup>1,2,3</sup>One beat collage of medical sciences

## ABSTRACT

Now a day, traditional medicines are used for the most types of diseases. In this study, Ethanolic extraction of *Passiflora edulis sims* extract is used for anthelmintic activity. This plant extract is also used in treating different types of diseases. Leaves of *Passiflora edulis sims* are dried, powdered and extracted with ethanol in Soxhlet extractor. Indian adult earthworms (*Pherithema posthuman*) are used to check the anthelmintic activity by using these extracts. Result shows that leaf part is been taken less time for the death and paralysis of earthworm. This extract was screened for anthelmintic activity.

**KEYWORDS:** *Passiflora edulis sims*, anthelmintic activity, *Pherithema posthuman*

## 1. INTRODUCTION

*Passiflora edulis sims* is obtained from vines and passion flower. It belongs to the family *Passifloraceae*. All part of this plant is used for medicinal purpose.<sup>1,2</sup> The development of anthelmintic resistance in the parasites. Chemotherapy is used for the control of helminthes.<sup>3,4</sup> Helminthiasis is caused by helminthes infection. It is a livestock production all over the globe.<sup>5,6</sup> Chemotherapeutic remain the corner stone for treating the helminthiasis by overcoming certain factor like chemical residue and toxicity, cost increases, drugs non-adaptability and non-availability in the remote aera.<sup>7,8</sup> Synthetic anthelmintics are the soul source for the control of the gastrointestinal nematode by means of continues and intensive use in recent era.<sup>9,10</sup> The usage of medicinal plants for above problem is more acceptable from the ancient period since they have the advantages of sustainable supply and acceptable.<sup>11,12</sup>

## 2. MATERIAL AND METHODS

### 2.1 Preparation of Plant Extract

The plant were collected from local farm behind NCP, Erode District, Tamil nadu. The plant material

was identified as *Passiflora edulis sims* (family Passifloraceae). The leaves were washed and air dried for five days and pulverized into coarse powder. The coarse powder was packed tightly in the Soxhlet apparatus and extracted with 500 ml 95% ethanol at 55 °C for 72 hours by continuous hot percolation method.

### 2.2 Experimental Animal

All experimental animals were Indian adult earthworms (*Pherithema posthuma*) were collected from moist soil, washed with normal saline. The earthworms of 3-5 cm in length and 0.1-0.2cm in width were used for all the experimental protocol. Four groups were made as given below, each contains six adult earthworms and it must be of approximately equal size.

### 2.3 Experimental Design For Animal Study

Group I -animals served as normal controls. Group II - received 10mg/ml of EEPE. Group III – received 30mg/ml EEPE. Group IV-received 50mg/ml of EEPE. Group V – received 10mg/ml of Albendazole suspension. Group VI-received 30mg/ml of



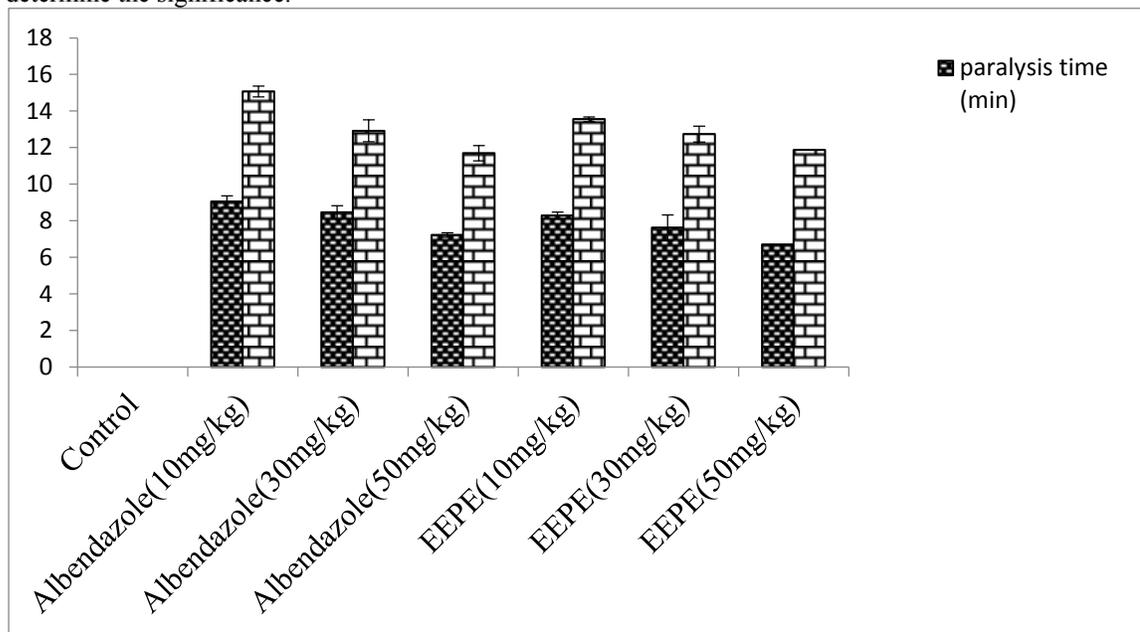
Albendazole suspension. Group VII-received 50mg/ml of Albendazole suspension. The observation was made for the time taken to cause paralysis and death of individual worms. Time for paralysis was noted when no movement of any sort could be observed except when the worms were shaken vigorously. Death was concluded when the worms lost their motility when dipped in warm water (50°C) followed with fading away of their body colors.

**RESULT AND DISCUSSION**

The result shown ethanolic extract exhibited anthelmintic activity in dose dependent manner giving significantly (p<0.01) shortest time of paralysis and death with 50 mg/ml concentration. The ethanolic extract of *passiflora edulis sims* caused paralysis in 6.70±0.70 min and time of death in 11.86 min, against the earthworm. The reference drug Albendazole showed the same at 7.22 and 11.69 min, respectively.

**STATISTICAL ANALYSIS**

Results were expressed as mean ± SEM. Statistical significance were determined by one way Analysis of Variance (one way ANOVA) followed by Dunnett’s ‘t’ test with level of significance set at P < 0.01 to determine the significance.



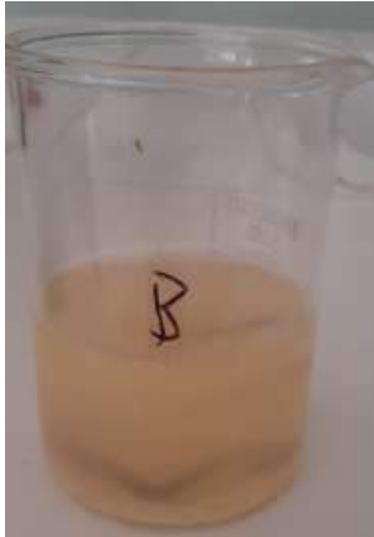
**Figure 1.**effect of ethanolic extract of *Passiflora edulis sims* on anthelmintic activity indicating death time & paralysis time

s. no	treatment	Dose mg/ml	Paralysis time(min)	Death time (min)
1	Control saline	.....	.....	.....
2	EEPE	10	8.29±0.12**	13.55±0.42**
3	EEPE	30	7.62±0.19**	12.74±0.13**
4	EEPE	50	6.70±0.70**	11.86±0.43**
5	Albendazole	10	9.05±0.50	15.07±0.20
6	Albendazole	30	8.46±0.32	12.92±0.30
7	Albendazole	50	7.22±0.37	11.69±0.60

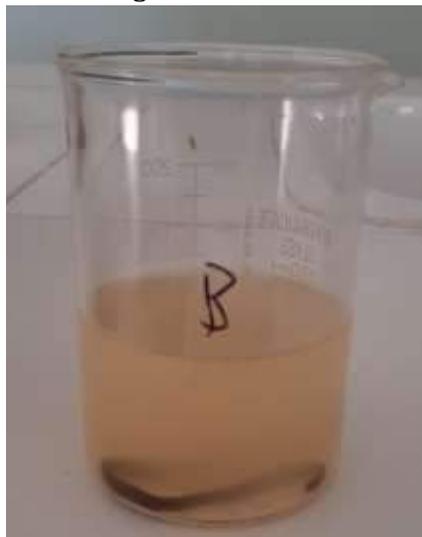
**Table 1.** Effect of ethanolic extract of *Passiflora edulis sims* on anthelmintic activity indicating death time & paralysis time



**Figure 2. Control saline**



**Figure 3. Albendazole 10mg/ml**



**Figure 4. Albendazole 30mg/ml**



**Figure 5. Albendazole 50mg/ml**

**Figure 6. EEPE 10mg/ml****Figure 7. EEPE 30mg/ml****Figure 8. EEPE 50mg/ml**

## DISCUSSION

It was found that ethanolic extract of *Passiflora edulis sims* exhibited anthelmintic activity in dose dependent manner showed shortest time of paralysis and death with 50 mg/ml concentration compared to reference drug Albendazole. Albendazole by blocking glucose uptake and depletion of glycogen stores in the parasite exhibits anthelmintic activity. Reported anthelmintic effect of *P.edulis sims* may be due to tannins, flavonoids, triterpenoids bind to free proteins in the gastrointestinal tract of host animal or glycoprotein on the cuticle of the parasite and may cause death and Phytochemical screening of the extracts revealed the presence of alkaloids, saponins, flavonoids, triterpenoids, tannins and steroids.

## CONCLUSION

The result of this study confirms the use of the ethanolic extract of leaves of *passiflora edulis sims* in traditional management of anti-anthelmintic effect. Further study is required to isolate the active phytochemical constituents present in the extract and pharmacological studies on the healing action of drug as well as on the possible side effects. The investigation on mode of action may pave way for establishment of new anti-anthelmintic therapy regimen.

## REFERENCES

1. Abreu, E.F., Aragao, F.J. Isolation and characterization of a myo-inositol-1-phosphate synthase gene from yellow passion fruit (*Passiflora edulis* f. *flavicarpa*) expressed during seed development and

environmental stress, *Ann Bot (Lond)*, 99, 2, 2007, 285-92.

2. Akhondzadeh, S., Naghavi, H.R., Vazirian, M., Shayeganpour, A., Rashidi, H., Khani, M. *Passionflower in the treatment of generalized anxiety: a pilot doubleblind randomized controlled trial with oxazepam*, *J Clin Pharm Ther*, 26, 2001b, 363-67.
3. Aoyagi, N., Kimura, R., Murata, T. *P. incarnata dry extract: Isolation of maltol and pharmacological action of maltol and ethyl maltol*, *Chemical and Pharmaceutical Bulletin*, 22, 1974, 1008-1013.
4. Hanjeet K., Mathias R.G., *The efficacy of treatment with albendazole*, *Acta Tropica* 1991;50: 111-114.
5. Carera B.D., Valdez E.V. & Go T.G., *Clinical trials of broad spectrum anthelmintics against soiltransmitted helminthiasis*, *Southeast Asian Journal of Tropical Medicine & Public Health*, 1980; 11: 502- 506.
6. Rossignol J.F. & Maisonneuve H., *Albendazole: A new concept in the control of intestinal helminthiasis*, *Gastroenterology and Clinical Biology*, 1984; 8: 569-576
7. Shan, Q., Haddrill, J.L., and Lynch, J.W., *Ivermectin, an unconventional agonist of the glycine receptor chloride channel*, *Journal of Biological Chemistry* 2001; 276:12556-12564.
8. Khakh, B.S., Proctor, W.R., Dun widdie, T.V., Labarca, C., and Lester, H.A. *Allosteric control of gating and kinetics at P2X(4) receptor channels*, *Journal of Neuroscience*, 1999; 19: 7289-7299
9. Rang HP, Dale MM, Ritter JM, Moore PK: "Pharmacology", Churchill Livingstone; Elsevier Sites Publication, 2003; Ed. 5th : 687-92.



10. Andrews, P., Tiiosl H., Pom., R. & Seubert J., Praziquantel, *Journal of Medical Research Reviews*, 1983; 3; 147-200.
11. Aubry, M.L., Cowell, P., Davey, M.J., and Shevde, S., Aspects of the pharmacology of a new anthelmintic: pyrantel, *British Journal of Pharmacology*, 1970; 38: 332-344.
12. Lacey E., *The role of the cytoskeletal protein, tubulin, in the mode of action and mechanism of drug resistance to benzimidazoles I*, *Journal of Parasitology* 1998;18: 885±936.



# OPTIMIZATION OF DAYLIGHT IN MUSUEMS AND ART GALLERIES

**Ar. Kirti Varandani<sup>1</sup>, Ar. Vibhuti Joshi<sup>2</sup>, Ar. Sangeeth S Pillai<sup>3</sup>**

*<sup>1</sup>PG Student (M.Des,Sustainable design, Scholar CODE,VGU),*

*<sup>2</sup>Assistant Professor (CODE, VGU)*

*<sup>3</sup>Malaviya National Institute of Technology  
<sup>1,2,3</sup>Jaipur, Rajasthan, (India).*

Article DOI: <https://doi.org/10.36713/epra7327>

DOI No: 10.36713/epra7327

## ABSTRACT

*The aim of research is to identify the connection between daylight and museums. A museum may be a place where individuals will explore and learn the past, present and future of history, culture and science. Nowadays museum architecture emphasizes the museum for public interaction and best for education approach. The museum lighting is a challenge with daylight openings. This paper analyses the lighting environment of museum and art galleries with a satisfactory solution of daylight by using different passive design strategies without avoiding the harm to the artifacts and these parameters are good lighting solutions for existing as well as proposed building in terms of sustainability, energy consumption and perseverance. By using these parameters, we can also manage the artificial light and provide an advance solution in LED technologies and lighting solutions can be effectively used to retrofit a museum lighting environment and affecting the connection to the environment.*

*Considering the benefits and challenges of introducing the daylight in museums and galleries. The typology of building and daylight parameters have directly impact on environment and create a visual shape in visitor's mind.*

*This study is based on majority of heritage buildings current deterioration state prevents those buildings from performing efficiently. A sustainable reuse approach for heritage buildings is considered essential. Old palaces that are usually reused with different functions mostly like museums for their considered interior beauty and unique rich designs. Function alteration along with a deteriorated state augments the energy consumption problem. The optimization of various skylight parameters is evaluated for their combined performance. The results disclose an improved performance which indicates the effectiveness of the energy and day lighting optimized strategies and techniques for heritage reuse. Daylight will help to create building more live, and a step to reducing the climate change and save our environment with global warming.*

**KEYWORDS:** *Museums; Daylight Factor; Passive Design Strategies; Visual Comfort; Thermal Comfort; Sustainability.*

## 1. INTRODUCTION

Museums are public buildings where the artifacts are displayed in different modes to entertain and enrich visitors. (Hooper Greenhill, 2013). In museum light plays different roles and enhance the space. But the main concern of daylight is control its penetration into the space. The availability of daylight is to excess the daylight level distribution

in the space by managing the artificial light. And the other challenge to understand the effect of light composition and its combination.

### 1.1 BACKGROUND STUDY

Natural lighting system become more important as some time museums and galleries have witnessed numerous upgrades to them. As private collections



of the elite, exhibition halls and various art galleries have relocated nearer to the public space from their predominantly 18th century origins, being increasingly supportive and pluralistic in nature. [A Practical Guide for Sustainable Climate Control and Lighting in Museums and Galleries Revision Finals.] In the late 1950s there was subsequent economic boom, new structures were intended to meet the developing urban culture's new necessities. This brought a large amount of conventional houses being demolished and substituted by new buildings that could allow productive and versatile spaces. Later on, the authorities perceived the meaning of these structures in representing the identity of the region and accordingly implemented regulations to retain the essential ones. In this way, a few of these average UAE structures have been transformed into galleries and their rooms have been utilized as display spaces. Nonetheless, these conventional structures were not initially planned or worked as galleries. In the exhibition hall rooms, numerous issues were set up, for example, the presence of serious daylight and expanded measures of illuminance that could hurt the items and construct an unfortunate visual climate. [Daylighting performance in UAE traditional buildings used as museums, 2018] In the twentieth Century, the emphasis of exhibition halls has changed from being internally centered on preserving and conserving collections to an outward emphasis on setting up zones of mass allure, discourse, interest, and display. These days, exhibition halls and exhibitions, as iconic architecture, may become showcases and attractors themselves, the achievement of which is mostly calculated in terms of occupancy numbers, produced tourism and revenue. In this sense, "manageability" is relevant, and "proper environment control and lighting

conditions" are causing exhibition halls and displays specifically a great deal of outrage lately. [A Practical Guide for Sustainable Climate Control and Lighting in Museums and Galleries Revision Finals].

**1.2 RAJASTHAN SCENARIO**

Structures are the users of electricity, representing in excess of 33% of all energy consumption and just about 30% of fossil fuel byproducts. The construction industry represents around 35 percent of the general energy consumption in our country. Transport and manufacturing firms are probably the biggest users of petroleum products. Nonetheless, their development plays a significant role in mitigating global warming. This is the reason the World Business Council for Sustainable Development (WBCSD) delivered the Energy effectiveness in Buildings (EEB) project. Executing energy effectiveness activities in Jaipur business area will bring about in general energy reserve funds of 6.3 billion kilowatt-hours in FY2014-15, which is around 30% of the complete power utilization of Rajasthan state in 2014-15. The residential and industrial users accounted for most of electrical energy burned-through for the duration of the period of time. There will be a 7 percent intensified expansion in energy prerequisite of the business area before the finish of the Thirteenth Plan (2018-2022). [EEB Laboratory Jaipur].

Rajasthan became the first state in India to inform the Energy Conservation Building Code in 2011 of a contract requirement of 120 KVA or more for all buildings with a linked load of 100 KW or more, or of a 500 sq.mt or more compact area used for commercial purposes. [EEB Laboratory Jaipur]

CATEGORY	ENERGY CONSUMPTION (MU)	ENERGY SAVING POTENTIAL AS PER STUDY	
		Potential	MU
Domestic	1587.23 (82%)	20%	317.45
Commercial	1133.85 (59%)	18%	204.09
Public Street Lights	76.14 (4%)	75%	57.105
Public Water Works	111.7 (6%)	30%	33.51
Industrial	838.95 (43%)	10%	83.89
<b>TOTAL</b>	<b>1977.97</b>		<b>496.955</b>

**Figure 1: Economically viable efficiency measures could reduce energy consumption**

**2. Need of study**

Today, artificial lighting has overtaken the natural lighting. There is a need to understand significance of light in setting of work of art just as the visual quality in exhibition halls. Analyzing the role of the sunlight, which is a significant job towards the supportability of workmanship in museums and art

galleries that is in the high demand and will further help in energy savings and benefitting the natural environment. The effect of the types of window openings and the connection with the climate, advantages and concerns of daylight in museums and art galleries is needed to be analyzed. From an architectural and design point of view, daylight



holds an important role as it is the part that give the space more value and enhance the visual and thermal quality of space. A person judges a building on the basis of its aesthetic, uniqueness, and its silent features which we can say its visual quality, thermal quality, openings, connectivity etc. when we talk about daylight in Rajasthan than it is the place where we see the maximum clear sunny days and Rajasthan is well known for its monuments and heritage. The selection of the topic and the place are connected to each other. There are lots of museums and arts galleries are available in Rajasthan. But everyone wants to work on artificial light as an architect and designer it's our responsibility to aware the people towards sustainability. Sun is one of the natural resources helps us to reduce the energy consumption of electricity and light plays an important role in museum, in place of maximum use of artificial light we can use daylight at some spaces by using daylight design strategies. In museum there are so many creative structures, artwork, a collection of artifacts and different objects of creative, cultural, historical, or scientific importance which gives various artist and historical knowledge, lights give a vital role of interaction with human with the place. Lights not only lighten up the space but also reveal the art of exhibit.

Now a day's artificial light is most common way to achieve the demand but with this we can indirectly increase the heat and temperature of our surroundings. Causes the global warming, by using daylight in museum and optimizing the artificial light we can give our contribution and it's a foundation step towards sustainability. Which will help to reduce carbon footprints and with this step we can make our building more energy efficient, sustainable and more economical. As we know that it has different benefits and drawbacks of according to the climatic condition. With the help of daylight in museum to control global warming and heat this step will also help to reduce energy consumption and co2 emission.

## 2.1 DAYLIGHT AND HEALTH

Daylight have a multiple advantage. It is a main source of light before artificial lighting become reliable and affordable. It has a solar radiation which is visible to human eye emitted by sun and perceived during day time. In Rajasthan the availability of the clear sun is maximum according to the previous studies and it cannot be artificially replicated often referred to as natural light. Characteristic light impacts the human framework and physiology in numerous regards. This investigation basically analyzes and explains the roundabout effect of common light. This is concerned chiefly with natural eye and how light

effects it and maturing. Light has capacities on both amount and quality levels, particularly quality which has a significant job. [Tawfik, A. W. M. A. (2005).]

'Light is maybe the most critical ecological contribution, after food, in controlling substantial capacities'. Sunshine has gotten a "structural" apparatus, in what elements of day like enlightenment, change of light as the day goes through its course, and so on and are supplanted by electrical lighting arrangements. During the day, light gives an assortment of choice and upgrades. The expanded efficiency from getting sunlight can help pressure decline and may likewise build profitability.

Sunshine is the radiation, noticeable to the natural eye that has been delivered from the sun and afterward acquired longer than a day. At the point when the world Health Organization gave a report. on wellbeing, it depicted wellbeing as "a condition of complete physical, mental and social prosperity and not simply the presence or nonappearance of sickness or illness." The hour of sunshine applies a significant impact on our wellbeing. For wellbeing, we likewise need to focus on the sun; even daylight is imperative for our environment. A large portion of the illuminating presences (or star-like lights) are made in the yellow-green range of light since it gives the most noteworthy luminance. The best sort of light source is the full range light as it gets a wide scope of daylight like light that makes an enormous band of light. Sunshine lights give splendid light yield near 100%.

## 2.2 LITERATURE REVIEW

As per study a good number of buildings are lacking in term of visual conditions and comfort because mostly are focused on functions and structure. But in term of environment it will be compromised at some point. Many studies investigated daylight in museums and art galleries using qualitative literature case study of existing building. Light plays a major role in assessing the artwork's appeal. It is now understood that the light on the artwork should be about three times as bright or intense as the ambient light. Although, as art objects are susceptible to sun, infrared (IR) and ultraviolet (UV) radiation, they should be discouraged. Direct sunlight can exceed more than 30,000 lux (luminous flux per unit area) and is therefore not recommended for use in light-sensitive artworks under any conditions, as it contributes to damage. Studies have shown that the highest suitable exposures for painting are 30 foot candles (ftc, non-SI unit of luminance or light intensity) equal to 325 lux. Light is one of the most critical and powerful elements in museums and galleries. The purpose of light in art galleries and



museums is not only to make it easier for visitors to see the work, but also to maintain the masterpiece. Galleries are also one of the most complex styles of buildings to be illuminated by daylight. Most galleries and museums prefer a louvered top lighting system; skylight as it is the great idea to provide light source. [Worpole, K. (2000).].

Planning for daylight isn't just a matter of heavy use of window glass, but there can be problems of uncomfortable glare. Daylight planning should be an important part of building design. A design strategy to validate good daylight conditions in art museums considers daylight availability, sky conditions, building location, street obstruction/ visual connection to the outside,

efficiency and shape of the building, interior planning and design, window and facade design (size and divisions of the windows), creative daylight strategies and checking the design strategy. Innovative light-control methods include louvres and light racks, rotating curtains, reflectors, prismatic glazing and pipes. Architecture elements, such as facade arrangement, space arrangement and lighting system, must be optimized to effectively light-control a building. [Kaya, S. M., & Afacan, Y. (2018)]

The daylight issue could be a common and simple method used to measure the standards of daylight in a room/building under an overcast sky.

**Table 1: Average daylight factor**

Average Df	Appearance	Energy Implications
<2%	Room Looks Gloomy	Electric Lighting Needed Most Of The Day
2%-5%	Predominantly Day Lit Appearance	Good Balance Between Lighting And Thermal Aspects

Source: NBC, 2016

**Table 2: Minimum Daylight Factors**

Types of space	Daylight factor(%)
Art galleries, museums and studios	4-5

**Table 3: Average Illumination Level**

Spaces	Illumination(lux)
Museum and galleries	300
Workshop	100-400(general)
	300-400(task)
Halls and exhibitions	500-1000

## 2.1 OPTIMIZED VISUAL EXPERIENCE OF ARTWORK

The nature of light in museums contains a solid effect on the tourist's insight and experience. The experience of artefacts under natural light will be more comfortable and good than just under unnatural lighting. Moreover, due to the always changing nature of light, the visitors experience is extraordinary during their each and every visit. The main component that the tourist needs when seeing displays are: purity of the art (for figures) and exactness of item color (for artworks, drawings). The use of sunlight can give a good degree of visual solace in the space and consider visual sense, as keeps up the natural feeling in their authentic way as they use to be.

The sunlight will improve the uniqueness of

the art by creating shades to them. Sunlight provides with shade, color rendering of the exhibits which can't be done by artificial methods. Due to its persistent range, brightening from sunlight gives impartial shading enlistment to all color tones. Despite the fact that of the difference in the amount of sunlight, the natural eye can adjust to the progressions and keep an exact view of the item's color. Besides, for a large number day lighting empowers the guest to notice them as near the lighting conditions as those under which they were made. Particularly in paintings, sunlight can help to show the authenticity of the art without changing the fine art's tones.



## 2.2 SUSTAINABILITY

Sunlight is one of the essential source of renewable energy and its utilization in plan assumes a fundamental part in the sustainability of the structures. The dissemination of sunlight in museum is a vital technique for green design, as the utilization of electrical lighting inside every show and different zones will represent 200th of the structure's energy utilization. Later on, the utilization of daylight mix with artificial light and lighting control frameworks will definitely improve the energy adequacy of galleries.

## 2.3 THERMAL COMFORT

A literature study of indoor natural conditions found that thermal comfort is ranked by building inhabitants to be of more worthy or significance than be visual and acoustic solace and have indoor air quality. [Frontczak et al., 2012] In any case, while having a look at museum or exhibition hall, the biggest effect on the fulfillment for guests are, DOORBOS, M. the technique for display, visual and locomotor openness, enlightenment and rest zones. [Jeong and Lee, 2006].

Power utilization for lighting is an inefficient and energy consuming cycle. Since individuals in many created nations use power, it generally affects energy utilization, there are numerous valid justifications for trying to build up a lighting design in building interiors that is viable, effective and harmless to the ecosystem without harming the climate. Energy protection through daylight integration to interior spaces is inevitable. It is additionally a perplexing issue on the grounds that the ecological necessities for the protection of the materials force exacting principles to maintain a strategic distance from the weakening of displays. It is conceivable to have subjective daylight design with productive visual solace and save energy effectively without harming the presentation objects within art museums. Hence, art museums ought to be qualified with bioclimatic, ecological benevolent and energy cognizant design. A productive and sustainable exhibition hall building design can completely meet the compositional, useful, solace, control and wellbeing prerequisites, by additionally providing revolutionary measures of energy savings and providing decrease of carbon dioxide outflows.

## 2.4 ENVIRONMENTAL BENEFITS

Buildings use energy to warm, cool, light, ventilate and fix utilizations in internal territories. In most industrialized nations the energy used by buildings by and large address

around 50% of all out energy utilization. Energy comes from the burning of petroleum derivatives. Buildings are answerable for roughly 50% of CO<sub>2</sub> emanations into the environment. What's more, in light of these burning there is additionally 10% of methane outflows, 25% of Nox emanations and 25 % of SO<sub>x</sub> discharges. Consequently, buildings are a significant effect of overall warming, environmental change, air contamination and corrosive rains. Beside the subjective meaning of daylight for people and engineering, environmental points of daylight integration are pivotal for sustainable lighting design. Daylight without squander use provided through its design is promptly accessible and is harmless to the ecosystem additionally cost free. Daylight utilization there is a less contamination and less mischief on climate. Consequently, daylight utilization is additionally valuable for our current circumstance. Within the art museums, this is additionally extremely helpful in light of the fact that this suggests personal satisfaction will be increased in where museums are found and this will prompt decrease of contamination of the art gallery buildings and improvement of the indoor environment.

## 3. INFERENCES

With reference to the studies, there were recognizable and quick changes in the sunlight due to climate conditions. Albeit these progressions were obvious on the whole exhibitions, in the rooms that just have top-lighting openings these varieties fill in as another layer in the impression of the craftsmanship showed. The varieties make the experience of both the space and workmanship more intriguing as changes in light power, give various impressions of the room and feature various shades of the artworks. In request to guarantee the best utilization of light and dodge direct daylight in the exhibitions; it is additionally the underlying advance to practical plan. The direction of the openings and their relationship with the way of the sun, influences the amount, quality and dispersion of light.

Windows are the most well-known type of daylighting utilized in many sorts of structures, as they give light, view and ventilation. In exhibition halls, they have been utilized verifiably in numerous displays, yet fundamentally in light of the fact that the gallery work was given to existing structures. Window gaps permit normal light to the inside of a space, yet can likewise give a perspective on the outside climate. They can catch perspectives to the metropolitan settings or nature around the



structure; in some cases, even utilize this view as a system for the craftsmanship showed.

There are two fundamental ways that sunlight openings communicate with the outside; either by making a visual association with the outside climate (metropolitan environmental factors or sky) or by framing an association with the elements of common light associated with time and climate conditions. By acquiring a view to the outside, in this manner a connection to the sunlight changes is additionally settled.

#### 4. CONCLUSION

The significance of natural light in the museums. Artificial light is a shortcut to enlighten our creative spaces but natural light can be used as a sustainable methodology for the museums. As per study I have analyzed that Lighting in museum is essential but on the other hand can also cause deterioration of the sculptures or the exhibits. Light is not just a requirement but serves as a medium for use to provide a context with the historic times in exhibitions. The intensity of light and the duration of exposure are the main factors that can lead to the destruction or can benefit the users as well as the historic artifacts. Lighting parameters and the source of lighting is most essential component to be looked upon while designing a museum. From the design point of view, climate of a place is also important to understand and design the museum according to it. So, need of the hour is to balance a relation between the climatic condition of the place i.e. environmental conditions and design of the museums and galleries to achieve the sunlight to the best possible way. Therefore, day lighting in museums with the co-relation of climatic conditions should be further studied to frame design guidelines for day lighting in museums, the sustainability and passive solar daylighting strategies for museum building in context of Rajasthan.

#### 5. REFERENCES

1. Ahmad, N., Ahmad, S. S., Talib, A., & Yaman, R. (2017). *Visual Responses of Visitors towards Daylighting in Museums: A case study of Malaysia*. *PERTANIKAJOURNAL OF SOCIAL SCIENCE AND HUMANITIES*, 25, 323-332
2. Ajmat, R., Sandoval, J., Arana Sema, F., O'Donnell, B., Gor, S., & Alonso, H. (2011). *Lighting design in museums: exhibition vs. preservation*. *WIT Transactions on The Built Environment*, 118, 195-206
3. Al-Maiyah, S., & Elkadi, H. (2015). *Turkish D-light: accentuating heritage values with daylight*. *Proceedings of the Institution of Civil Engineers-Engineering History and Heritage*, 168(4), 139-149.
4. Al-Sallal, K. A., AbouElhamd, A. R., & Dalmouk, M. B. (2018). *UAE heritage buildings converted into museums: Evaluation of daylighting effectiveness and potential risks on artifacts and visual comfort*. *Energy and Buildings*, 176, 333-359.
5. Ameer Mustafa Varzgani 2014-15
6. *A Practical Guide for Sustainable Climate Control and Lighting in Museums and Galleries Revision Finalsm*
7. Aries, M. B., Aarts, M. P., & van Hoof, J. (2015). *Daylight and health: A review of the evidence and consequences for the built environment*. *Lighting Research & Technology*, 47(1), 6-27
8. Balocco, C., & Volante, G. (2018). *Lighting design for energy sustainability, information, and perception. A museum environment as a case study*. *Sustainability*, 10(5), 1671.
9. *BEE-ECBC guidelines 2017*
10. Davidson, L. (2013). *Visitor studies: Toward a culture of reflective practice and critical museology for the visitor-centered museum*. *The international handbooks of museum studies*, 503-527
11. *Daylighting performance in UAE traditional buildings used as museums, 2018*
12. de Oliveira, F. S., & Guedes, M. C. (2006). *Daylighting museums—a case study in Lisbon*. In *PLEA2006-The 23rd Conference on Passive and Low Energy Architecture*
13. *EEB Laboratory Jaipur*
14. Fathy, F., Mansour, Y., Sabry, H., Refat, M., & Wagdy, A. (2020). *Conceptual framework for daylighting and facade design in museums and exhibition spaces*. *Solar Energy*, 204, 673-682
15. Garside, D., Curran, K., Korenberg, C., MacDonald, L., Teunissen, K., & Robson, S. (2017). *How is museum lighting selected? An insight into current practice in UK museums*. *Journal of the Institute of Conservation*, 40(1), 3-14.
16. *International Council of Museums (ICOM)-2007*
17. <https://multicomfort.saint-gobain.com/comforts-and-solutions/visual-comfort>.
18. <https://www.wbdg.org/resources/daylighting>
19. <https://www.energy.gov/energysaver/save-electricity-and-fuel/lighting-choices-save-you-money/daylighting>
20. [https://mahaurja.com/meda/data/energy\\_conservation/pdf/EC\\_needec.pdf](https://mahaurja.com/meda/data/energy_conservation/pdf/EC_needec.pdf)
21. <https://sigearth.com/the-benefits-of-daylighting-in-your-building/>
22. <https://doi.org/10.1177/1420326X17704028>
23. Hurlbert, A., & Cuttle, C. (2020). *New museum lighting for people and paintings*
24. Hunt, E. G. (2009). *Study of museum lighting and design*.
25. *Illuminating Engineering Society, IES RP-31-14, Recommended Practice for the Economic Analysis of Lighting*. New York: IESNA, 2014.
26. *Importance of Daylight In Art Galleries Ameer Mustafa Varzgani(2015)*
27. Iordanidou, C. (2017). *Daylight openings in art museum galleries :A link between art and the outdoor environment* (Dissertation). Retrieved from <http://urn.kb.se/resolve?urn=urn:nbn:se:kth:d-iva-215338>
28. Kaja, N. (2015). *An Overview of Energy Sector in India*. *International Journal of Science and Research (IJSR)*, 6.
29. Kaya, S. M., & Afacan, Y. (2018). *Effects of daylight*



- design features on visitor's satisfaction of museums. *Indoor and Built Environment*, 27(10), 1341–1356.
30. Kim, C. S., & Chung, S. J. (2011). Daylighting simulation as an architectural design process in museums installed with toplights. *Building and Environment*, 46(1), 210-222.
31. Kreps, C. F. (2008). Appropriate museology in theory and practice. *Museum Management and Curatorship*, 23(1), 23-41.
32. Kristinsdóttir, A. (2017). Toward sustainable museum education practices: confronting challenges and uncertainties. *Museum Management and Curatorship*, 32(5), 424-439.
33. Licht, F. G. (2000). *Good Lighting for Museums, Galleries and Exhibitions* 18.
34. McCall, V., & Gray, C. (2014). Museums and the 'new museology': theory, practice and organisational change. *Museum Management and Curatorship*, 29(1), 19-35.
35. Oliveira, F., & Steemers, K. (2008). 210: Daylighting Museums—a survey on the behaviour and satisfaction of visitors. In *PLEA 2008—25th Conference on Passive and Low Energy Architecture*.
36. P. Hanselaer, C. Lootens, W.R. Ryckaert, D. Deconinck and P.b Rombauts, "Power density targets for efficient lighting of interior task areas," *Lighting, Research & Technology*, vol. 39 (2), pp. 171-184, 2007.
37. Piana, E. A., & Merli, F. (2020, October). *Lighting of Museums and Art Galleries*. In *Journal of Physics: Conference Series* (Vol. 1655, No. 1, p. 012138). IOP Publishing.
38. Pinilla, S. M., Moliní, D. V., Fernández-Balbuena, A. Á., Raboso, G. H., Herráez, J. A., Azcutia, M., & Botella, Á. G. (2016). Advanced daylighting evaluation applied to cultural heritage buildings and museums: Application to the cloister of Santa Maria El Paular. *Renewable Energy*, 85, 1362-1370.
39. Reinhart, Christoph (2014). *Daylighting Handbook 1*. Christoph Reinhart. ISBN 9780692203637
40. Schielke, T. (2020). *Interpreting art with light: Museum lighting between objectivity and hyperrealism*. *LEUKOS*, 16(1), 7-24.
41. Sterrett, J., & Piantavigna, R. (2018). Building an Environmentally Sustainable San Francisco Museum of Modern Art. *Studies in Conservation*, 63(sup1), 242-250.
42. Subramanian, C. V., & Kamalesvari, S. (2016). Daylight and Sustainable Architecture for Warm Humid climate. *Mirror (glass)*, 80, 90
43. Tawfik, A. W. M. A. (2005). *Natural Lighting As A Factor In Providing A Healthy Environment In Buildings* (Doctoral Dissertation, Faculty Of Engineering at Cairo University In Partial Fulfillment of the Requirements for the Degree of Masters Of Science In Architecture Faculty Of Engineering, Cairo University Giza).
44. Ulas, E. B., & Roos, M. (2013). *Looking at Art in a New light*.
45. *Users' Manual - Bureau of Energy Efficiency*
46. Vaezizadeh, F., & Kazemzade, M. (2013). Investigating different strategies for light and ventilation provision in vernacular underground architecture and their integration with underground museums architecture—a case study in Iran. *International Journal on Technical and Physical Problems of Engineering*, 5(4), 63-71.
47. Wilson, M. (2006). Lighting in museums: lighting interventions during the European demonstration project 'Energy efficiency and sustainability in retrofitted and new museum buildings' (NNE-1999-20). *International Journal of Sustainable Energy*, 25(3-4), 153-169.
48. Wolfgang Schone, Berlin 1993
49. Worpole, K. (2000). *Here comes the sun: architecture and public space in twentieth-century European culture*. Reaktion Books.
50. Zannis, G., Santamouris, M., Geros, V., Karatasou, S., Pavlou, K., & Assimakopoulos, M. N. (2006). Energy efficiency in retrofitted and new museum buildings in Europe. *International Journal of Sustainable Energy*.



# IMPROVED PERFORMANCE OF PHOTOVOLTAIC BASED EMBEDDED DUAL POWER SOURCE SL-QUASI Z SOURCE INVERTER FOR IM DRIVE

<sup>1</sup>S. Priyadharsini, <sup>2</sup>T. S. Balaji Damodhar, <sup>3</sup>C. Kannan, <sup>4</sup>L. Ganesh Babu

<sup>1,3</sup> Associate Professor, Department of Electrical and Electronics Engineering,  
Arunai Engineering College, Tiruvannamalai, Tamil Nadu, India,

<sup>2</sup> Professor, Department of Electrical and Electronics Engineering,  
Ranippettai Engineering College, Walajah, Tamil Nadu, India,

<sup>4</sup> Assistant Professor, Mechatronics Engineering, Tishk International University, Erbil, KRG, Iraq.

Article DOI: <https://doi.org/10.36713/epra7328>

DOI No: 10.36713/epra7328

## ABSTRACT

This paper presents the performance of PV-based embedded dual power source of SL quasi Z source inverter. The SL quasi Z source inverter with an embedded PV source and a dual power source (DPS) is injected into the system. The DPS helps the system to operate at an equilibrium state and stabilizes the entire system during PV power fluctuations. The design of the proposed system is carried out in MATLAB/Simulink environment. The control strategy with the PI controller is adopted. ESLQ Z source inverter with voltage boost method is employed with basic SPWM methodology will be suitable for IM drive applications. The system has the merit of a low inrush current that will protect and increase the life of switching devices. Finally, the study and simulation setup is validated by proving their good operating features. The proposed work is trustworthy that minimizes the total distortion factor, start-up inrush current with improved performance.

**KEYWORDS:** Photo voltaic (PV), embedded dual power SL quasi Z source inverter, Induction motor drive (IM), PI controller.

## 1. INTRODUCTION

The decreasing of fossil fuels and increasing environmental pollution leads the researcher to concentrate on ever-green technology such as renewable energy. In such cases, the researcher has to adopt a novel and robust system to ensure the system's capability and performance metrics. Meanwhile, a lot of parameters influence the complexity of the entire system that will affect the performance. The proposed work will eliminate the complexity and increases the performance of the embedded dual power SL quasi Z source inverter with the simple modulation technique, rapid boost voltage, and robust structure. Impedance source inverters can be utilized for both buck and boost functions in a unique system.

Turning ON the same phase leg can be made simultaneously is possible in this type of setup and not available in conventional voltage source inverter (VSI) and current source inverter (CSI) [1]. Control strategy for quasi z source inverter with battery and PV system employs a modified SVM technique to minimize the harmonics content in the output voltage [2]. Proposed PS-PWAM for PV QZS network with MLI with a reduced number of switches leads to reduce the power loss in [3].

A small-signal dynamic model for QZSI is proposed with the combination of battery bank and SVM control strategy to achieve the low inductor current and higher efficiency [4]. The voltage-fed quasi z source inverter topology is presented in [5] is suitable for light and heavy loads that are implanted with a DSP processor. It eliminates the problems of abnormal work state in light loads. Voltage stress, inrush current, and common ground problems are avoided in [6]. For low power applications, switched boost inverter (SBI) is replaced by a Z source inverter that reduces the LC pairs [7]. To overcome the drawback in conventional Z source inverter, a new high voltage boost impedance source inverter i.e. switched coupled inductor Quasi Z Source inverter has been proposed with the integration of switched capacitor and switched inductor [8]. Double frequency power mismatch will affect the dc input and ac output, this can be avoided with the help of the capacitance reduction control strategy is proposed [9]. Quasi Z Source inverter in boost mode and grid-tie current controller with plug-in repetitive control is developed in [10]. The QSLZSI is the combination of traditional ZSI and CHB circuits that reduces the count of the components and achieves high boost factors [11]. A new control strategy to suppress the resonance on the impedance networks is proposed in [12]

The proposed work focuses on an SL quasi Z source inverter with an embedded PV source and a dual power source. This topology employs the dual battery power source to gain the voltage level during fluctuations and to maintain an equilibrium operating state. The simple SPWM technique is used to reduce the complexity in the existing traditional SL Quasi Z Source inverter. The PV fluctuations by PV panels are eliminated in this system and it is suitable for IM drive applications.

## 2. PROPOSED EMBEDDED DUAL POWER SOURCE SL-QUASI Z SOURCE INVERTER

Figure 1 shows the traditional single-phase QZSI for PV power conversion. The QZSI has an impedance network consisting of a couple of inductor  $L_1$  &  $L_2$ , a couple of capacitor  $C_1$  &  $C_2$ , and a diode  $D_1$  in the photovoltaic section with a dc link.

Where,  $C_p$  is the PV panel capacitor,  $V_o$  is the ac output voltage and  $L_f$  is the filter inductor. Meanwhile,  $V_g$  and  $i_s$  denotes grid voltage and grid-tie current.

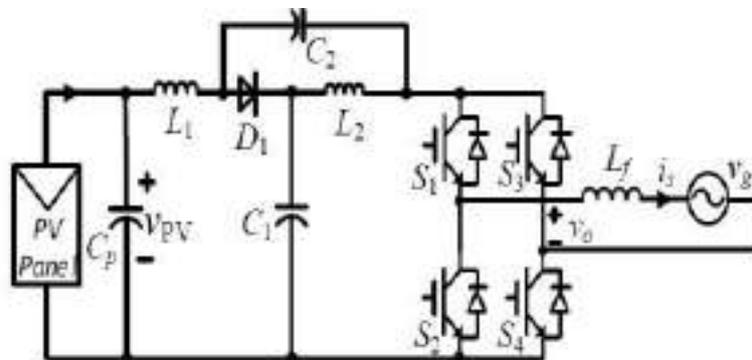
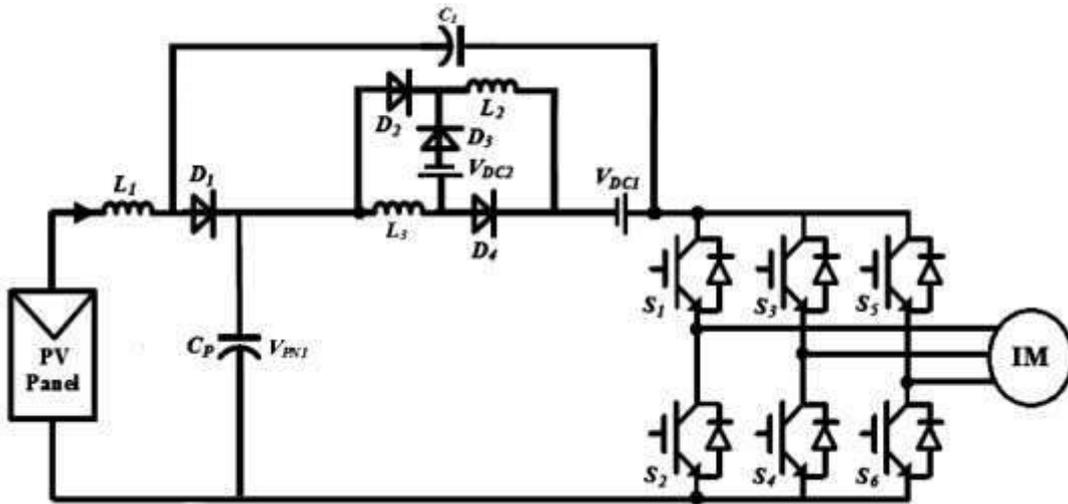


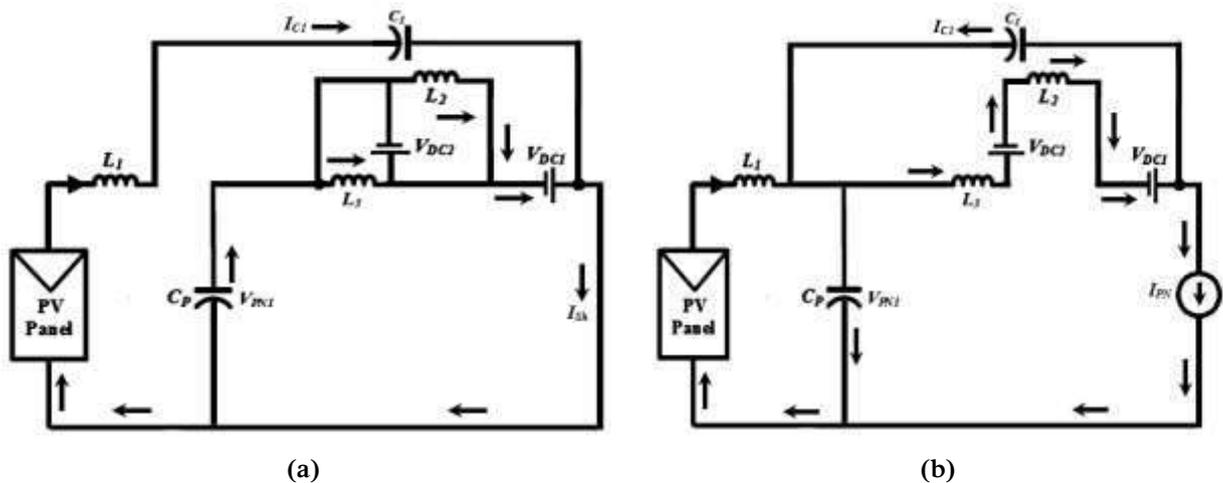
Figure 1. Traditional SL quasi Z source inverter

To avoid PV fluctuations, one or dual dc sources can be connected to an impedance network will make a smoother input current flow and avoids fluctuations. This topology can boost the voltage gain. Figure 2 shows the SL Quasi Z Source inverter with an embedded dual power source for IM drives consisting of battery  $V_{DC1}$  and  $V_{DC2}$  are connected in series to the diode  $D_3$ . The scope of this proposed configuration has to overcome continuous fluctuation input current and also suppress the start-up inrush current caused by the leakage inductance. It can be absorbed by the capacitor  $C_1$  and recycled without creating any voltage spike in the target.



**Figure 2: Proposed SL quasi Z source inverter with embedded dual power source for IM drives**

Figure 3(a) shows the equivalent circuit in the shoot-through state of the proposed inverter and figure 3(b) shows the equivalent circuit in the non-shoot through state. Both equivalent circuits, 3 (a) and (b) add two capacitors, three inductors, and a dual voltage source.



**Figure 3: a) Equivalent circuit in shoot-through state. b) Equivalent circuit in non-shoot through state**

This topology is built with a battery and PI controller to have closed-loop operations. The PI controller has robust system performance and reduced fluctuations.

The output voltage  $V_0 = V_0 \sin \omega t$ , where  $\omega$  is the amplitude and fundamental frequency of ESLQZSI output voltage. During the SPWM period, the dc-link peak voltage  $V_{DC} = V_{PV}$ . Hence the voltage fluctuations are eliminated. The modulation index  $M$ , angular position  $\theta$ , shoot-through duty cycle  $D(t)$ , and the peak voltage  $V_{dc}$  of the ESLQZSI can be derived and as follows,

$$M_a = \frac{V_0}{V_{pv}} \tag{1}$$

$$\theta = \sin^{-1} \frac{1}{M} \tag{2}$$



$$D_i(\omega t) = \frac{1 - |M \sin(\omega t)|}{1 - 2|M \sin(\omega t)|}, V_{DC} = \frac{1}{1 - 2D_i(\omega t)} V_{pv} \quad (3)$$

### 3. PROPOSED CONTROL STRATEGY OF SPWM WITH PI CONTROLLER

Figure 4 shows the control strategy of the proposed ESLQZSI with the SPWM technique for a single leg along with an MPPT controller to utilize the full harvested power from the PV panel. The following control objectives are implemented in the embedded dual power SLQZSI. 1. Adaptation of MPPT algorithm. 2. Constant dual power source to avoid PV power fluctuations and, 3. Battery handling system. The PI regulator is implemented to verify the proposed topology. The harvested PV voltage and its reference  $V_{PV}$  from MPPT algorithm, and current  $I_{PV}$  are obtained from the controller to form the phase angle. Feedback of induction motor torque  $T_m$  is given to the PLL. The dual power source with closed-loop control will achieve the required shoot-through duty ratio to handle the dual battery system to operate in real-time. To achieve the equilibrium condition with fast response, the feed-forward shoot-through duty ratio is given as

$$D = \frac{V_b}{(V_{pv} + 2V_b)} \quad (4)$$

Where  $V_{pv}$  is the reference output voltage obtained from MPPT, the dual battery power is derived as,

$$2P_b = P_{out} - P_{pv} \quad (5)$$

Where  $P_{out}$  is the grid injected power to eliminate power fluctuations

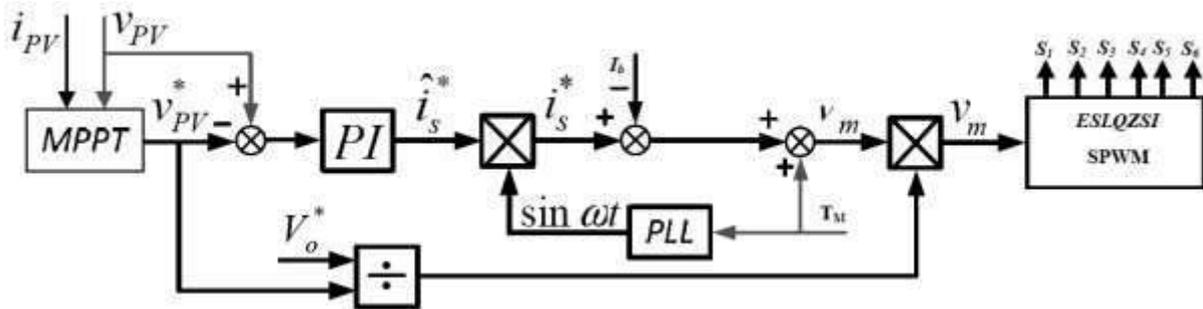


Figure 4. Control strategy of SPWM modulated single leg ESLQZSI for IM drives

The dual power source open loop transfer function is given as,

$$D_{ual}(s) = \frac{i_b(s)}{d_s(s)} \quad (6)$$

Closed loop transfer function is given by,

$$D_{ual}(s) = \frac{d(s)}{i_b^*(s)} \quad (7)$$

From battery power reference, we can get the dual power source reference.

The PI controller coefficient is given by

$$P = \frac{1}{V_{pv}} \quad (8)$$



#### 4. SIMULATIONS AND EXPERIMENTAL VERIFICATION

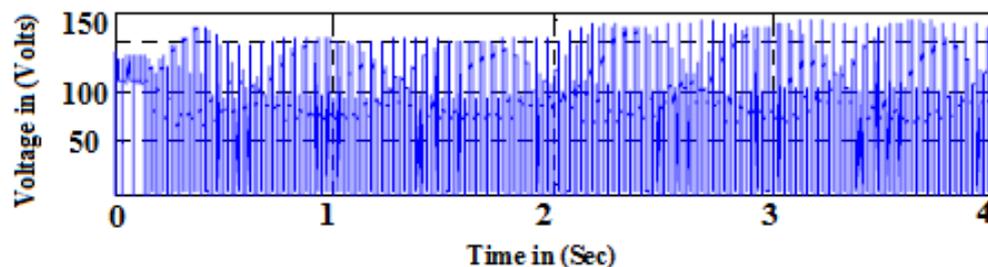
To validate the proposed system, the simulation is carried out in MATLAB/Simulink environment for ESLQZSI with a PI control strategy. Figure 5 presents the harvested output PV voltage of 150volts and is fed to MPPT with PI controller. Figure 6 describes the PV current characteristics and varies with the illumination level of light rays. Figure 7 shows the three-phase voltage waveform of the ESLQZSI fed IM drive without any fluctuation in voltage. Figure 8 gives the output current waveform. Figure 9 demonstrates the IM speed characteristics and rated speed of 1500RPM is achieved. Figure 10 gives information about the torque characteristics. Figure 11 shows THD values at the fundamental frequency of 50Hz, with a voltage level of 234.4, and achieves the total harmonics distortion of 1.60%. These results prove that the system is operating in stable conditions.

**Table 1 shows the parameter used for the simulation and experimental**

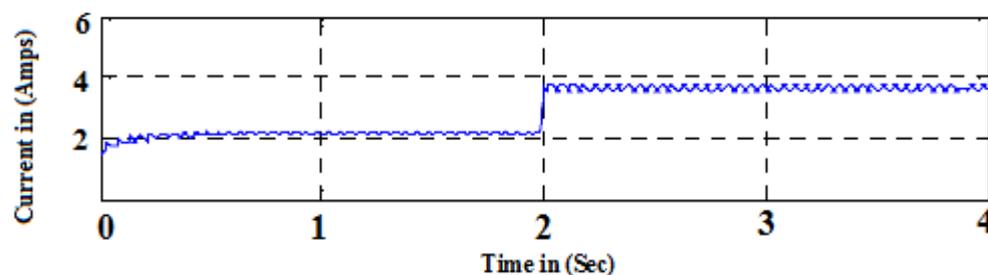
Sl. No.	Parameters	Values
1	Open circuit voltage of PV system	150V
2	Short circuit current	8.7A
3	Maximum power voltage	175V
4	Maximum power current	7.94A
5	Inductor	5 Henry
6	Capacitor	2800 $\mu$ F
7	MOSFET	25N120
8	Control strategy	PI controller

**Table 2 PV panel specifications**

S.No	Specification	Value
1	Maximum Power (Pmax)	300 Watts
2	MPP voltage	32.0V
3	Open circuit voltage (Voc)	39.8V
4	MPP current	9.40Amp
5	Short circuit current	9.98Amp



**Figure 5: Harvested PV voltage with fluctuation**



**Figure 6: Harvested PV current with fluctuation**

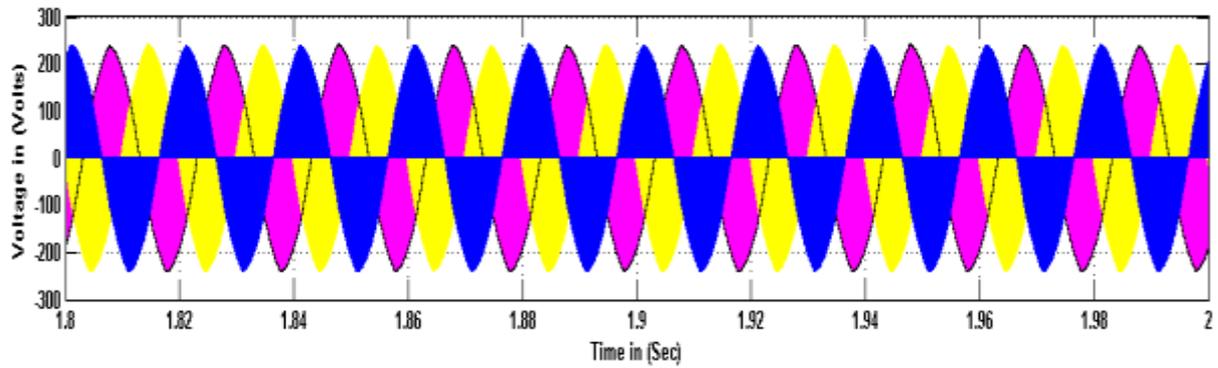


Figure 7: Three phase voltage waveform of ESLQZSI without fluctuation

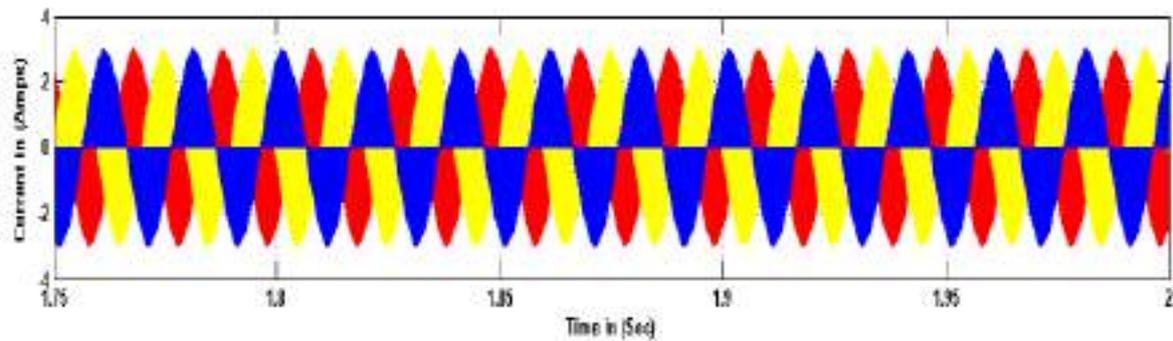


Figure 8: Three phase current waveform of ESLQZSI without fluctuation

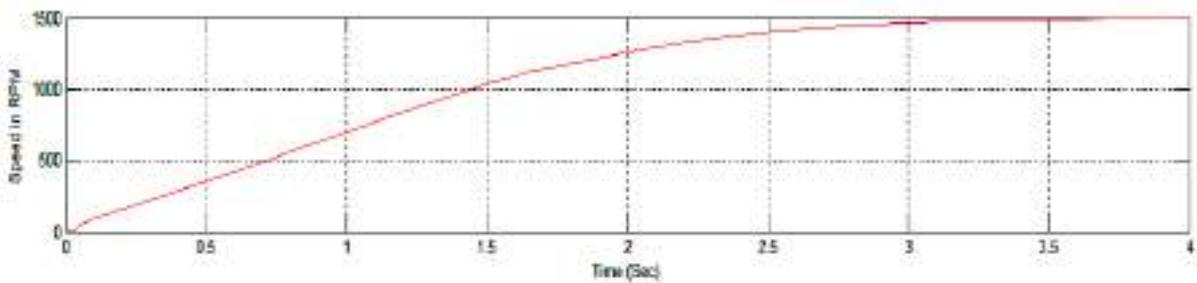


Figure 9: Induction motor speed characteristics

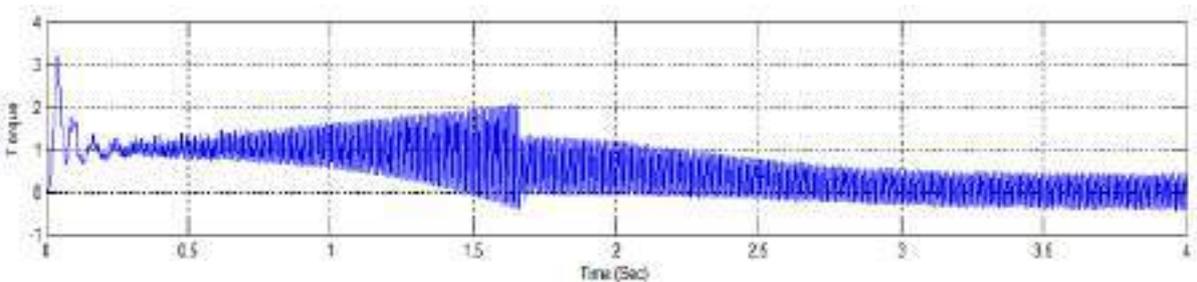
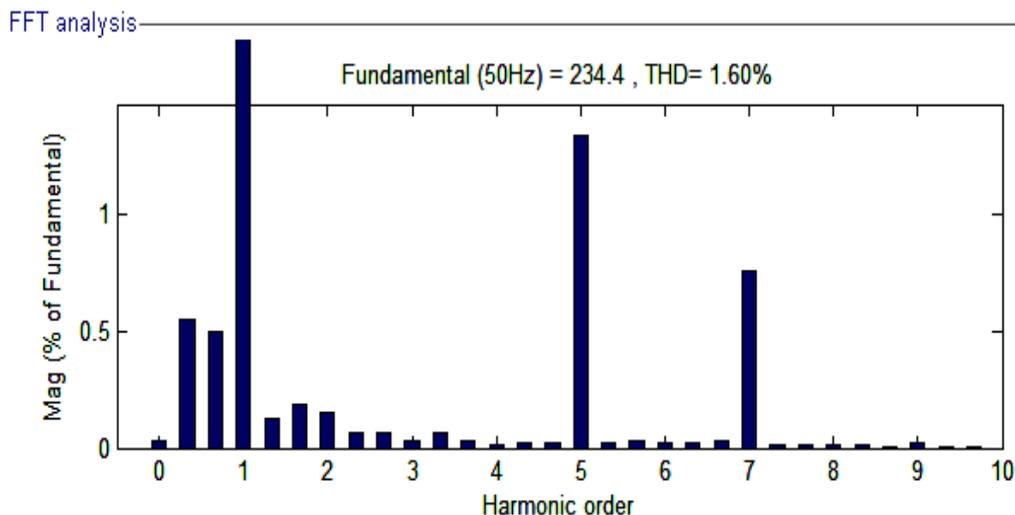


Figure 10: Induction motor torque characteristics

**Figure 11: Total harmonic distortion**

## 5. CONCLUSIONS

The proposed work concludes that the system is operating in a stable state and the voltage fluctuations from the PV source are overcome with the help of an embedded SL Quasi Z Source inverter with a dual power source. The proposed PI controller achieves high voltage gain during the shoot-through intervals and has low capacitor stress with less inrush current in the PV system. Since the basic SPWM is implemented, the complexity of the system is reduced and has robustness for the proposed topology. A fluctuation input of voltage 100 volts – 150 volts is applied to MPPT and the DPS of 30 volts each is injected. A constant output voltage of 234 volts is obtained without any fluctuations. Apart from this, the THD is much reduced to 1.64% and the system yields better efficiency. The proposed topology is gently suitable for induction motor drives.

## REFERENCES

1. Fang Zheng Peng "Z-source inverter" *IEEE Transactions on Industry Applications*. Volume: 39, Issue: 2 Page(s): 504 – 510, Mar/Apr 2003.
2. Yushan Liu, Baoming Ge, Haitham Abu-Rub, Fang Zheng Peng "Control System Design of Battery-Assisted Quasi-Z-Source Inverter for Grid-Tie Photovoltaic Power Generation" *IEEE Transactions on Sustainable Energy*. Volume: 4, Issue: 4, Oct. 2013.
3. Yushan Liu, Baoming Ge, Haitham Abu-Rub, Fang Peng "Phase-shifted pulse-width-amplitude modulation for quasi-Z-source cascade multilevel inverter-based photovoltaic power system" *IET Power Electronics*. Volume: 7, Issue: 6, June 2014.
4. Yushan Liu, Baoming Ge, Haitham Abu-Rub, Fang Zheng Peng "Modelling and controller design of quasi-Z-source inverter with battery-based photovoltaic power system" *IET Power Electronics* Volume: 7, Issue: 7, July 2014.
5. V Maheswari, V Nandagopal, C Kannan (2014), "Performance Metric of Z Source CHB Multilevel Inverter FED IM for Selective Harmonic Elimination and THD Reduction" *Circuits and Systems*, Vol 7. No. 11, pp 3794-3806.
6. Xu Peng Fang, Xu Guang Wang, Zhi Qiao Chen "A Single-Phase AC Power Supply Based on Modified Quasi-Z-Source Inverter" *IEEE Transactions on Applied Superconductivity*. Volume: 24, Issue: 5, Oct. 2014.
7. Liqiang Yang, Dongyuan Qiu, Bo Zhang, Guidong Zhang "High-performance quasi-Z-source inverter with low capacitor voltage stress and small inductance" *IET Power Electronics* Volume: 8, Issue: 6, 6 2015.
8. Minh-Khai Nguyen, Tuan-Vu Le, Sung-Jun Park, Young-Cheol Lim "A Class of Quasi-Switched Boost Inverters" *IEEE Transactions on Industrial Electronics*. Volume: 62, Issue: 3, March 2015.
9. C Kannan, NK Mohanty and R Selvarasu, (2017) "A New topology for cascaded H-bridge multilevel inverter with PI and Fuzzy control", *Energy Procedia*, Vol.117, pp.917-926.
10. Hafiz Furqan Ahmed, Honnyong Cha, Su-Han Kim, Heung-Geun Kim "Switched-Coupled-Inductor Quasi-Z-Source Inverter" *IEEE Transactions on Power Electronics*. Volume: 31, Issue: 2, Feb. 2016.
11. Balaji Damodhar, TS & Senthil Kumar, A 2016, 'Implementation of FPGA Based Hybrid Power Generator for PV and Wind Grid Applications', *Circuits and Systems*, Vol. 7, No.13 pp. 4280-4290.
12. Yan Zhou, Hongbo Li, Hui Li "A Single-Phase PV Quasi-Z-Source Inverter with Reduced Capacitance Using Modified Modulation and Double-Frequency Ripple Suppression Control" *IEEE Transactions on Power Electronics*. Volume: 31, Issue: 3, March 2016
13. Yushan Liu, Haitham Abu-Rub, and Baoming Ge "Hybrid Pulsewidth Modulated Single-Phase Quasi-Z-Source Grid-Tie Photovoltaic Power System" *IEEE Transactions on Industrial Informatics* Volume: 12, Issue: 2, April 2016.



14. C Kannan and C K Kishore (2014), "A comparison of three phase 27 level inverter scheme under no load and multiple load conditions" *Bulletin of Electrical Engineering and Informatics*, Vol. 3, No. 4, pp 245-250.
15. Hailong Liu, Yuyao He, Mingyang Zhang, Liu "Quasi-switched-inductor Z-source inverter" *Power Electronics and Motion Control Conference (IPEMC-ECCE Asia)*. 2016 IEEE 8th International conference) 22-26 May 2016.
16. Kannan Chandrasekaran, Nalin Kant Mohanty, Ashwin Kumar Sahoo (2020), "Performance Analysis Of Modular Vs Non Modular Multilevel Inverter", *International Conference on Renewable Energy Integration into Smart Grids: A Multidisciplinary Approach to Technology Modelling and Simulation (ICREISG)*, IEEE, pp.61-67.
17. Thierry Kayiranga, Hongbo Li, Xinchun Lin, Yanjun Shi, Hui Li "Abnormal Operation State Analysis and Control of Asymmetric Impedance Network-Based Quasi-Z-Source PV Inverter (AIN-qZSI)" *IEEE Transactions on Power Electronics*. Volume: 31, Issue: 11, Nov. 2016.
18. Xiaoquan Zhu, Bo Zhang, Dongyuan Qiu 2018, 'Enhanced boost quasi-Z-source inverters with active switched-inductor boost network', *IET Power Electronics*, vol. 11, issue 11, pp. 1774 – 1787.
19. Kannan Chandrasekaran, Nalin Kant Mohanty (2020), "A Flexible Rung Ladder Structured Multilevel Inverter" *Tehničkivjesnik*, Vol. 27, No. 4, pp 1044-1049.
20. Anh-Vu Ho, Anh-Tuan Huynh, Tae-Won Chun. 2019, "Switched-Capacitor Embedded Quasi-Z-Source Inverters with Advanced Boosting Capability" *2019 IEEE International Conference on Industrial Technology (ICIT)*.
21. Mehran Sabahi ; Ebrahim Babaei ; Taher Ahmadzadeh ; Pouya Kolahian ; Hadi Tarzami. 2019. "An Extended Quasi-switched Z-Source Inverter" *2019 10th International Power Electronics, Drive Systems and Technologies Conference (PEDSTC)*.
22. Rehan Majeed ; Aamir Hussain Chughtai, 2019, "Multi-cell Schemes for Active-Switched-Capacitor and Active-Switched-Capacitor/Switched-Inductor Quasi Z-Source Inverters" *IEEE Journal of Emerging and Selected Topics in Power Electronics*.pp.1-1.



# CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT LEGISLATION AND FRAMEWORK IN INDIA - A MINI REVIEW WITH BEST PRACTICES IN C & D WASTE MANAGEMENT

Yogesh Kumar Raj\*<sup>1</sup>, Ar. S Choudhary<sup>2</sup>

<sup>1</sup>Post Graduate Student, Faculty of Design, Vivekanand Global University, Jaipur

<sup>2</sup>Associate Professor, Faculty of Design, Vivekanand Global University, Jaipur

Article DOI: <https://doi.org/10.36713/epra7388>

DOI No: 10.36713/epra7388

## ABSTRACT

The construction industry in Indian cities has grown rapidly in recent decades due to population growth, industrialization and the introduction of new infrastructure projects, which has led to a tremendous growth in the construction industry. A key demand as a result of the growth of the Indian construction sector is expected to be the supply gap in terms of construction materials such as sand, limestone, and aggregate. The Supreme Court has had a major impact on the construction industry due to the ban on river sand and stone mining. It is designed to find an alternative source of natural raw materials. An alternative source in the field of aggregate construction recycled by C&D Waste could replace a significant amount of natural aggregates that run abroad in countries such as the United States, France, Denmark, Germany and Japan. Has been While various methods of waste have been suggested in the literature, the quantification of waste produced in India is insufficient. This inadequacy is due to lack of proper classification control procedures, lack of joint C&D waste estimation procedures, and knowledge of C&D waste processing among generators, collectors, operators, regulators, and the general public. The C&D Waste Management Rules 2016 to address the responsibilities of all stakeholders for the systematic collection, storage, transport, treatment / processing, and disposal of C&D bins in India was introduced. This comprehensive study seeks to analyze current legislation and challenges, and proposes an informational framework for systematic collection, storage, treatment / processing, and C&D waste disposal. This article examines the current methods of C&D waste in India. It also studies the institutional, regulatory and legislative framework in India in the field of construction and demolition waste management.

**KEY WORDS-** Construction and demolition waste management, legislation, framework, best practices

## INTRODUCTION

Construction and Demolition Work (C&D) Waste refers to the demolition of any type of building material, debris, and debris and civil structures such as houses, bridges, roads, dams, large building structures, and others. , Repair, Modeling and Demolition of Component Infrastructure (MOEFCC, 2016). The construction industry in India is booming. Already at 10% of GDP, it has been growing at an annual rate of 10% over the last 10 years while its global average is 5.5% per annum. About 70% of the

building stock in India is still outstanding. The area is expected to expand from 21 billion square feet in 2005 to 530 billion and 104 billion square feet by 2030. This will be the result of a huge increase. Buildings and infrastructure are our basic needs for water, energy and materials. But they also produce waste. The Union Ministry of Forests and Environment (MOEF) has acknowledged that there is no systematic database on C&D waste. According to estimates by the Center for Science and Environment (CSE), since 2005, India has built an additional 5.75



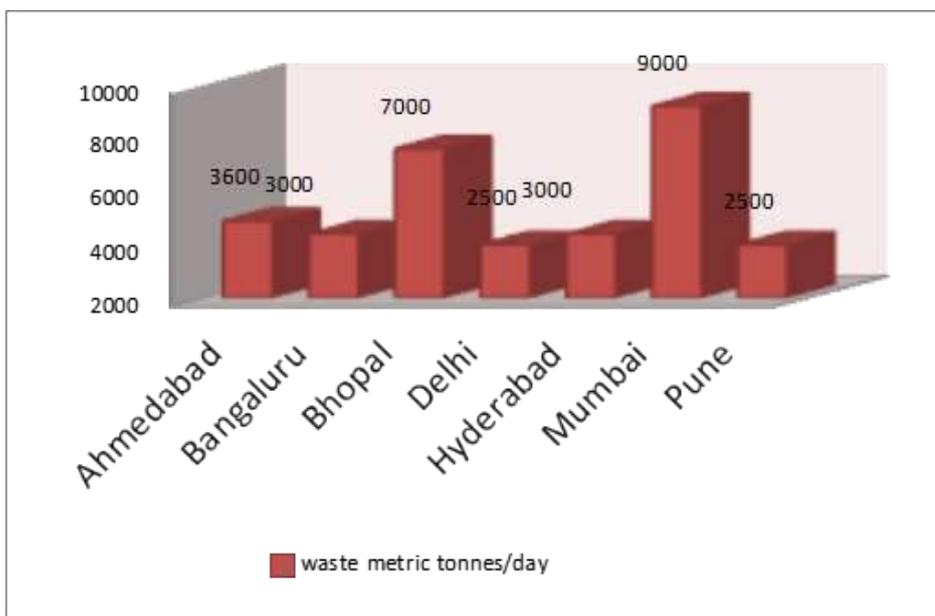
billion square meters in 2013 alone, with approximately one billion square meters. If a new construction (according to the Council of Technology Information, Forecasting and Evaluation, or TIFAC, according to the Thumb Principle) produces 40-60 kg of C&D waste per square meter, the average is 50 kg. Per square meter, India should generate 50 million tonnes (MT) of C&D waste in 2013. Over the past eight years, it has produced 287 MT of this waste.

According to one estimate construction waste alone is 14.5 million tonnes. Construction and demolition waste in India is estimated at 24 million tonnes during 2010 (Shetty, 2013). If measures to minimize and handle construction and demolition waste are not adopted in a developed and efficient manner, it can have an impact on the environment. This estimate is for new construction only.

Waste related to demolition and renovation / repair of old stock produces additional waste. For every square meter of demolition, there is 10 times the amount of waste generated during construction, according to TIFAC, 300 to 500 kilograms of waste per square meter. Assuming that five percent of the existing building's stockpile has been destroyed and that it has been completely rebuilt annually, the

demolition alone would have generated only 288 MT more C&D waste in 2014. So, in just one year in India - in 2014, the C&D waste generated by buildings is equivalent to an ideal 30 megatons, which is 44 times more than the official estimate.

Imagine a scenario if waste generated from infrastructure projects such as roads and dams is included. Not surprisingly, in India, if the amount of C&D dustbin is corrected, it will be dumped along with all other types of solid waste. As per the report prepared by MOEF (Ministry of Environment and Forests) in 2008, the country produces 0.53 million tons / day of waste. On this basis, 210 million tons of MSW is produced annually, Below Table shows the estimate prepared by the Central Government of India. But as the World Bank report states, Asian countries produce about 1,000 to 1,000 kilograms per capita each year, which means that the figures reported by the MOEF are much lower than the World Bank report. Are The show has seemed a bit unfocused in recent episodes in India. Below Figure , which has a graphical representation, shows the daily production of construction and demolition waste in Indian cities.



**Waste generation in Indian cities**

Source: (nexusnoves.com)

Year	Authority	Estimate in Million Tonnes
2000	Ministry of Urban Development(2000)	10—12
2001	TIFAC (2000)	12—15
2010	Ministry of Environment and Forest	10—12
2014	Ministry of Urban Development(2014)	no estimate exist

Estimate Prepared by Central Govt.

Source: MOEF report



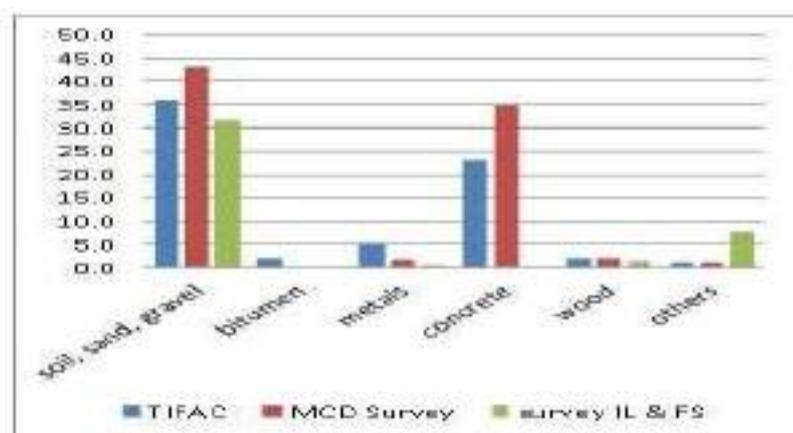
### COMPOSITION OF CONSTRUCTION WASTE GENERATED IN INDIA

The construction waste of the mixture depends on the type of structure. For example, if the structure is a flyover or a bridge structure, its

structure will usually be solid and steel. On the other hand, if residential structures are built or demolished, the structure will be real, including concrete, steel, wood, tile, paint, plastic, etc.

Components of C & D waste	TIFAC (%)	MCD Survey (%)	Survey IL & FS (%)
soil/sand, Gravel	36.0	43.0	31.5
Bitumen	2.0	-	-
Metals	5.0	-	0.4
Concrete	23.0	35.0	-
Wood	2.0	2.0	1.5
Others	1.0	1.0	7.6

Source:Gayakwad,HarishP.(2000)



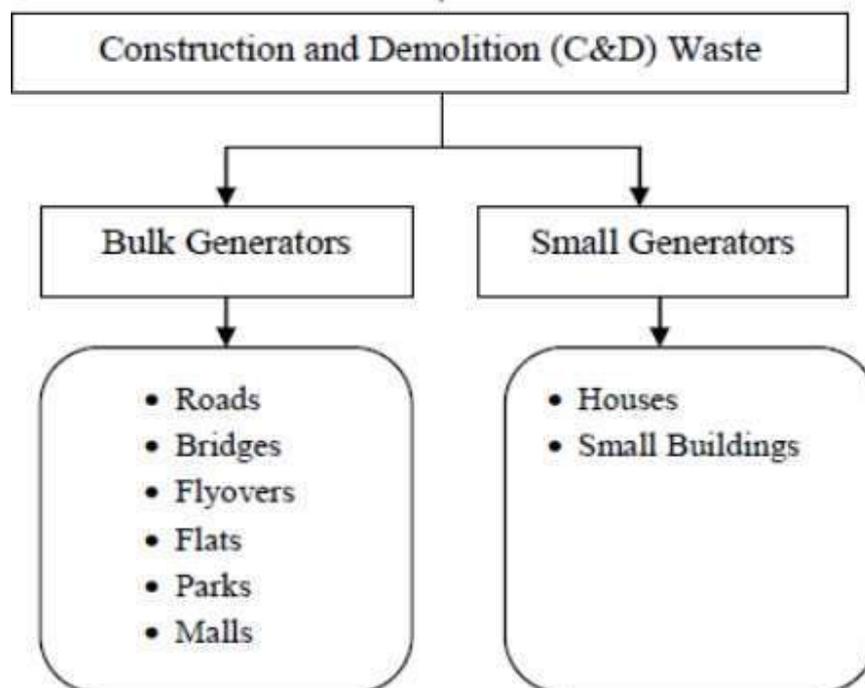
### Typical Composition of Indian Construction Waste

Source:Gayakwad,HarishP.(2000)

### SOURCES OF WASTE GENERATION IN THE CONSTRUCTION INDUSTRY

In the last decade, the construction sector in India has shown its rapid growth, leading to development and rehabilitation projects in India. There are usually two sources of waste, bulk generators and retail generators or small generators. From the classification of sources, data is provided

that the infrastructure and real estate sectors are the total generators of waste production. Construction and repair of roads, bridges, flyovers etc. are classified under the Department of Infrastructure Development. The real estate sector has construction of houses, industrial and commercial buildings, demolition of unauthorised structures etc. Small businesses and individual housing buildings are considered retail or small generators (Job Thomas, Wilson PM).



**Figure-4: Sources of Generation of Construction and Demolition Waste**

Source: Job Thomas, Wilson PM(2015)

## **MATERIAL CONSUMPTION IN INDIAN CONSTRUCTION INDUSTRY**

In 2007, the construction sector was the second largest sector in India in terms of material consumption. With the increase in absolute material consumption by more than a billion tonnes, the construction sector was the fastest growing sector between 1997 and 2007 (TERI et al., 2016). At such a rate of growth, the construction sector is expected to surpass the agriculture sector by 2020 and become the most material-consuming sector in India. The main ingredients used are sand/fine accumulation (concrete and mortar), stone/gravel (for rough bulk), soil (for brick production), iron and steel (for bars and stems), and lime (for cement production) as Indian Consultant (TERI et al., 2016).

The increase in construction activity has put more demands on building materials, with demand for sand particularly high (CSTEP, 2016). The annual consumption of construction materials in India was 750 million tonnes (MT) of sand, 242 metric lime, 2 billion tonnes of stone (aggregate) and 350 million m<sup>3</sup> of soil in 2018 (MoHUA and NITI Aayog, 2018). The total annual demand in Karnataka alone is estimated at 26 MT in 2014 and is expected to grow up to 56–81 MT per annum till 2030 (CSTEP, 2016; Sundar and Asundi, 2015). India is the second largest producer of cement globally, which accounts for about 6.3% of global cement production (Department of Industrial Policy and Development, 2011; Teri et al., 2016). At the current growth rate, cement

production in India is expected to increase 4-7 times by 2050 and By 2030 India may be draining its substantial limestone reserves (IEA and WBCSD, 2018; IGEP, 2013). In order to meet the demand of limestone for steel and chemical industries in India and the resulting shortage of limestone for cement production, the net cement imports in India increased from 1 MT in 2000 to 4 MT in 2010 (IGEP, 2013). Furthermore, the cement industry is one of the largest emitters of CO<sub>2</sub>, and accounts for approximately 7% of total CO<sub>2</sub> emissions in India (IEA and WBCSD, 2018).

## **C & D WASTE GENERATION IN INDIA AND ITS QUANTIFICATION METHODS**

The construction sector was the second largest sector in India in terms of material consumption in 2007. With an increase in absolute material consumption by more than one billion tonnes, the construction sector was the fastest growing sector between 1997 and 2007 (TERI et al., 2016).

Several methods have been developed to quantify C&D waste at regional and project levels. One such method developed by the Technology Information Forecasting and Assessment Council (TIFAC) is based on the waste generated during different activities (CPCB, 2017):

- (a) 40–60 kg m<sup>-2</sup> of new construction;
- (b) 40–50 kg m<sup>-2</sup> of building repair;



(c) 300–500 kg m<sup>-2</sup> of building demolition.

Empirical estimations may be used for C&D waste quantification under certain specific conditions. However, some other useful methodologies have been developed to quantify C&D waste using direct/indirect measurements, waste generation factors/ multipliers, building/material lifetime estimates, economic indicators, etc. The precise quantities of C&D waste generation in India are uncertain (CPCB, 2017). This can be attributed to various factors.

1. **Site Visit (SV) method:** This method involves the direct or indirect measurement of C&D waste bundertaking visits to construction or demolition sites. Direct measurement requires weighing the waste or measuring its volume on-site. Indirect method employs truck load records to estimate the volume of waste generated on a construction/demolition site or a landfill (Kartam et al., 2004; Poon et al., 2004b; Wu et al., 2014).

2. **Generation Rate Calculation (GRC) method:** GRC method is a common technique of waste generation estimation by using the waste generation rate for a particular activity unit. Several alternative parameters such as per capita multiplier, financial value extrapolation, and area-based calculations can be employed to obtain waste generation (Wu et al., 2014). The waste generation rate principle has been used to estimate building-related C&D waste generation in cities like Chennai (Ram and Kalidindi, 2017).

3. **Lifetime Analysis (LA) method:** Constructed buildings are ultimately demolished and become demolition waste. Hence, the amount of demolition waste must equal the mass of constructed structure and can be estimated by assuming reasonable lifetime of buildings and materials, and accounting for the material consumption and typical waste factors for construction materials (Poon, 1997; Wu et al., 2014). 4. **Classification System Accumulation (CSA) method:** This method of calculating waste generation is based on the GRC method. The primary improvement over the GRC method is that this methodology uses a classification system which provides a platform for quantifying different specified material (Wu et al., 2014).

5. **Variables Modelling (VM) method:** C&D waste generation depends on variables such as economic indicators, construction areas, working conditions, etc., which help in the simulation of C&D waste generation using variables modelling (Wu et al., 2014). Some studies have adopted this approach to understand the time-dependent accumulation rate of C&D waste (Kern et al., 2015, S'aez et al., 2014).

## C&D WASTE MANAGEMENT LEGISLATION IN INDIA

C&D waste in India was traditionally considered as a component of MSW and has therefore been addressed on a very limited scale in the legislations governing MSW management. However, increasing quantities of C&D waste mixed with MSW creates major problems at the MSW processing facilities. The proper management, reuse, and processing of C&D waste has been the focus of various governmental agencies since 2010 (BMTPC,

2018). A chronological review of key waste management legislations, guidelines, and standards concerning C&D waste is useful in tracing the evolution of C&D waste management practices as well as the continual challenges posed by C&D waste in India (Table 1).

The C&D Waste Management Rules 2016 were implemented in India with primary focus on management of C&D waste based on the principles of reuse and recycling, and ensuring planned processing and disposal of C&D waste.

1. The C&D Waste Management Rules 2016 explicitly define the duties of the waste generator, service provider and its contractors, local authority, State Pollution Control Board (SPCB) / Pollution Control Committee (PCC), State Government/Union Territory Administration, Central Pollution Control Board (CPCB) and the Central Government in an organized waste management mechanism.
2. Schedule I of the Rule specifies detailed criteria for site selection for storage and processing or Recycling facilities for C&D waste.
3. Schedule III of the Rule stipulates a specified timeframe for planning and implementation of the provisions provided therein by various enforcing bodies/authorities.
4. The Rule provides for reporting of any accident in a C&D waste processing or treatment or disposal facility to the local authority.

Manuja et al. (2016) identified some limitations and recommended measures to improve upon the operative part of the C&D Waste Management Rules 2016.

1. A list of expert institutions and civil society groups which can be utilized for consultation or creation of a sustained system of Information, Education, and Communication (IEC) for C&D waste may be included in the legislation for public interest.
2. The possibility of utilizing C&D waste as a cover material for sanitary landfill has not



been proposed in the C&D Rules of 2016. An action plan for utilizing C&D waste as landfill cover can be a viable disposal method of unprocessed C&D waste.

- To avoid arbitrary user charges, the location and composition of C&D waste may be used as the basis for calculation of fixed charges payable by the waste generator for collection, transportation, processing and disposal of C&D waste.

Some other measures which can be adopted to ensure effective management of C&D waste include setting up of specific targets to achieve recycling of C&D waste, tax exemption on usage of recycled concrete aggregate to encourage use of recycled C&D waste, and investing efforts in IEC campaigns to spread awareness on reuse and recycling of C&D waste (Ramanathan, 2018).

### CONSTRUCTION AND DEMOLITION (C&D) WASTE MANAGEMENT LEGISLATIONS IN INDIA

Year	Legislation/Guidelines	Contents	Issuing Authority Department
2000	Schedule III of Municipal Solid Waste (Management and Handling) Rules, 2000	A description of C&D waste	Ministry of Environment and Forests, Govt. of India
2000	Manual on Municipal Solid Waste Management	A chapter on C&D waste laying down basic guidelines on C&D waste handling	Ministry of Urban Development (MoUD), Govt. of India
2006	Construction & Demolition and Desilting Waste (Management and Disposal) Rules, 2006	C&D waste management	Municipal Corporation of Greater Mumbai
2010	Report of the Working Committee on Municipal Solid Waste Management	Recommendation of special focus on C&D waste	Working Committee on Municipal Solid Waste Management
2012	Circular to set up C&D waste recycling facilities under Swachh Bharat Mission (SBM)	Setting up of C&D waste recycling facilities in all cities with population of over 1 million (MoHUA and NITI Aayog, 2018)	MoUD, Govt. of India
2014	Guidelines for Sustainable Habitat	A chapter on 'Guidelines on re-use of recycled C&D waste' and ways and precautions for recycling of C&D waste and emphasizing the need for a deconstruction plan to recover reusable products (BMTPC, 2018; MoHUA and NITI Aayog, 2018)	Central Public Works Department (CPWD), Ministry of Housing and Urban Affairs (MoHUA), Govt. of India
2015	Advisory on the use of recycled products from C&D waste	Addition of a mandatory clause in all future tenders for using 2% and 10% of recycled C&D waste products in buildings and road works, respectively (Government of NCT of Delhi, 2018)	Public Works Department, Govt. of NCT of Delhi
2015	Draft Solid Waste Management Rules, 2015	A chapter on C&D waste management	Ministry of Environment, Forest and Climate Change (MoEFCC), Govt. of India
2016	Construction and Demolition Waste Management Rules, 2016	Rules governing waste resulting from construction, re-modeling, repair and demolition of any civil structure individual/organization/authority who generate C&D waste such as building material, debris, or rubble (MoEFCC, 2016)	MoEFCC, Govt. of India
2016	Guidelines for Utilization of Construction and Demolition Waste in Construction of Dwelling Units and Related Infrastructure in Housing Schemes of the Government	Address considerable shortage of conventional building materials in India based on high demand of building materials by 2021-2022 (MoHUA and NITI Aayog, 2018)	Building Materials and Technology Promotion Council (BMTPC), MoHUA, Govt. of India



2016	Notification on use of recycled portions of C&D waste	Mandatory use of recycled portions of C&D waste in construction activities if the same is available within 100 km of the construction site (MoHUA and NITI Aayog, 2018)	CPWD, MoHUA, Govt. of India
2016	Indian Standard (IS) 383: 2016 'Coarse and Fine Aggregate for Concrete – Specification' (third revision)	Inclusion of fine and coarse aggregate produced by recycling of C&D waste (BMTPC, 2018; IS 383: 2016)	Bureau of Indian Standards (BIS), Ministry of Consumer Affairs, Food and Public Distribution, Govt. of India
2016	National Building Code of India 2016 (Volume 2)	Recommendation to replace up to 30% of natural crushed coarse aggregate by coarse recycled concrete aggregate, in fresh concrete. This percentage is to be increased up to 50% for pavements and other areas which are under pure compression (BIS, 2016).	Bureau of Indian Standards (BIS), Ministry of Consumer Affairs, Food and Public Distribution, Govt. of India
2017	Guidelines on Environmental Management of Construction and Demolition Waste	Integrated approach for environmental management of C&D Waste in compliance with C&D Waste Management Rules, 2016 (CPCB, 2017)	Central Pollution Control Board (CPCB), MoEFCC, Govt. of India
2017	Indian Roads Congress (IRC) 121: 2017	Guidelines for use of C&D waste in roads sector (MoHUA and NITI Aayog, 2018)	Indian Roads Congress (IRC)

## INDIAN C&D WASTE MANAGEMENT FRAMEWORK

The predicted demand growth of construction materials is expected to cause significant material supply problems in India (TERI et al., 2016). Supply bottlenecks have already affected prices and construction schedules in some parts of the country. The construction sector is particularly vulnerable to price instabilities since material costs typically account for more than 60% of the total cost of a building in India (TERI et al., 2016). The acute demand for recycled aggregates in the housing and road sectors to reduce the demand–supply gap, and the need to check resource depletion due to excessive sand mining are some other factors of immediate concern. On the other hand, large construction projects under government initiatives to fulfill housing demands and commercial infrastructure projects adds to the enormous quantities of C&D waste that remain unprocessed. The development of a framework for organized collection, storage, processing and disposal of C&D waste using the principles of reuse and recycling is an important step towards solving the dual problem of material shortage and waste accumulation (CPCB et al., 2017). An understanding of a typical C&D waste processing system is essential to establish best practices within the information framework.

## BEST PRACTICES IN INDIAN C&D WASTE MANAGEMENT

Civic bodies, industries, and other organizations have become increasingly aware of the

problems of C&D waste and have begun to undertake some measures for C&D waste processing. Several C&D waste management projects that have been implemented across various locations in India can be reviewed and analyzed for best practices (BMTPC, 2018; Development Alternatives, 2017).

1. The first C&D waste processing plant in India was commissioned in 2010 at Burari in North Delhi under a Public Private Partnership (PPP) agreement between North Delhi Municipal Corporation and ILFS Environmental Infrastructure & Services Ltd (IEISL) for treatment of 500 TPD C&D waste on a pilot basis. The plant currently operates at a processing capacity of 2000 TPD and demonstrates an economically feasible business model that could be adopted across India. Both dry and wet processing have been adopted to recycle and process about 95% of incoming C&D waste into aggregates, manufactured sand, and finished products such as paver blocks, concrete bricks, drain slabs, etc. The produced materials meet Bureau of Indian Standards (BIS) codes for construction applications and have been recommended for preferential procurement by public agencies. Three other C&D waste recycling plants have been commissioned by the Government of NCT of Delhi to cover all zones of Delhi. A second plant of capacity 500 TPD at Shastri Park in Delhi started operations in 2016.



2. Ahmedabad Municipal Corporation (AMC) started a C&D waste processing plant of capacity 1100 TPD in 2014 under a PPP agreement with Amdavad Enviro Projects Pvt. Ltd (AEP). The plant currently operates at 300 TPD and processes C&D waste into aggregates, which in turn are used to prepare finished products such as paver blocks, concrete tiles, pre-cast toilets, park benches, etc. The preferential procurement policy of AMC facilitates the use of these products in government infrastructure projects.
3. A C&D waste recycling plant was set up by M/s Enzyme India Pvt. Ltd in 2014 for recycling 150 TPD of C&D waste at the project site of 'Re-development of East Kidwai Nagar, New Delhi'. The plant worked on PPP agreement with 100% buyback of recycled products by National Buildings Construction Corporation (NBCC). The recycled produce such as fine/coarse aggregates and manufactured soil were used as fill material and in the manufacture of downstream products like RMC, bricks, tiles, and blocks.
4. A non-governmental organization named 'Youth for Unity and Voluntary Action (YUVA)' undertook recycling of 1500 tonnes of C&D waste generated from City and Industrial Development Corporation of Maharashtra Ltd (CIDCO)- YUVA Building Center (CYBC) in Kharghar, Mumbai during the period 2002–2006. The C&D recycling demonstration manufactured building materials such as bricks, blocks, concrete, sand substitute, and coarse aggregates.

## CONCLUSION

Demolition waste is waste debris from destruction of a construction. Construction industry in India generates about 10-12 million Tons of waste annually. While Retrievable items like bricks, wood, metal, tiles are recycled in India, Concrete and masonry waste (>50% of total waste) are not recycled. A defined manual is not available with regulatory authorities for effective management of Construction and Demolition (C & D) waste. Authorities sometimes make rules but often fail in implementing them. This report is expected to be a pilot study towards preparation of such a manual. The two-faced problem of meeting the demand for construction materials as well as processing of large quantities of unprocessed waste has led to the development of important C&D waste management measures in India. Waste management legislations in India have emerged as a natural consequence of the need to ensure effective C&D waste management,

culminating in the formulation of a separate C&D Waste Management Rules 2016 by the government. However, due to lack of C&D waste processing awareness among the regulators, operators, and the general public, the potential for usage of recycled products in the Indian construction sector is still untapped. The C&D Rules of 2016 were followed by several guidelines and revisions in important material usage standards for concrete (IS 383: 2016, IRC 121: 2017). It is important to comprehend the best practices of C&D waste management adopted by cities like Delhi and Ahmedabad and reproduce their business models at other operational and proposed C&D waste recycling plants across India.

## REFERENCES

1. *Administrative Staff College of India (ASCI) and Natural Resources Defense Council (NRDC) (2012) Constructing Change: Accelerating Energy Efficiency in India's Buildings Market. New York: Natural Resources Defense Council.*
2. *Building Materials & Technology Promotion Council (BMTPC) (2018) Utilisation of Recycled Produce of Construction & Demolition Waste: A Ready Reckoner. New Delhi: Building Materials & Technology Promotion Council, Ministry of Housing and Urban Affairs, Government of India.*
3. *Bureau of Indian Standards (BIS) (2016) National Building Code of India 2016. Vol. 2. New Delhi: Bureau of Indian Standards, Ministry of Consumer Affairs, Food and Public Distribution, Government of India.*
4. *Center for Study of Science, Technology and Policy (CSTEP) (2016) Construction and Demolition Waste Utilisation for Recycled Products in Bengaluru: Challenges and Prospects. New Delhi: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.*
5. *Central Pollution Control Board (CPCB) (2017) Guidelines on Environmental Management of Construction & Demolition (C&D) Wastes. New Delhi: Central Pollution Control Board, Ministry of Environment, Forest and Climate Change.*
6. *Central Pollution Control Board (CPCB), Ministry of Environment, Forest and Climate Change (MoEFCC), Ministry of Housing and Urban Affairs (MoHUA) and National Productivity Council (NPC) (2017) Toolkit on Construction and Demolition Waste Management Rules-2016: Capacity Building Programme on Implementation of Waste Management Rules, 2016 (Draft). Available at: [http://www.npcindia.gov.in/wp-content/uploads/2017/11/CD-Waste-Management-Toolkit-2017\\_R-1.pdf](http://www.npcindia.gov.in/wp-content/uploads/2017/11/CD-Waste-Management-Toolkit-2017_R-1.pdf) (accessed 16 September 2019).*
7. *Centre for Science and Environment (CSE) (2011) Buildings: Earthscrapers Environment Impact Assessment of Buildings. New Delhi: Centre for Science and Environment.*



10. Centre for Science and Environment (CSE) (2014) *Construction and Demolition Waste*. New Delhi: Centre for Science and Environment.
11. Department of Industrial Policy and Promotion (2011) *Report of Working Group on Cement Industry for XII Five Year Plan (2012-17)*. New Delhi:
12. Department of Industrial Policy and Promotion, Ministry of Commerce and Industry, Government of India.
13. Development Alternatives (2017) *Training Manual on Construction and Demolition Waste Management in India for Cities and Towns*. New Delhi:
14. Government of NCT of Delhi (2018) *Use of Recycled Products from Construction & Demolition Waste (Advisory)*. New Delhi: Government of NCT of Delhi.
15. Indian Roads Congress (IRC) (2017) *IRC 121-2017: Guidelines for Use of Construction and Demolition Waste in Road Sector*. New Delhi: Indian Roads Congress.
16. Indian Standard (IS) 383 (2016) *Coarse and Fine Aggregate for Concrete - Specification (third revision)*.
17. Indo-German Environment Partnership (IGEP) (2013) *India's Future Needs for Resources: Dimensions, Challenges, and Possible Solutions*. New Delhi: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.
18. International Energy Agency (IEA) and World Business Council on Sustainable Development (WBCSD) *Cement Sustainability Initiative (CSI) (2018) Technology Roadmap: Low-Carbon Transition in the Cement*
19. Industry. Paris: International Energy Agency.
20. Ministry of Housing and Urban Affairs (MoHUA) and NITI Aayog (2018) *Strategy for Promoting Processing of Construction and Demolition (C&D) Waste and Utilisation of Recycled Products*. New Delhi: Ministry of Housing and Urban Affairs.
21. *A mini review of construction and demolition waste management in India* (M Humam Zaim Faruqi and Faisal Zia Siddiqui)
22. Ministry of Environment, Forest and Climate Change (MoEFCC) (2016) *Construction and Demolition Waste Management Rules, 2016*. Available at: [https://cpcb.nic.in/uploads/MSW/SWM\\_2016.pdf](https://cpcb.nic.in/uploads/MSW/SWM_2016.pdf) (accessed 29 September 2019).
23. The Energy and Resources Institute (TERI), Development Alternatives (DA) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH (2016) *Material Consumption Patterns in India: A Baseline Study of the Automotive and Construction Sectors*. New Delhi: Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH.
25. The World Bank Group (2019) *Urban Population: World bank staff estimates based on the United Nations Population Division's World Urbanization Prospects (2018 Revision)*. Available at: <https://data.worldbank.org/indicator/SP.URB.TOTL?end%202018%20&start%201960%20view%20chart> (accessed 25 September 2019).



# PERCEPTIONS OF PARENTS AND LEARNERS TO MODULAR DISTANCE LEARNING AS CONTEMPORARY TEACHING STRATEGY

**Emma S. Trovela**

*Faculty, Sta. Catalina Integrated National High School*

Article DOI: <https://doi.org/10.36713/epra7330>

DOI No: 10.36713/epra7330

## ABSTRACT

*This research investigated the parents and learners' perceptions on modular distance learning that they are experiencing during this time of pandemic as part contemporary new normal education setup. The main purpose of this study was to understand parents' and learners' perceptions on modular distance learning as contemporary teaching strategy and how they coped with the experiences and challenges of the new normal education settings. The participants of this study were five (5) senior high school learners and five (5) parents/guardians of senior high school learners of Sta. Catalina Integrated National High School. The research was conducted in Majayjay District from School Year 2020-2021.*

*This study used Qualitative Research through Descriptive research where in-depth interviewing and storytelling was done to gather the narratives or accounts of the research participants. Using an interview protocol and with a strong collaboration with the participants, the researcher will manage all the fieldwork and ensured the depth and breadth of the study. Through the analysis of the data from the interview, the Perception of Parents and Learners on Modular Distance learning as contemporary teaching strategy shows effectiveness even facing different challenges and disadvantage.*

**KEYWORDS:** *Modular Distance Learning, Self – Learning Modules, Edutainment, Academic Performance, Conceptual Understanding*

## INTRODUCTION

In order to enhance the educational experience of learners, it would seem that the majority of educational institutions in the Philippines have committed strategically to a greater use of modular distance learning and e-learning. Alongside, broad commitments to flexible delivery, student-centered learning approaches and the development of desired attributes of student learning can be found in institutional plans and policies. The purpose of teaching is learning. A classroom teacher only teaches what he or she considers important and difficult in the lecture. They have neither the time nor the energy to teach everything. However, learners want and need to know

everything. To paraphrase the old saying, we should be teaching them 'fishing' not giving them a 'fish'. Educators should encourage learners to become active and lifelong learners. Teachers need to focus on learners' characteristics and their learning styles. When a teacher prepares a lecture, he or she needs to understand what learners want to know and what they need to know.

Despite the small differences in organization, pedagogical approaches and contemporary teaching strategies, the world experiences are quite similar in general terms. This allows us outlining the main features and advantages of distance learning. Distance learning allows learners, who do not have the



opportunity to attend school for obvious reasons, to get content knowledge at full scale. Distance learning can follow both a special program and a general school curriculum. Distance learning requires the learner and the teacher to have a sufficient level of proficiency. Any learner must have a tutor to learn at distance. In most cases, tutor's role is played by a parent, who also goes between the learner and the teacher. Distance learning can take a hybrid shape (include some elements of full-time education) or be completely virtual. Distance learning should have a good legal framework behind it.

Distance learning is not just the only opportunity for some groups of learners. In cases when the learner is not comfortable with group lessons, online learning contributes to greater interest in learning and to better performance (Ma & Wei, 2016). Student's need in communication with the teacher sets a shape for new curricula to take.

Given the abovementioned, this research will investigate the parents and learners' perceptions on modular distance learning that they are experiencing during this time of pandemic as part new normal education setup.

### **OBJECTIVE OF THE STUDY**

The main purpose of this research is to understand parents' and learners' perceptions on modular distance learning as contemporary teaching strategy and how they coped with the experiences and challenges of the new normal education settings.

Distinctively, it sought to answer the subsequent questions:

1. What perceptions do parents and learners have regarding the modular distance learning as contemporary teaching strategy?
2. How do participants described their teaching and learning experiences under the new normal education?
  - Experiences of Parents and Learners on Modular Distance Learning
  - Contribution for Growth and Development
  - Strategies used by the Parents to guide students in answering modules.
  - Challenges encountered by the Parents and Learner.
3. Based on the findings of the study, what intervention can be proposed?

### **RELATED LITERATURE**

The Philippine Education Quarterly (1985, as cited by Figuerres, 2014) reported that modules can

take the place of a teacher. These self-learning devices help pupils to learn or acquire skills, knowledge and information in the absence of a teacher. These materials provide sufficient reinforcement, enrichment and source materials. They allow also the learner to work at a rate style and level situated to his capacity. Among the forms of individualized instruction, modules are effective and economical in developing specific knowledge and skills. Modules induce learning with minimum teacher direction and supervision. Furthermore, these develop learning and grading strategies, improve classroom management techniques, and encourage achievement for greater use of existing educational resources through the establishment of realistic obtainable learning goals within an individualized program of studies.

Figuerres (2014) a module is a self-contained, independent unit of instruction prepared for the purpose of attaining specific instructional objectives. It is characteristically self-directing since it includes instructions on how the various investigation will be pursued also included is a listing of the materials and other resources that should accompany the text of the module. Classroom instruction using modules is described as self-pacing where the pupil progress through the learning tasks at his own rate.

According to Salandanan (2019), self-instructional materials are those which are described to be self-contained and the manner of presentation is such that the learning activities can be undertaken individually or in small groups. These materials are most effectively used in individualized instruction programs. The self-instructional module helps in providing remedial instruction for slow learners and enrichment materials for fast learners. Topics can best be presented through these self-instructional materials.

Aquino-Danganan (2011) proposed instructional modules in developing computational skills in College Algebra. She mentioned that the proposed instructional modules had titles, instruction to the learners, rationale, objectives, pretest with answer keys, worksheet assignment, progress check with answer key and post-test with answer key. The format and language of each were properly organized, clear and simple. The objectives of each module were specific and were based on the course syllabus. The topics were properly developed and explained and the activities and exercises facilitated student learning in College Algebra.

LeBrun (2011) each module has a distinct training element; it covers either a single element of subject matter content or a group of content elements objectives; preferably in behavioral form Rudnitsky



(2011) A recognized level of proficiency or a qualification can be achieved through the completion of a series of modules. LeBrun (2011) also stated that when vendors sell individualized instructional modules “the ability to manage the classroom” was mentioned

frequently. Rudnitsky (2011) found that using individualized instructional modules reduces the time it takes teachers to develop a technology-based program.

**RESULTS AND DISCUSSION**

**Perceptions of Parents and Learners regarding the Modular Distance Learning as Contemporary Teaching Strategy**

QUESTIONS	RAW DATA (RESPONSES/ANSWERS)	PARTICIPANTS	PRELIMINARY CODES		THEMES
			COMMONALITIES	CATEGORIES	
<b>2.2. What can you say about this new normal education setup?</b>	As of now, that is what really, we should do for the safety of everyone. Face to face should not be allowed because of the pandemic.	P-P 1	<b>Challenges in the New Normal Educational Setup</b>		<b>Parents' Perceptions on MDL</b>
	It is quite difficult in the aspect of education, because not everyone has the access of internet, and not all the answer are written in the module.	P-P 2			
	Quite difficult ma'am, difficult in the part of the student and the teacher, as a student their lesson is very different compare to the past. That is why when my sister asks regarding her lesson, I'll just tell that just search it in the internet.	P-P 3			
	So far, I can say that modular distance learning is quite okay, my sister learned and her mind sharpened because it is more on self-study.	P-P 4			
	Very hard the child learned nothing	P-P 5			

**Table 1. Parents' Perception on Modular Distance Learning**

Upon analyzing the responded provided by the parent-participants, it can be inferred that their perception on the modular distance learning poses challenges as supported by their answers that it is quite difficult for them in the aspect of Education because of the

challenges in the access of internet, all of the answers are not written in the answer key of modules, and their lessons are different from the past. From the commonalities and categories, it falls as a challenge in the New Normal Educational Setup.

**Table 2. Learners' Perception on Modular Distance Learning**

QUESTIONS	RAW DATA (RESPONSES/ANSWERS)	PARTICIPANTS	PRELIMINARY CODES		THEMES
			COMMONALITIES	CATEGORIES	
<b>2.2. What can you say about this new normal education setup?</b>	Quite difficult but we must think first of our safety, we need to follow the protocol of the government. There is some adjustment on the part of the teacher and the student.	S-P 1	<b>Challenges of MDL</b>		<b>Learner's Perceptions on MDL</b>
	Difficult, because this is new to us, because of the pandemic, it is my first time to study all by myself that is why quite difficult.	S-P 2			



	It is hard, because not all the students have the same level of understanding.	S-P 3		
	It is hard because there is no one to guide and teach us, it is more on self-study.	S-P 4		
	There is disadvantages and advantages, advantages it helps our parents to lessen the cost of expenses, disadvantages, not all the students are equal of intelligence there are some students who are struggling without the guide of teacher.	S-P 5		

Examining the responses of learner participants, it can be inferred that their perceptions on Modular Distance Learning pose challenges and disadvantages. This can be supported by their answers that Modular Distance Learning is Quite difficult that the teachers and students' experiences adjustments in the implementation. Other reasons emerged includes learners do self-study and do not have the same level of

understanding when it comes to the different lessons on modules. Aside from that, although there is cost-cutting to the side of parents since students are only studying at home, still, the respondents reiterated that not all students are equal in intelligence that results to struggling in studying without the physical guide of a teacher.

**Participants Teaching and Learning Experiences under the New Normal Education**  
**Table 3. Experiences of Parents on Modular Distance Learning**

QUESTIONS	RAW DATA (RESPONSES/ANSWERS)	PARTICIPANTS	PRELIMINARY CODES		THEMES
			COMMONALITIES	CATEGORIES	
<b>2.1. Can you tell me more about your understanding on Modular Distance Learning?</b>	Written works, most of the students do not use internet connection	P-P 1	<b>Module and Printed Materials</b>		<b>Parents' Experiences on MDL</b>
	It is a way of studying where module is used by the student to be able to study at home	P-P 2			
	What they are doing is taking the module at school, then answer sheet will pass every Friday.	P-P 3			
	Printed materials that my sister will answer at home.	P-P 4			
	Studying at home similar to distance learning.	P-P 5			
<b>3. Do your child accomplish all the learning tasks on his/her self-learning modules on time?</b>	I think my daughter are able to answer all the task because she can submit on time.	P-P 1			<b>Parents as PARATEACHERS (facilitating learning)</b>
	Yes, able to accomplish all the task	P-P 2			
	Able to accomplish if she spent time on it.	P-P 3			
	I think yes, she is able to answer the task, she spent her time on reading and researching.	P-P 4			
	I think she's able to accomplish the task.	P-P 5			

Based on their responses, it can be inferred that the parent-participants' understanding of Modular Distance Learning is the use of Modules, mostly of

Written Works that learners will answer at Home. Also, with their responses, it shows that the given modules by teachers to learners gives them enough time to answer



or complete the given modules for submission at specific time. Aside from that, it shows that the Parent’s role based on the theme is that they serve as Para-Teachers (where they are helping in facilitating

the learning with the learners in studying their modules.)

**Table 4. Experiences of Learners on Modular Distance Learning**

QUESTIONS	RAW DATA (RESPONSES/ANSWERS)	PARTICI PANTS	PRELIMINARY CODES		THEMES
			COMMONA LITIES	CATEGO RIES	
<b>2.1. Can you tell me more about your understanding on Modular Distance Learning?</b>	The students will answer at home, the parents take the module from the school pass the answer sheet at the school	S-P 1	<b>Module and Printed Materials</b>		<b>Learner’s Experiences on MDL</b>
	The students answer at home and the parents take the module from the school.	S-P 2			
	They will not use online, modular lesson will be distributed by the teachers through printed materials.	S-P 3			
	In my own understanding, teacher will be distributed printed materials on different subjects and students will answer it through writing on yellow pad.	S-P 4			
	It is not face to face, there is no communication between the teacher and the students, it is more on self-studying while at home	S-P 5			
<b>3. Do you accomplish all the learning tasks on your self-learning modules on time?</b>	Yes	S-P 1			
	Yes	S-P 2			
	Yes, able to accomplish	S-P 3			
	yes	S-P 4			
	Yes able to accomplish before the deadline.	S-P 5			
<b>3.1. Do you find it a time-wasting activity?</b>	No, as a student we need to stand on our own without asking the help of classmate, here we learn to answer on our own. Understand the lesson and instructions. I manage my time very effectively by following the WHLP given by my adviser so I can utilize my time and balance my household chores and my studies.	S-P 2	<b>Monitoring (Learning by doing) Time Management and proper utilization of the internet</b>		<b>Edutainment</b>
	No, because I learn somehow. Sometime, SLMs’ are providing link for videos, like educational video that serves as an additional learning material that we can use for answering the different tasks on our module.	S-P 3			
	No. most of the time I enjoy learning when SLMs are providing links to watch. Those videos were very helpful so I can easily understand the lesson even without asking	S-P 4			



	questions to my parents and teacher.			
	No, because there is something that we learned. Like the video links that the module is providing. I watch it first and it makes me feel good when I fully understand	S-P 5		
	No, the school provide a book, it depends on the students if he/she will read the books. Sometimes they are also providing video lessons that we can watch on to gain more knowledge and understanding about the lesson.	S-P 5		

Based on their responses, most of the Student-Participants see modular distance learning as not time-wasting activity. From their responses, learners can learn something, and it gives them the independence of learning at their own pace. Also, there is still

communication with the teachers since the learners are provided with the Weekly Home Learning Plan as well as additional educational video links that learners can access to support their learning that falls on the theme of “*Edutainment.*”

**Contribution for Growth and Development**

**Table 5. Parents Perception on Growth and Development on Learners**

QUESTIONS	RAW DATA (RESPONSES/ANSWERS)	PARTICIPANTS	PRELIMINARY CODES		THEMES
			COMMONALITIES	CATEGORIES	
2.3. Was it helpful and effective for your growth and development ? Why?	I can say yes, Because they are the one who answered their module, their ideas and understandings becomes widened.	P-P 1	Monitoring of Learning Tasks (at home)		Parents as PARATEACHERS (facilitating learning)
	Yes ma’am, she learned to answer the task all by herself and it is also a practice of self-control if she can answer honestly.	P-P 2			
	I think it really helps, like now that we are experiencing pandemic it is better to study than doing nothing at home.	P-P 3			
	I think it helps because there is additional knowledge that she learned, like what she said her English vocabulary was enhanced.	P-P 4			
	I think it developed somehow because they will be able to answer with their own idea.	P-P 5			

From the responses, it can be deduced that the Parent-Participants take it in a positive side that their sons/daughters pose Growth and development in the implementation of the Modular Distance learning. This is supported by their responses that the learners are the one who answers their modules using only their own

ideas and understanding. It also imposes self-control in answering the modules honestly. This falls on the category of Monitoring of Learning task (at home) where the parents serve as facilitator.



**Table 6. Learners' Perception on Growth and Development**

QUESTIONS	RAW DATA (RESPONSES/ANSWERS)	PARTICIPANTS	PRELIMINARY CODES		THEMES
			COMMONALITIES	CATEGORIES	
<b>2.3. Was it helpful and effective for your growth and development ? Why?</b>	Yes, because it is one way to test our self-comprehension, like in reading instructions you can test yourself if you understand it, or you can ask the help of your parent but in answering the question it should be your own idea.	S-P 1	<b>Monitoring (Learning by doing)</b>	<b>Learning Independently</b>	<b>Acquisition of Knowledge</b>
	Yes it helps me to develop myself because I learned to answer on my own, without the help of my classmate and teacher.	S-P 2			
	I can say because I was able to manage my time then I just think that I need to study more.	S-P 3			
	Yes it helps me to develop myself without asking the help of others.	S-P 4			
	For me yes, it helps develop myself, there is improvement, I learned in this situation.	S-P 5			

From the given responses, it may be inferred that there is improvement in the Growth and development of Learners in the implementation of Modular Distance Learning. This is supported by their responses that it tested their self-comprehension, able to manage their own time in answering the modules

provoking their own thinking to finish the modules. Although there is the guidance of the parents, still learners were able to self-study and improve themselves by having independence on their study. This falls on the theme of Acquisition of Knowledge through learning independently.

**Strategies used by the Parents/Learners to Guide/Finish in Answering Modules.**

**Table 7. Strategies used by the Parents to Guide in Answering Modules.**

QUESTIONS	RAW DATA (RESPONSES/ANSWERS)	PARTICIPANTS	PRELIMINARY CODES		THEMES
			COMMONALITIES	CATEGORIES	
<b>3.3. How do you motivate yourself to accomplish all the tasks? Can you tell me more?</b>	Sometimes I remind her the deadline of submission, so she needs to accomplish her module	P-P 1	<b>MDL's Challenges</b>		<b>Parents as PARATEACHERS (facilitating learning)</b>
	To be able to answer her module, I'll explain to her the part of the lesson that are not clear to her.	P-P 2			
	I'll give her enough time to be able to answer the whole learning task.	P-P 3			
	We guide her and help her as long as we can.	P-P 4			
	I looked at her lesson if I could answer it then I help her.	P-P 5			
<b>4. Can you tell me that you are learning from these self-learning modules? Why do you say so?</b>	Yes she learned, sometimes I was beside her when she's answering the module	P-P 1	<b>Effectiveness of MDL</b>		<b>Parents as PARATEACHERS (facilitating learning)</b>
	Yes ma'am, if you understand the question, you will understand the lesson that is being given.	P-P 2			
	Yes, she learned with the help of internet.	P-P 3			
	Yes, I can say that there is additional knowledge she can study by herself.	P-P 4			
	I think yes, somehow, she learned because she's able to answer her module without asking help.	P-P 5			



Based on the responses given, it may conclude that some of the ways/ strategies that parents do in guiding the learners in answering the modules include Constant Reminding of Deadlines as guide for learners to finish the modules, explaining to the learner the parts of the modules which are not clear (tutoring), and

giving of Time Allotment to properly finish the task. From these responses, the theme shows that parents' role are facilitators of learning. Also, from the responses, learners are learning, imposing that there is effectiveness in implementing Modular Distance Learning.

**Table 8. Strategies used by Learners to Finish in Answering Modules**

QUESTIONS	RAW DATA (RESPONSES/ANSWERS)	PARTI CIPAN TS	PRELIMINARY CODES		THEMES
			COMMONAL ITIES	CATEG ORIES	
<b>3.3. How do you motivate yourself to accomplish all the tasks? Can you tell me more?</b>	I just think that I am graduating student, I just tell myself that if others can do it so can I.	S-P 1	<b>The Learning Process</b>		<b>Learner's Perceptions on MDL</b>
	I just think that it will end as well, we can also ask the help of teachers.	S-P 2			
	If I cannot answer the lesson, I'll read it again, then I'll skip it. I'll answer first the task that is easy for me, when I'm done all the tasks I'll go back to the difficult task.	S-P 3			
	I just think that I can answer all the task I don't take it as a negative side.	S-P 4			
	I motivate myself by thinking that it is only a trial, sometimes I ask the help of my classmate so that I can have some idea or I'm using the internet.	S-P 5			
<b>4. Can you tell me that you are learning from these self-learning modules? Why do you say so?</b>	Yes, because through reading there is something I understand	S-P 1	<b>Challenges to the Learning Process</b>		<b>Learner's Perceptions on MDL</b>
	Yes, because it is written in the module the things that we need to learn	S-P 2			
	Somehow, because my understanding are not that wide to understand the lesson.	S-P 3			
	Yes, because my English vocabulary are enhanced through reading	S-P 4			
	For me yes, because I become independent in understanding the lesson	S-P 5			

From the responses given, it may be inferred that there is "intrinsic motivation" in the learners that drives them to finish the different tasks on the module. Based on their responses, it shows that they set their minds to finish the task even if it is hard because eventually, they will be able to finish that. Another Strategy that was mentioned is that they know how to

filter the tasks from easy to difficult. They try to answer modules with tasks that is easy to do, and the difficult tasks were done in the latter part to save time in answering the modules. The category falls on the learning process where their "intrinsic motivation" drives them to finish the tasks in the modules.

**Challenges Encountered by the Parents and Learner****Table 9. Challenges Encountered by the Parents**

QUESTIONS	RAW DATA (RESPONSES/ANSWERS)	PARTICIPANTS	PRELIMINARY CODES		THEMES
			COMMONALITIES	CATEGORIES	
<b>3.2. Are there times that you observed that you are having a hard times and difficulties in answering the entire learning task?</b>	Not really, because she loves to study	P-P 1	<b>Monitoring of Learning Tasks (at home)</b>		<b>Parents as PARATEACHERS (facilitating learning)</b>
	Yes, but with the help of parents and internet she is able to answer the task.	P-P 2			
	Yes, because sometimes she is very moody.	P-P 3			
	Yes, there is	P-P 4			
	Yes	P-P 5			
4.1. Based on your own observation, are these SLMs itself are enough to provide you quality education? Why do you say so?	If you think of it face to face is better but because of the pandemic we must be like this.	P-P 1	<b>MDL's Challenges</b>		<b>Parents as PARATEACHERS (facilitating learning)</b>
	Ma'am maybe not, we cannot tell right now because it takes time to tell how effective these processes are.	P-P 2			
	No, face to face is better	P-P 3			
	No, I think face to face is better students need a teacher to explain and answer the question of the students.	P-P 4			
	No, it is much better that there is a teacher who teach them.	P-P 5			
<b>5. As a parent, what are the challenges of this modular distance learning?</b>	I will just let my daughter to answer the task because she can handle it.	P-P 1	<b>MDL's Challenges</b>		<b>Parents as PARATEACHERS (facilitating learning)</b>
	Very hard	P-P 2			
	As guardian, what really hard is that when she ask you a question and you don't know the answer especially those who have not studied.	P-P 3			
	It's hard to understand the lesson all by yourself.	P-P 4			
	Nothing	P-P 5			
<b>5.1. Can you identify some? Please elaborate</b>	My daughter answers the task all by herself since she can handle it.	P-P 1	<b>"Teacher's cannot be replace by this learning modality"</b>		<b>Parents as PARATEACHERS (facilitating learning)</b>
	Communication with the teacher, student's questions cannot answer immediately.	P-P 2			
	Sometimes there is no internet connection or even load that's the difficulty.	P-P 3			
	It is hard if there is no teacher to guide you	P-P 4			
	It's just as difficult as when in the news the student thought of committing suicide.	P-P 5			

From the responses given, it may be inferred that even the parents as the one who guides the learners in the modular distance learning also experiences challenges and difficulties. One of the challenges mentioned was the communication with the teacher. If a student has questions of the teacher, it takes some time for the teacher to answer the query of the learners since they are many to be entertained one by one by the

teacher. Another challenge that was mentioned is that the limited knowledge of the parent on a certain topic in the lesson. Since not all parents was able to finish their studies, some parents are not familiar with the lesson, so it becomes difficult for the learners to understand more the lesson in answering the tasks in the module.'



QUESTIONS	RAW DATA (RESPONSES/ANSWERS)	PARTICIPANTS	PRELIMINARY CODES		THEMES
			COMMONALITIES	CATEGORIES	
<b>3.2. Are there times that you observed that you are having a hard times and difficulties in answering the entire learning task?</b>	Yes. When I don't have data to ask questions to my teacher and there are times that I can't watch the videos because I do not have internet or data.	S-P 1	<b>Challenges to diverse learners</b>		<b>Learner's Perceptions on MDL</b>
	Yes, I am not that good at understanding everything. But those videos that they provide in the modules, I watch it repeatedly so I can understand the lesson.	S-P 2			
	Yes. I find difficulties when no can asked at home, because mom and dad have to go to work. So I can't follow the WHLP.	S-P 3			
	Yes, especially when the lesson are hard to understand.	S-P 4			
	Yes.	S-P 5			
<b>4.1. Based on your own observation, are these SLMs itself are enough to provide you quality education? Why do you say so?</b>	No, face to face is better, there is a teacher who will teach us compare to self-study, if there is a teacher we understand better.	S-P 1	<b>Evaluation of Learning through MDL</b>		<b>Learner's Perceptions on MDL</b>
	No, we are not used to in this kind of situation that is why there some students who are struggling.	S-P 2			
	Yes, because there are students learned by studying their activities.	S-P 3			
	For me no, face to face is better.	S-P 4			
	For me no, face to face is better because there are communication between teacher and student, they can give you example they explained well.	S-P 5			
<b>5. As a parent, what are the challenges of this modular distance learning?</b>	Very hard	S-P 1	<b>Challenges to the Learning Process</b>		<b>Learner's Perceptions on MDL</b>
	Time management	S-P 2			
	Understanding the lesson	S-P 3			
	Like what I said, challenge for me is without asking the help of others	S-P 4			
	The challenge I experienced is to become independent	S-P 5			
<b>5.1. Can you identify some? Please elaborate</b>	When I ask my parents they do not know the answer, sometimes it is hard to ask question unlike face to face setting the teacher can explain those and that....	S-P 1	<b>Evaluation of Learning through MDL</b>		<b>Learner's Perceptions on MDL</b>
	For me we need time management to accomplish the activities, if you do not know the answer it is also hard to communicate with the teacher.	S-P 2			
	Time management because of household chores.	S-P 3			
	If you have question no teacher can answer you immediately, I don't if what I know is right	S-P 4			
	Sometimes it is hard to understand the lesson	S-P 5			

**Table 10. Challenges Encountered by the Learners**

All the responses of the learners fall on the category that these are challenges to the diverse learners and a challenge in the learning process of a student in implementing the Modular Distance Learning Modality as Contemporary Teaching Strategy.

**Proposed Learning Intervention**

After the presentation, interpretation and thorough analysis of the data gathered from the interview done to Parent-Participants and Student-Participants, it poses that there are advantages and disadvantages on the implementation of Modular Distance Learning as Contemporary Teaching Strategy



as based on the different perceptions gathered from the respondents.

From this, the researcher proposes an intervention program based on the results of the research.

**Table 11. Proposed Intervention (Action Plan)**

AREA(S) And Project Title	OBJECTIVES	PERSON(S) RESPONSIBLE	TIME FRAME	RESOURCES NEEDED/SOURCE OF FUND	
				Equipment / Material Needed	Source of Fund
Modyul mo, Hatid ko!	To deliver Learning Packets with the aid of community partners (Team Mayabo, Liga ng mga Baranggay).	Teachers Team Mayabo (association of riders) Liga ng mga Baranggay	Oct - July 2021	Students Learning Packets	MOOE
Project Bente Mo – Kinabukasan ko!	To raise fund for learners' kit and to buy additional school supply like bond papers for printing of activity sheets.	Parents Teachers Association	Oct.- July 2021	Ads through platforms	
Project Reach	<p>-To establish connection between the school and home to develop, enhance the reading skills of the learners.</p> <p>-To empower parents and guardians in assisting their children to read at a regular scheduled time.</p> <p>-Provide children reading materials that will help them to be empowered readers by developing their vocabulary, study skills, media literacy and reading comprehension skills.</p>	English Teachers Class Adviser	<p>Full Implementation on SY 2021-July 2022</p> <p>Pilot Implementation on March 2021- July 2021</p> <p>Planning Preparation January - February 2021</p>	Reading materials	MOOE

**Table 12. Proposed Intervention Program for Parents/ Guardians**

PROGRAM	OBJECTIVES	PERSON(S) RESPONSIBLE	TIME FRAME
Virtual Kumustahan on a weekly basis	The purpose of this activity is to reach parents/ guardians virtually. Its aim is to address some issues and answer the parents/ guardian concerns regarding the lessons.	Parents/ guardians teacher	Whole school year
Facebook Group	This platform serve as a venue for parents and teacher to reconnect and to update each other in the activities regarding the lesson despite the pandemic.	Parents/ guardians teacher	Whole school year
Video clips	The purpose of this activity is to assist the parents and students in answering the lesson, giving them further explanation and instruction for better understanding and interaction.	Parents/ guardians Teacher students	Whole school year

## CONCLUSION

Based on the results of the qualitative inquiry, the researcher has drawn the following conclusions:

1. The Perception of Parents and Learners on Modular Distance learning as contemporary teaching strategy shows effectiveness even facing different challenges and disadvantage.
2. Challenges that Parents and Students encounter such as the time management, limited knowledge of the parents on the topics in the modules, independence in learning, access to other resources for learning should be given attention and solution to improve more the implementation of the Modular Distance Learning.
3. Intervention programs should be administered to support and enhance the current situation of

Distance Learning Modality to improve more the teaching and learning process in this contemporary teaching.

## Recommendation

Based on the findings and formulated conclusions, the following are highly recommended:

1. School may implement the proposed intervention program through the Action Plan as support for the delivery of learning to all the learners.
2. The school may strengthen the partnership with its stakeholders through continuous communication. It is important that in implementing various Distance Learning Modality, there should still be strong partnership with the learners, parent, and



community for a successful implementation of learning modalities in the New Contemporary Teaching.

3. Learners and Parents may establish more communication in different means to assure continues monitoring and support on the teaching-learning process of the students.

4. Include the parents/ guardians in conducting School Learning Action Cell since they are the one who guide their son/ daughter in explaining the lesson amidst pandemic.

## REFERENCES

1. Aggabao, Ambrose Hans. *Development and Evaluation of Individualized Self Instructional Modules on Selected Topics in Basic Mathematics*. (Journal of Research, Isabela State University, Vol. XI, No. 1, January – December 2012).
2. Akinoglu., O. and Tandogan., R. (2016). *The effect of Problem based active learning in science education on student's academic achievement, attitude, and concept learning*. *Eurasia journal of mathematics, science and technology education*, 3(1), 71-81.
3. Amedzro, K.A.D. (2005). *Theory and practice of adult education*. Accra: Ghana University Press.
4. Amponsah, S. (2010). *The evolution and implementation strategies of the University of Ghana Bachelor of Arts distance education programme*. Unpublished M.Phil. Thesis. University of Ghana.
5. Aquino-Danganan, Aussie. (2011) "Development and Validation of A Module in Developing Computational Skills in College Algebra" Unpublished Thesis, Tarlac State University
6. Bevan, M. T. (2014). *A method of phenomenological interviewing*. *Qualitative Health Research*.
7. Biggs, J. (2010). *Teaching for Quality Learning at University*. Buckingham: SRHE/OU Press
8. Cappetta, Robert W., 2007, *Reflective Abstraction and the Concept of Limit: A Quasi-Experimental Study to Improve Student Performance in College Calculus by Promoting Reflective Abstraction through Individual, Peer, Instructor and Curriculum Initiates*, (Dissertation Abstract International Vol. 69 No. 2 August (541-A)
9. Cardon, P. (2015). *At risk students and technology education*. *The Journal of Technology Studies*, 26(1), 49-57.
10. Commonwealth of Learning (2005), *Planning Open and Distance Learning Systems: A Handbook for Decision Makers*. Vancouver: Commonwealth of Learning. Retrieved from [http://www.saide.org.za/sites/default/files/course\\_design/odlinstdesignHB.pdf](http://www.saide.org.za/sites/default/files/course_design/odlinstdesignHB.pdf)
11. Department of Education, Philippines (2020). *DepEd Memorandum (DM) No. 15, 21, 23, 31 and 34 series of 2020. "Creation of a Task Force for the Management of Department of Education Response to Novel Coronavirus Acute Respiratory Disease (2019-nCoV ARD)"*
12. Delgado, Ana J., 2016, *Effects of the Use of Computers, Integrated to an Instructional Module on Functions of the Attitudes towards Mathematics and the Achievement in Functions in Precalculus of College Students*, (Dissertation Abstract International Vol. 67 No. 6 December (2084-A).
13. Dewey, J. (1933). *How we think*. (pp, 133-219). Lexington, MA: D.C. Heath and Company.
14. Evasco, N. B. (2020). *Sta. Catalina Integrated National High School's Learning Continuity Plan for School Year 2020-2021*
15. Gagarin, C. (2013). *Module in physics I: Development and Evaluation (Master's thesis)*. Eulogio "Amang "Rodriguez Institute of Science and Technology, Manila.
16. Ghabanchi., Z. and Behrooznia., S. (2016). *The impact of brainstorming on reading comprehension and critical thinking ability of EFL Learners*. *Social and Behavioral Science*, (98). 513-521. DOI. 10.1016
17. Guimbatan A. (2013) *Educational Alternatives*. Mandaluyong City, Philippines: Academic Publishing Corporation, 2013
18. Guo, Y., Cao, Q., (2020). *The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak – an update on the status*. *Military Med Res*, 7(11). <https://doi.org/10.1186/s40779-020-00240-0>
19. Hermosisima, V. (2019). *Development and Validation of Modules in Physics 112 (Magnetism) for DTI Students of Cebu State College of Science and Technology (Unpublished Master's Thesis)*. Philippine Normal University, Manila.
20. Kemp, O. and Smelie, A. (2019) *Planning, Producing and Using Instructional Media*, New York: Harper & Row Publishing
21. Kidd, A. (2012). *The oxford union rough guide to debating*. The English Speaking Union. Retrieved from: [http://www.britishdebate.com/resources/hb\\_.html](http://www.britishdebate.com/resources/hb_.html)
22. Lacdao, Melchor O. (2014) "A Comparative Study of the Effects of Modular Instruction and Lecture Discussion Method on the Achievement of Grade Six Pupils in Mathematics" Unpublished Master's Thesis, Eastern Samar State College, Borongan, Eastern Samar.
23. LeBrun, D. (2015). *A Study of Modularized Instructions And Its Role In The Technology Education Curriculum At Southern Door Schools* University of Wisconsin-Stout.



24. Madriaga, Estelita A. (2014) "Effects of Modular Instruction in Teaching Physics", Unpublished Master's Thesis, Samar State Polytechnic College, Catbalogan Samar
25. Morse, J. M., et. al. (2002). Verification strategies for establishing reliability and validity in qualitative research. *International Journal for Qualitative methods*.
26. Okon., C. (2014). Teachers attitude to social studies and students academic performance in junior secondary Three certificate examination through Modular Learning. *Asian Journal of Social Science and Humanities*, 3(3), 12 17.
27. Olweus, D. (1993). Annotation: Bullying at school: Basic facts and effects of aschool based intervention program. *Journal of Child Psychology & Psychiatry & Allied Disciplines*, 35(7), 1171-1190.
28. Onwuegbuzie, A. J., & Collins, K. M. T. (2007). A typology of mixed methods sampling designs in Social Science research . *The Qualitative Report*. Retrieved from <https://nsuworks.nova.edu/cgi/viewcontent.cgi?article=1638&context=tqr>
29. Patton, M. Q. (2015). *Qualitative Research and Evaluation Methods* (3rd Edition)
30. Palinkas, L. A., et. al. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation
31. Race, Phil. (2019) *The Open Learning Handbook*. USA: Nichols Publishing
32. Receno, Carmela N. (2011) "Development of Instructional Materials for the Enhancement of the Listening Skills among Freshman College Students of SMCL" Unpublished Thesis Philippine Normal University
33. Rizaldo, Rosita, et. al., (2017) *Comparative Effects of Modular and Traditional Methods in Teaching Analytic Geometry* (A Publication of Research & Educational Development Training Institute, Vol 6).
34. Rossman, G. B., & Rallis, S. F. (1998). *Learning in the field: An introduction to qualitative research*. Thousand Oaks, CA: Sage.
35. Rudnitsky, A. N. (2011). *Course Design: A Guide to Curriculum Development for Teachers*. New York: Longman
36. Salandanan, Gloria G. (2011) *Teaching and the Teacher*, Quezon City: Adriana Printing Co., Inc
37. Salandanan Gloria G. (2019) *Teacher Education*. QC, KATHA Publishing Co., Inc.
38. Sadsad, Z. (2011). *Validity of the Resource Book in Science I* (Master'sThesis). Eulogio "Amang "Rodriguez Institute of Science and Technology, Manila.
39. Sejjal, K.(2013). *Learning and skill network Independent learning literature review* (Vol. 2, Issue: 2, February 2013 (IJRE) ISSN:2320-091X pp.170
40. Simpson, O. (2013). Student retention in distance education: are we failing our students? *Open Learning: The Journal of Open, Distance and e-Learning*, 28(2), 105-119. Retrieved from <http://www.tandfonline.com/doi/full/10.1080/02680513.2013.847363>
41. Taneja, R. (2014). *Dictionary of Education*. Anmol Publication Murare New Dehli, India p. 155
42. Vega, J. (2014). *Computer-Bbased Modules in Selected Topics for Drafting* (Master's thesis). Eulogio "Amang "Rodriguez Institute of Science and Technology, Manila.
43. Vaismoradi, M. et. al. (2016). Theme development in qualitative content analysis and thematic analysis. *Journal of Nursing Education and Practice*.
44. Woolfolk, A. E., (2010) *Educational Psychology*. Massachusetts: Allyn & Bacon Publishing
45. Wilkerson, V. L. (2017). *A Guide To Teaching With Modules* Hope College
46. Zare., P. and Othman., M. (2013). Classroom debate as systematic learning and teaching approach. *Journal of World Applied Science*, 28 (11) 150
47. Zulueta, Francisco (2013) *Teaching Strategies & Educational Alternatives*. Vol. 1, Mandaluyong City, Philippines: Academic Publishing Corporation, 2013 (57-59)



# DEVELOPMENT OF ORBITAL WRAPPING MACHINE

**Smitesh Bobde<sup>1</sup>, Shailesh Dhomne<sup>1</sup>, Saurabh Bobde<sup>1</sup>, S G Ghugal<sup>2</sup>**

<sup>1</sup>- Assistant Professor, Dr. Babasaheb Ambedkar College of Engineering & Research, Nagpur

<sup>2</sup>- Assistant Professor, Priyadarshini Bhagwati College of Engineering, Nagpur.

## ABSTRACT

*The aim of this paper is to study the Orbital Wrapping Machine and their various components and to develop a wrapping machine affordable for small scale industries or small start-ups. After taking analysis we got to know that most of the wrapping are too much costly which a small manufacturer cannot afford, so they use some old techniques to complete their process. So, we are going to build an affordable, easy to use, having basic functionalities for a small-scale manufacturer. In this machine only basic important functions are retained so that we can cut the cost in making. In this project we have done our best to design, fabricate a working model of Orbital Wrapping Machine.*

## 1. INTRODUCTION

Wrapping Machine are used in manufacturing units for covering the surface of the product so that the surface of the product remains protected for unnecessary moisture.

Unnecessary moisture leads to corrosion, therefore wrapping the product with good stretch film protects the surface from getting corrode. Most of the wrapping machines are expensive which a small manufacturer cannot afford. They have a lot of features such as automatic cutting of the stretch film feature which increases the cost of the machine. For a start-up level manufacturer, they need basic functionality to do their job.

So, after studying the facts we made a successful model of a wrapping machine with basic features considering the need.

## 2. METHODOLOGY

As per our study we have found that the orbital wrapping machine used in industries are not suitable for the small or intermediate size of product to be wrapped. Due to the light weight of the product, they might get uplift with the wrap material or stretch

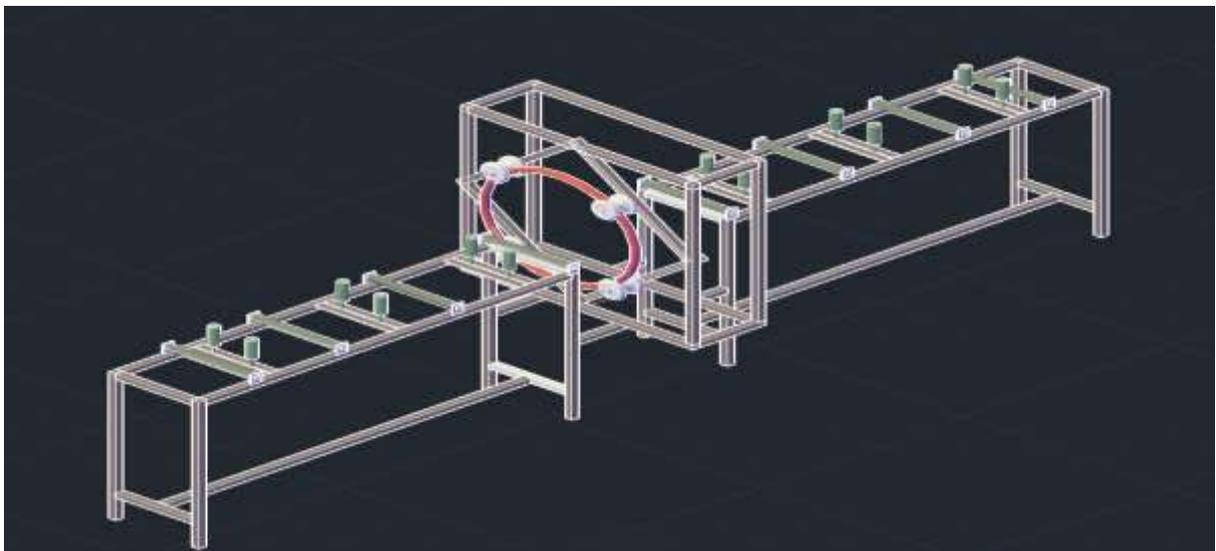
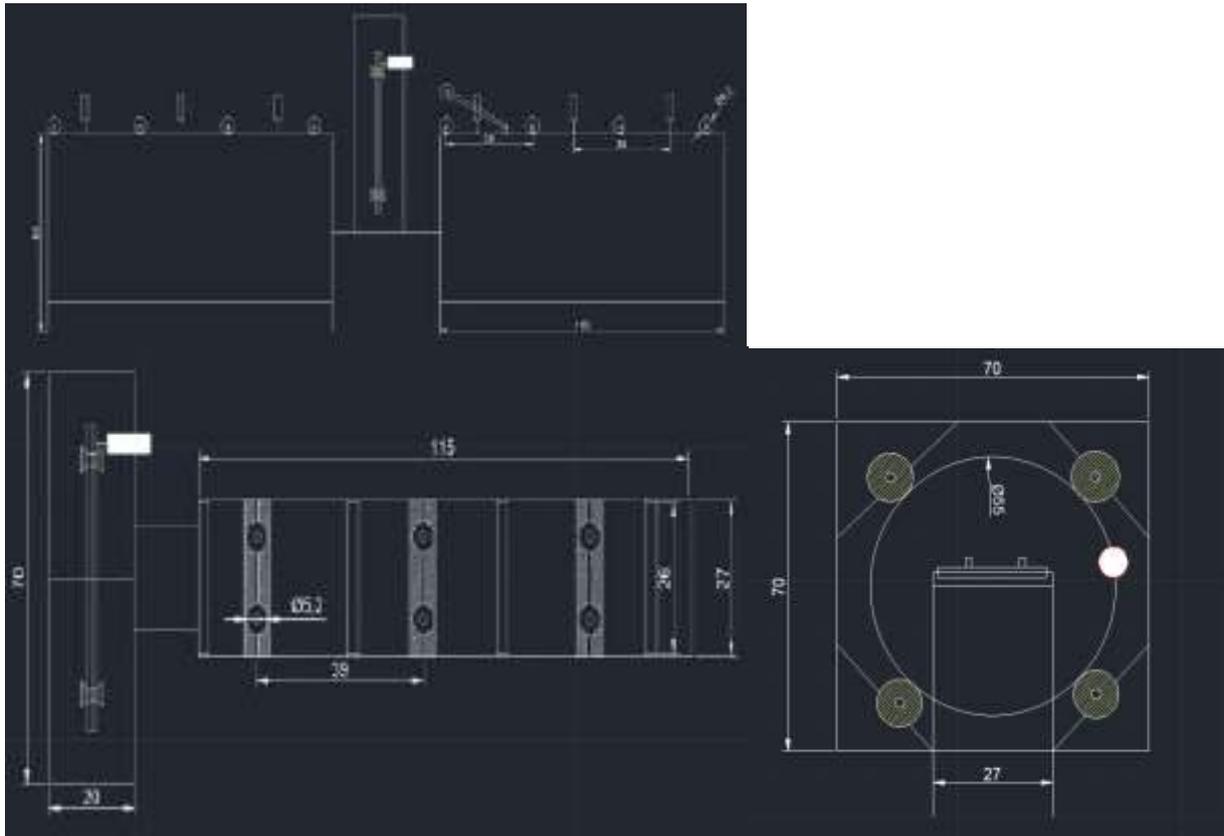
film. To overcome this situation, we make changes in traditional wrapping machine by providing supporting roller and clamp which will hold the product during wrapping.

### 2.1 PROBLEM IDENTIFICATION

The number of Orbital wrapping machine are used in large scale industries to wrap the Pallets and other products are very expensive which might not be affordable for small scale industries. The other problem which are generally observed in wrapping machine are. Tearing of stretch film, Shrinkage of wrap materials, Wrapping on Bar too loose or too tight, Uneven wrapping on the Bars, Loose wrapping cause the materials to get rust or other damages seen on bars, Lag in feeding movement of the materials to be wrapped by conveyors.

### 2.2 Design

The designing consist of selection of material and power source, synthesis of the mechanism, force analysis, determining the dimensions. This has been done and explained below in the part list.



### 2.3 Components

Sr. no	Components	Dimension
1.	Conveyor frame	Length = 120 cm, Width =27cm, height= 64cm
2.	Ring frame	Length= 71.5cm, Width =20.5cm, Height 68.5cm
3.	Centre ring	Diameter = 55 cm
4.	Conveyor motor	12 volt Speed= 30 RPM Torque= 5 kg.cm
5.	Ring motor	12 volt, 200 rpm, Torque =10 kg.cm
6.	Roller bearing	Bearing no. Z809 ,outer diameter=22 mm, inner



7.	Horizontal roller	Length =26 cm, Diameter = 26 mm, shaft length =
8.	Supporting roller (vertical	Shaft Length =12.5 cm , Diameter= 26mm, shaft
9.	Distance between 1 <sup>st</sup> and 2 <sup>nd</sup>	Length =35 cm
10.	Distance between 2 <sup>nd</sup> and 3 <sup>rd</sup>	Length =35 cm
11.	Distance between 3 <sup>rd</sup> and 4 <sup>th</sup>	Length = 35 cm
12.	Supporting roller distance	Length = 39 cm

Sr. no	Component	Unit
1.	Central ring	1
2.	Conveyor	2
3.	Dc motor	2
4.	Horizontal Rollers	7
5.	Vertical rollers	8
6.	Fabrication Frame	1
7.	Wrapping wheel holding rollers	4
8.	SMPS	1
9.	Regulator	1

**Central Ring: -**

Central ring is the main part of the wrapping machine. Which consist of wrapping tape. when the ring rotates with the help of dc induction gear motor. when rod is feed to words ring it efficiently wrap the rod and give the tight wrap and equal distance wrapping in minimum time. Material of the ring is mild steel and wrapping material is plastic is also called stretch film.

**Conveyor:** - conveyor is the main part of wrapping machine. the function of the conveyor in the wrapping machine is to feed the rod with the constant speed. there are two type conveyors are present in the wrapping machine are as follows:

1. **Feeding conveyor:** - feeding conveyor give the feed towards the central part of the wrapping machine is called as ring. only feeding conveyor consist of the moving rollers. the rollers can rotate with the constant speed.

2. **Receiving conveyor:** - the function of the receiving conveyor is to receive the wrapping pipes. This conveyor is also called free conveyor because there are no moving rollers are present to receive.

**Dc gear motor:** - Dc motor plays an important role in the wrapping machine. dc motor gives the constant revolution speed to the ring and the conveyor .in the ring we use the dc motor of 12 volts, 200 rpm and torque of 10 kg.cm and the dc motor used in conveyor is 12 volts ,30 rpm and torque of 5 kg.cm.

**Horizontal rollers:** - In the wrapping machine horizontal rollers is also called as followers. Horizontal rollers consist of the bearing and the shaft. the specification of bearing is bearing no is Z809, outer diameter is 22mm and internal diameter is 8 mm. the specification of the shaft is length is 29 cm,

diameter is 8mm. and the dimension of roller is length of 26 cm and diameter is 26mm.

**Vertical rollers:** - vertical roller is also called supporting rollers. which is used to support or guide the pipe towards ring without misguide the pipe. this roller are movable rollers and adjust as per the size of the pipe we want to feed. The specification of the vertical rollers are as follows: the length of the shaft is 12.5 cm and diameter of shaft is 8 mm and the roller length is 8cm and diameter is 26 mm

**Fabrication frame:** - the fabricated frame is the main component where the whole assembly will take place. the fabricated frame is made of mild steel hollow square pipes. fabricated frame is consisting of conveyor frame and ring frame. conveyor is the table like structure, specification of the conveyor is as follows that is length if 115 cm and width of 27 cm and height of 64 cm the specification of the ring frame are as follows that the length is 70cm, breadth of 70 and width of 20 cm

**Wrapping wheel holding rollers:** - Holding rollers are used to hold the ring and wrapping wheel and wrapping material (stretch film). the wrapping rollers are made up of nylon material gives the suitable friction and help to rotate the ring the wrapping rollers are free to move.

**SMPS**

SMPS is the Switched Mode Power Supply circuit which is designed for obtaining the regulated DC output voltage from an unregulated DC or AC voltage. There are four main types of SMPS such as. DC to DC Converter. AC to DC Converter. We use ac to dc SMPS

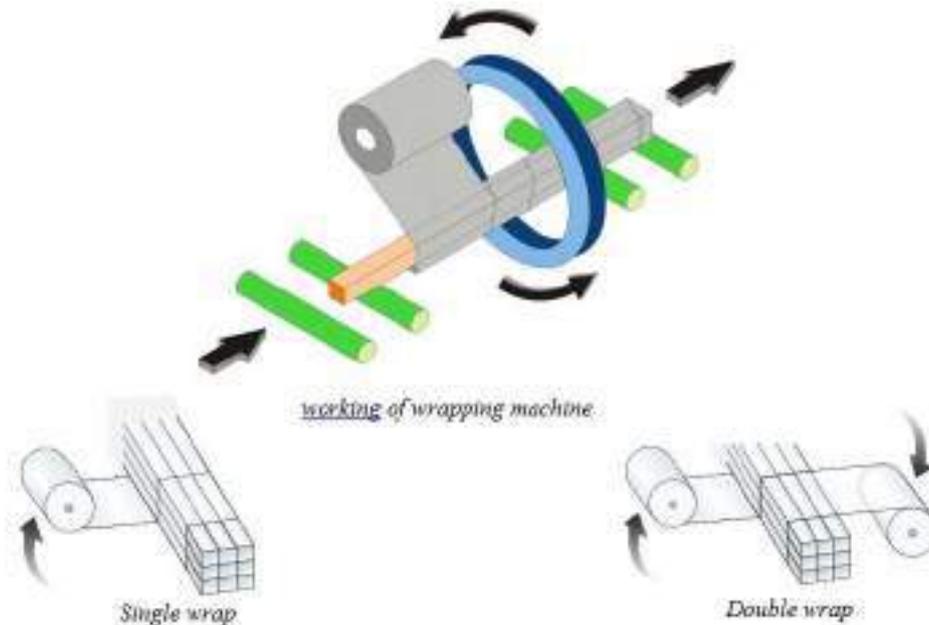


### Regulator

An electronic speed control (ESC) is an electronic circuit that controls and regulates the speed of an electric motor. It may also provide reversing of the motor and dynamic braking. Miniature electronic speed controls are used in electrically powered radio-controlled models

### 3. WORKING

It consists of an input and output table, between which a rotating crown (ERL) is located. Its operation is very intuitive: once the product to be packed is located in the center of the entrance table, the process starts automatically. The product advances to the crown, where it is wrapped by the stretch film. In this way, the package is closed and protected on all 4 sides.



The primary wrap is ideal where the material contrasts with the product, such as a package of loose letters. The secondary wrap refers to a situation in which the product is already wrapped using a different style in which this time you need to add a wrap on the top. Then, transit wrap, which is mainly used for the collection of loose products. Then, understanding these functions provides you with a basis for knowing how this particular stretch wrapping machine works. Speaking of how it works, the principle is that the product is pushed through a sheet of film that is cut from a single reel. What happens is that a longitudinal or base thermal seal is created where the film tends to overlap. Therefore, this equipment consists mainly of different mechanisms. It has a wrapping mechanism, a transport device that receives moves and also downloads the items. A semi-automatic stretch wrap machine also contains a roll of wrapping materials that have already prepared labels, a gluing device and, in some cases, a counting device.

### 4. BENEFITS

**Speed.** The orbital wrapping machine can achieve throughput rate significantly higher than manual wrapping machine.

**Scalability.** Because the wrapping machine is fast, it enables the smaller companies or manufacturers to more easily scale their operation or production as they grow.

**Uniformity.** Wrapping machines applies same amount of material in the same way to each package or product. This is important from the point of view of quality control and customer expectations.

**Quality.** Automatic wrapping results in more secure shipping and unitized loads, reducing any kind of damage to the package.

**Material cost reduction.** Machines apply significantly less material to the package or product than packaging applied manually. This can reduce the material usage by half or more. And less packaging material usage is good for the environment.

**Labor redeployment.** Rather than engaging personnel in time consuming, repetitive packaging tasks, staff can focus on more important and revenue generating activities.

### 5. CONCLUSION

In this development of project we are aiming to increase the productivity of the small industries or manufacturer and reduce the cost of machine so that the small manufacturer can afford it and improve the



quality of their product by effective wrapped packaging. Thus cost effective wrapping machine can serve his purpose to Small Scale Industried

## REFERENCES

1. [https://www.fhopepack.com/Orbital-stretch-wrapper/1\\_Orbital-stretch-machine-014-08-24.html](https://www.fhopepack.com/Orbital-stretch-wrapper/1_Orbital-stretch-machine-014-08-24.html)
2. <https://medium.com/@smartcut05/working-principal-of-wrapping-stretch-rapping-machines-25ef5716b05b>
3. <https://www.plasticband.com/Orbital/Orbital-Wrapping-Machine.html>
4. US6729106B2, Wiley, "Orbital pallet wrapping machine and method", published 2004(PATENT)
5. US 4,723,393, Silbernagel, "Twin roll laminated packaging process P Silbernagel - US Patent 4,723,393, 1988 -", published 1988(PATENT)
6. Yam, K. L., "Encyclopedia of Packaging Technology", John Wiley & Sons, 2009, ISBN 978-0-470-08704-6



# USE OF BIOLOGICALLY ACTIVE ORGANIC COMPOUNDS IN AGRICULTURE AND METHODS OF THEIR SYNTHESIS

<sup>1</sup>M.S. Xatamova, <sup>2</sup>L.M.Usmonova

*Navoi State Pedagogical Institute, Uzbekistan*

## ABSTRACT

*This article provides information on pesticides, herbicides, fungicides, insecticides, nematocides, acaricides, bactericides, growth accelerators in agriculture and the search for new compounds, the development and implementation of technologies for their production, and the use of them in agriculture. listed.*

**KEYWORDS:** *pesticides, pesticide classification, insecticides, fungicides, herbicides, growth agents, insecticides, defoliants.*

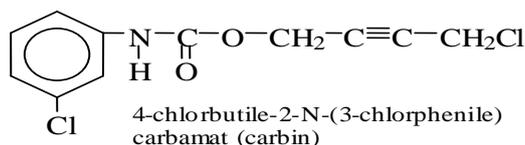
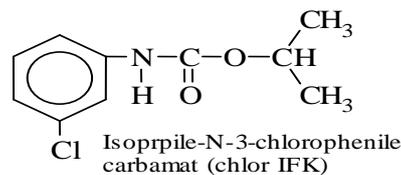
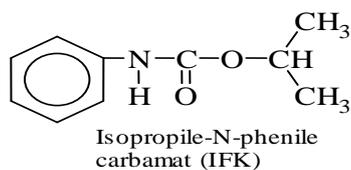
Advances in chemistry are aimed at increasing agricultural production and further increasing productivity. Successful solution of this task depends in many respects on increasing land productivity, proper organization of the fight against waste of agricultural products. Agricultural products are wasted in large quantities due to weeds, pests and diseases of cultivated plants. Weeds take moisture from cultivated plants, nutrients from the soil, squeeze crops and inhibit their growth.

Agricultural plant pests include insects, canals, roundworms, mollusks, rodents, and more. Insects absorb their sap, along with damaging plant tissue; roundworms (nematodes) penetrate the plant and erode their tissue, while rodents gnaw on the surface and underground parts of the plant.

Fungi, bacteria and viruses live in plants as parasites, disrupting their normal nutrition, causing some parts of the plant to rot and die, and the whole plant to wither. Pests and pathogens that fall on cultivated plants reduce the productivity of agricultural crops and cause enormous economic damage to the state. For example, infestation of wheat with only one buckwheat reduces the yield by 30-50%. Thus, there are currently more than 70,000 pests in the world. Due to this, various chemical compounds that have the property of stopping the growth or killing of insects, canals, rodents, bacteria, viruses, fungi, weeds and other pests in agricultural crops are called pesticides. Pesticides can be classified according to their chemical composition and the purpose for which they are used.

1. Herbicides — chemicals used to control weeds.
2. Insecticides — chemicals used to kill harmful insects.
3. Fungicides are chemicals used against plant diseases.
4. Plant growth agents are chemicals that affect the growth of plants.
5. Insect repellents - chemicals that protect against insect attacks.
6. Insectoattractors - chemicals that attract insects.

7. Chemocerilizers - chemicals that prevent the growth of harmful organisms. Today, most carbamates have active biological effects and exhibit good insecticidal and herbicidal properties. The most widely used herbicides against annual weeds are carbamic acid IFK ester, chlorine-IFK, carbine (barban):



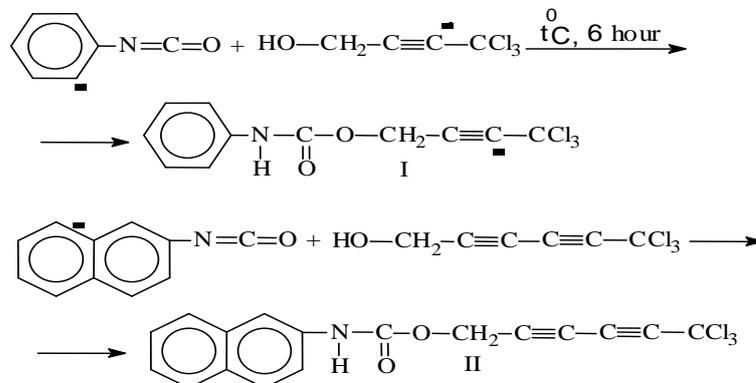
In acetone, in the presence of  $(C_2H_5)_3N$ , 3,5- $(C_2H_5)_2C_6H_3-OH$  is reacted with  $CH_3-N=C=O$ , and 3,5- $(C_2H_5)_2C_6H_3-OCONHCH_3$  is obtained with 84.5% yield. The product is an insecticide, for example, at a concentration of 2.5 mg / l has an effective effect against "drisophila melanog aster" [1].

The compound  $Ar-OC(O)NH-CH_2-CH=CH_2$ , obtained by reaction of the corresponding phenol with isocyanate, exhibits insecticidal activity and has the ability to have an energetic effect on N-methylcarbamate and organophosphorus compounds [2].

A compound with the formula 3-(2-Cl-4-CF<sub>3</sub>C<sub>6</sub>H<sub>3</sub>O)C<sub>6</sub>H<sub>4</sub>OCONHR (where R = H, alkyl, Ph, haloidphenyl) reacts 3-(2-chlorine-4-triflormethyl phenoxy) phenol with  $CH_3-N=C=O$  as a result of the effect is obtained with a yield of 57%. The reaction products have a herbicide effect when applied initially and after weeding against poultry millet and large-leaved weeds.

$X_nVC_6H_{4n}N=C=O$  with R-SH, in inert solvents in the presence of tertiary amines at a temperature of -30-150°C, the yield is obtained by 64%. 0.5–1 kg of nuts destroy many weeds without damaging the wheat.

German scientists [3] synthesized esters and carbamates in order to study the dependence of pesticide activity on the structural structure.

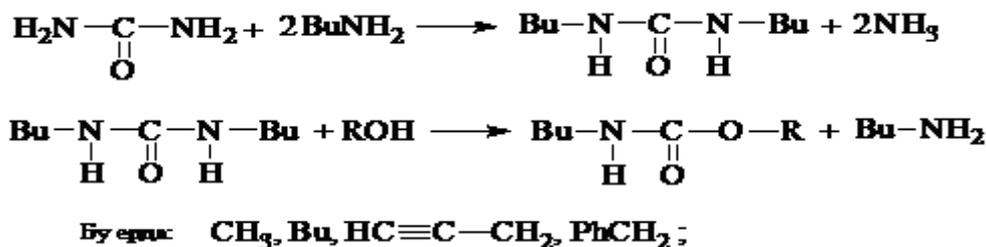


The synthesized carbamates have a herbicide effect that is far superior to that of  $CCl_3COOH$ . Drugs I and II also have fungicidal and insecticidal activity. Compound I is an insecticide and is widely used in agriculture.

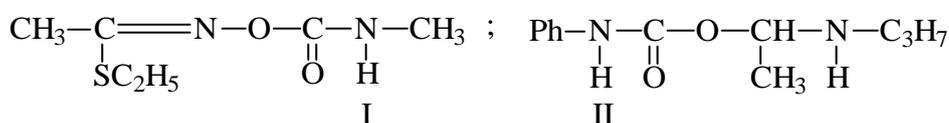
Carbamate derivatives are offered without formula I. ( $R^1$ -alkyl); used as an active ingredient in fungicidal compositions.

A number of synthetic methods for obtaining cyclic sulfamyl carbamates and urea have also been developed. These pathways are used for 3-component condensation, alkylation of Mitsunob, and targeted synthesis of S-heterocyclic compounds with 9–11 ring members using a Grubbs catalyst [4].

This work is devoted to methods of synthesis of aliphatic carbamates based on the alcoholism of symmetric dialkyl urea. The process was performed on N, N<sup>1</sup>-dibutyl urea, which was re-assimilated urea:



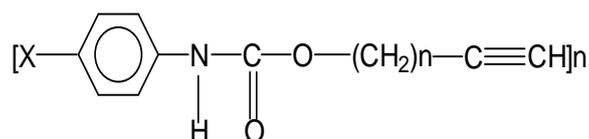
This method is described in the patent literature, but the conditions of the process, methods of separation of reaction products and thermodynamic interactions are not given. The conditions of re-assurance in two stages: in solvents and in urea liquids have also been studied. As a result, the temperature limit of the reaction was studied. It has been shown that the optimum temperature for reassurance is in the range of 140-160°C. It was found that the synthesis of N, N'-dibutyl urea can be carried out both periodically and continuously. Compounds with formulas I and II were synthesized.



Structures I and II were confirmed by IR-, PMR-spectra, and element analysis data. The biological activity shows that the results of the studied test show that while I exhibits insecticidal properties, II exhibits herbicide effect.

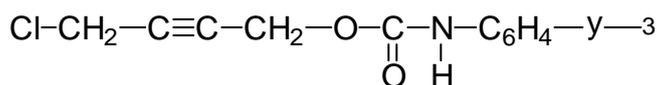
Emulsion extraction of isoprenoids in plant raw materials and the use of pulsation technology for the production of substances with regulatory properties have been demonstrated. Polyene alcohols, a substance that carries the function of transporting hydrophilic particles through the cell membrane, have been isolated. These substances serve as the basis for the creation of substances that have a wide range of effects against fast-healing viruses. Triterpenic acid was isolated from pine leaf litter. Na, K, Cu- salts of these acids were obtained and preparations were made on their basis.

Compounds with the following formula used as an active ingredient in the herbicide composition are proposed.



11 compounds with the following formula were synthesized by the authors, between these carbamate groups and between the benzene ring, between systems of tertiary bonds of X=N, NO<sub>2</sub>, CH<sub>3</sub>O-, N(CH<sub>2</sub>)<sub>2</sub> different electronic nature, (n=3,6,7,9) are available. Primary acetylene carbamates were obtained from n-x-n-x-C<sub>6</sub>H<sub>4</sub>-N=C=O or HC≡C(CH<sub>2</sub>)<sub>n</sub>OH in TGF in the presence of Bu<sub>2</sub>Sn[OOCCEtH-Bu]<sub>2</sub> and Et<sub>3</sub>N.

The American patent [5] cites in the study the general formula of active compounds as selective herbicides:



Compared to the control, the effect on tomato root system growth was 170.7% and 148.8%, while the effect on body growth was 156.1% and 138.8%, respectively. The effect of a similar drug XM-1 hexamethylene-bis [(methyloilo) carbamate] on tomato body growth was 127.6% in 0.001% league and 134.2% in root growth.

The drug XM-2 hexamethylene-bis [(ethanoilo-carbamate)], when tested in tomatoes, had an effect on root and body growth of 125.9% and 127.6% at 0.01%, and 0.001% at 134.2 and 127, respectively. , 6%. XM-4 accounted for 163.4% of root growth at 0.1%, XM-6 accounted for 148.8% of root growth at 0.001%, and body growth at 130.1%.



The table shows that the biostimulatory properties of the drugs showed high effects, despite the fact that they are much more diluted than the drug currently used in agriculture [7].

In summary, the systematic testing of biopreparations, seed processing, the use in agriculture of biologically active organic compounds that regulate growth when sown in plants during the growing season, and methods of their synthesis, as well as the severity of the ecological situation, the development of bioregulators.

## REFERENCES

1. Oily Joel, Ambush Jean-Louis. *On the same path of selective polucheniya N-alkyl- N-nitrosomochevin* // *J. Euro. Med. Chem.* -1998. №3. -P. 211-213.
2. Moszczyński Wicław. *Pesticide activity of arilovyx ethers N-alkylcarbamic acid.*- *Pranauk .: Ingot. Organ.* 2005. P -53-58.
3. Sitoris V., Sunak J., Cipinova H. *The acquisition of ethylene ethers and carbamates in the study of pesticides* // *Shem. Zvesti.* 2011. 23. № 1. - P. 41-52.
4. *Synthesis of cyclic sulfamylcarbamates and urea cherez metathesis with zamykaniem cycle.* // *Douhery Joseph M., Jimenes Mari, Hanson Paul R. Tetrahedron.* - 2015. - 61.- № 26. - P. 6218-6230.
5. 85. *Patent SSHA, MPK7 №209 / 82. Carbamate inhibitors of the Caspian Sea and their application* / *Bebington David, Knegetel Ronald, Mortimore Michael, Kay David, Golec Julian M.C.*// *Referatnye ximicheskij journal.*- 2004. №2. - P. 254.
6. *Maxsumov A.G., Xatamova M.S., Ataxadjaeva M.A. Technology of production of hexamethylene bis [(methyloyl)-carbamate] and ego chemical properties* // *Control and management of chemical technology.*- Tashkent, 2012.- №2.-B. 22-28.
7. *Khatamova M.S., Maxsumov A.G. Bezotkhodnaya technology polucheniya rostostimulyatora rasteniy bis-karbamata* // *Ximicheskaya technology.*- Moscow, 2012. Tom1. – P.192-193.



# THEORETICAL PROBLEMS OF COGNITOLIGY AND COGNITIVE LINGUISTICS

**Atabayeva Zarnigor Bakhran kizi**

*ESP teacher of Samarkand Branch of Tashkent State University of Economics*

## ANNOTATION

*The article is devoted to the development of cognitive linguistics, its aims, subject and the connection with other sciences. The main branches of modern cognitive linguistics are also classified.*

**KEY WORDS:** *cognitology, cognition, categorization, classification, cognitive linguistics, encode, verbalisation*

## DISCUSSION

In recent years, the study of the real functioning of the language brings linguistics to a new level associated with the cognitive activity of a person, his individual and social life. This is due to the expansion of the boundaries of linguistics.

At the end of the twentieth century. The development occurred in a large number of disciplines related to the study of receiving, processing and storing information.

XXI century. the emergence of cognitology, which has been intensively developing in recent years, is emerging, which is explained by the emerging interest in the processes of obtaining and processing information taking place in the human brain.

The definition of cognitology is concerned by most several researchers, according to which it is a science "about knowledge and cognition, about the results of the perception of the world and the subject-cognitive activity of people, collected in the form of meaningful and given in a certain system of data, which -that way they are depicted in our consciousness and form the basis of mental, or cognitive, processes of thinking"[5].

The aim of cognitology is to track how the processes of perception, categorization, classification and understanding of the world are carried out, how knowledge increases, which systems provide various types of activities with information" [1].

So, cognitology is an independent area of knowledge, the subject of which is the acquisition, processing and use of information by a person.

Having arisen as a science about knowledge and its representation, cognitology integrates many scientific disciplines: philosophy, logic, psychology, linguistics, culture science, neurophysiology. This is necessary to gain a complete understanding of the human mind.

Due to the fact that the mind has been the subject of attention of scientists since ancient times, cognitology has a rich prehistory. "Human intelligence, patterns of thinking, sources of knowledge and processes of its attainment - all of this has long been the subject of such sciences as philosophy and logic, psychology and biology. In philosophy, there is a special section dedicated to the theory of knowledge, in which gnoseological problems are investigated - the problems of the possibilities of cognition, the relation of knowledge to reality, questions of the truth and falsity of knowledge, etc. Within the framework of cognitive science, all these questions sound differently and arise in connection with the emergence of new paradigms of scientific knowledge in modern science" [10].

The beginning of cognitive science occurs in the 40s-50s. XX century. The best scientists from Germany and all of Europe were gathered in the USA [1]. "During a war, it becomes clear that for the successful conduct of hostilities, with the interaction of various subunits, combat arms and associate



armies, it is superior to make quick decisions to coordinate joint actions. That is why, the posers of communication and fast information processing turn out to be extremely important" [10]. The US government and the US Department of Defense provide scientists with huge amounts of money for scientific research, including the study of fast and effective communication, to develop perfect communication channels.

At the same time, the famous physicist R. Oppenheimer, director of the American Institute for Fundamental Research in Princeton, conclude that man has a powerful impact of everything that happens in physics. Accordingly, there is a need to determine the level of human influence on the solution of a particular problem. To discuss these issues R. Oppenheimer invited psychologists (J. Miller), cybernetics (N. Wiener), specialists in mathematical modeling, information theory, linguists (R. Jakobson) [10].

An attempt to find out what a person is, how he programs his actions, what depends on him in science, generated to the emergence of an anthropocentric paradigm of scientific knowledge, which turns from a simple description of scientific problems and phenomena to an understanding of the role of a person. century and his consciousness.

This is how the need increased to study ordinary human consciousness in order to understand what processes a person carries out, cognizing and understanding the world. As a result, psychologists came to the study of mental, thought processes, which later were called cognitive processes.

Scientists also drew attention to the fact that language occupies a special place in the processing of information coming to a person. It is the level at which information is processed, conceptualized, associated, categorized and classified. Therefore, it is linguists who must account for how these processes take place. An understanding is formed that the best access to consciousness is not only observation of the subject-cognitive activity of a person, but also study of language as a form of expression of thought processes.

It is through language that a person receives basic information about the world, it is in language that he reflects this information. There are certain cognitive processes behind all this that needed to be investigated. This factor determined the emergence and development of cognitive science.

Cognitive linguistics arises as a scientific direction that answers the same questions as cognitive science, only in their direct connection with language. The most important aspect of the connection between cognitive science and linguistics is that part of linguistics that falls on the study of semantics, the meaning of linguistic forms and

expressions. After all, the meaning itself is defined as a cognitive phenomenon, and any data about this phenomenon - as shedding light on the structures of consciousness and their internal structure. Among these structures, verbal and non-verbal are distinguished. The most essential of the representations of our brain and the existing structures of consciousness are those that depict the structures of consciousness with the help of linguistic signs [5].

The birth of cognitive linguistics was officially announced in the spring of 1989 in Duisburg at a symposium arranged by René Dirven and other European scholars. It announced the creation of the International Association for Cognitive Linguistics, the preparation of the journal "Cognitive Linguistics" and a series of monographs "Research in Cognitive Linguistics". In the first issue of the magazine

"Cognitive linguistics" the tasks of the new linguistic direction were defined as follows: study of language as a means of organizing, processing and carrying information. At the same time, cognitive linguistics is based on the study of the conceptual and empirical base of linguistic categories and concepts. Linguistic forms are studied not by themselves, but from the attitude of how they reflect a certain vision of the world by a person and the ways of its conceptualization in language, general principles of categorization and mechanisms of information processing from the point of view of how they reflect the entire cognitive background of a person, as well as the influence of the environment [10].

The formation of modern cognitive linguistics is affiliated with the works of American linguists J. Lakoff, R. Langacker, R. Jakobson, in whose works we find statements about how information enters the human brain and how it is processed, encoded and verbalized ... R. Jakobson considers linguistic meaning as a mentally coded information structure, and J. Lakoff says that the cognitive system produced by language is made up of imaginative perception, cognitive images and images of cultural realities [7].

The works of these scientists and the development of the problem of cognitive linguistics are considered in detail and characterized in the works of E.S. Kubryakova, which formed the basis of cognitive linguistics in Russia.

In Russian linguistics, despite the fact that cognitive linguistics has developed in the last decades of the twentieth century, language was believed in the first theoretical works on linguistics from the point of view of its connection with thinking.

The task of cognitive linguistics is "to describe and explain the internal cognitive structure and dynamics of the speaker / listener. The speaker /



listener is considered as a system of information processing, consisting of a finite number of independent components ... and correlating linguistic information at different levels.

The goal of cognitive linguistics is the study of the system and the concern of its most important principles, and not just a systematic reflection of the phenomena of language. It is crucial for the cognitive scientist to understand what the mental representation of linguistic knowledge should be and how this knowledge

Is "cognitively" processed, i.e. what is the "cognitive reality" [10].

Today, there are a large number of scientific schools and areas of linguo-cognitive research, which are classified in different ways by linguists.

Z.D. Popova and I.A. Sternin give the following classification of the main schools and directions of modern cognitive linguistics:

- culturological - the study of concepts as elements of culture based on data from different sciences (Yu.S. Stepanov);
- linguocultural - the study of concepts named by linguistic units as elements of national linguoculture in their connection with national values and national characteristics of this culture (V.I. Karasik, S.G. Vorkachev, G.G. Slysh-kin, G.V. Tokarev);
- logical - the analysis of concepts by logical methods, regardless of their linguistic form (ND Arutyunova, RI Pavilionis);
- semantic-cognitive - the study of the lexical and grammatical semantics of the language as a means of access to the content of concepts, as a means of modeling them from the semantics of the language to the concept sphere (ES Kubryakova, NN Boldyrev, EV Rakhilina, E. V. Lukashevich, A. P. Babushkin, Z.D. Popova, I. A. Sternin, G. V. Bykova);
- philosophical and semiotic - the cognitive foundations of sign are investigated (AV Kravchenko) [9].

A.V. Rudakova identifies the following main schools and areas of modern cognitive linguistics:

- general conceptual approach of the Moscow school. Representatives: E.S. Kubryakova, V.Z. Demyankov, Yu.S. Stepanov, Yu.N. Karaulov, D.S. Likhachev, Yu.A. Sorokin, E.V. Rakhilina, R.M. Frumkina, A.N. Baranov, D.O. Dobrovolsky and others;
- psycholinguistic approach. Representatives: I.N. Gorelov, N.I. Zhinkin, A.A. Zalevskaya and others;
- a prototypical approach to the study of the cognitive aspects of the language units of the Tambov school. Representatives: N.N. Boldyrev, T.A. Fesenko, E.V. Miloserdova, N.I. Kolodin, E.M. Pozdnyakova, A.L. Sharandin, I.V. Mironova, S.V. Ivulgina, E.L. Kochkina, S.G. Vinogradov and others;

• lexical and semantic approach in the study of the conceptual content of language units of the Voronezh school. Representatives: Z.D. Popova, I.A. Sternin, A.P. Babushkin, V.Yu. Koprov, G.V. Bykova, L.I. Grishaeva, A.A. Kretov, V.M. Toporov, V.I. Ubiyko, V.B. Goldberg, O.V. Ivashenko, E. D. Khaustova and others;

• discourse analysis. Representatives: A.A. Kibrik, L.V. Tsurikova, O. N. Charykov, V.I. Karasik and others;

• a culturological approach to considering the problems of knowledge representation. Representatives: Yu.S. Stepanov and others;

• linguistic and cultural approach to the study of knowledge representation of the Volgograd school. Representatives: V.I. Karasik, G.G. Slyshkin, N.A. Krasavsky, N.F. Alefirenko, S.G. Vorkachev, A.A. Khudyakov, E.N. Egina, M.V. Milovanov and others;

• gender analysis of the representation of conceptual structures in the mind. Representatives: A.V. Kirilina and others [10]. IN AND. Karasik, within the framework of the cultural research of the language, identifies the following areas: identification of the national and cultural specifics of the use of the language (Vorkachev, Vezhbitskaya, Prokhorov, Telia, Vorobiev, Maslova, Snitko, Bizheva, Klovov, Krasavkiy, Evsyukova); study of ethnocultural features of language and speech within the framework of linguistic and regional studies (Vereshchagin, Kostomarov, Tomakhin, Oshchepkova), ethnolinguistics (Gerd, Kopylenko, Tolstoy), ethnopsycholinguistics (Sorokin), the theory of intercultural communication (Kabakchi, Shamne, Leontovich ) [2]. So, today, despite different understandings, cognitive linguistics

Is a branch of linguistic functionalism, which believes that the linguistic form is derived from the functions of language, since cognitive linguistics is associated with the belief that "the linguistic form is a reflection of cognitive structures, that is, the structures of human consciousness, thinking and cognition"[4]. The main categories of cognitive linguistics are concept, categorization, conceptualization, concept sphere.

## REFERENCES

1. Boldyrev N.N. *Conceptual space of cognitive linguistics / N.N. Boldyrev // Issues of cognitive linguistics. – 2004. - №1, p. 18 – 36.*
2. Karasik V.I. *Transmitability of concepts / V.I. Karasik // Concept verbalizing problems in language and textual semantic: 2 vol. – Vol. 2. The theses of reports. – Volgograd, 2003. – P. 17 – 19.*
3. Karasik V.I. *Language circle: personality, concepts, discours / V.I. Karasik. – Volgo- grad: Peremena, 2002. – 477 p.*
4. Kibrik A.A. *Cognitive research on discours / A.A.*



- Kibrik // Issues of linguistics. – 1994, №5. – P. 126 – 139.*
5. *Koubryakova E.S. Initial stages of cognitivism development: linguistics – psychology – cognitive science / E.S. Koubryakova // Issues of linguistics.– 1994. - № 4. – P. 26 – 45.*
  6. *Koubryakova E.S. Cognitive linguistics and the problem of composition semantic in word formation sphere / E.S. Koubryakova // The Intelligence of RAS. – Literature and language section. – 2001. - №1. – P. 13 – 24.*
  7. *Koubryakova E.S. On cognitive linguistics and the meaning of the term “cognitive” /*
  8. *E.S. Koubryakova // The Bulletin of VSU. Linguistics and cross-cultural communication. – 2001. - №1. – P. 3 – 9.*
  9. *Koubryakova E.S. On the aims of cognitive science and urgent problems of cognitive linguistics / E.S. Koubryakova // Issues of cognitive linguistics. – 2004. - №1. – P. 6 – 17.*
  10. *Popova Z.D., Sternin I.A. Sketches on cognitive linguistics / Z.D. Popova, I.A. Sternin.*
  11. *– Voronezh, 2003. – 191 p.*
  12. *Roudakova A.V. Cognitology and cognitive linguistics / A.V. Roudakova. – Voronezh, 2004. – 80 p.*



# STUDENTS PERCEPTION ON EDUCATIONAL LOAN WITH SPECIAL REFERENCE TO COIMBATORE DISTRICT

**Mr. Nishanth Kumar H<sup>1</sup>, Ms. P.Maheswari<sup>2</sup>**

<sup>1</sup>*Student of III B.com, Department of commerce, Dr. N.G.P Arts and Science College (Autonomous), Kalapatti Road, Coimbatore- 641 048*

<sup>2</sup>*Assistant Professor, Department of Commerce, Dr. N.G.P Arts and Science College (Autonomous), Kalapatti Road, Coimbatore- 641 048*

## ABSTRACT

*This project is about the students perception on educational loan with special reference to Coimbatore district. The data has been collected from 115 students in Coimbatore district by applying convenient sampling technique. Statistical tools such as percentage analysis, chi-square analysis, weighted score analysis and ranking analysis have been used to analyse the data. The study has attempted to cast light on the students perception towards educational loan with reference to Coimbatore district.*

**KEYWORDS:** Loan, Students, Education.

## INTRODUCTION

Education is the process, which enables an individual to adjust himself to the environment. A present day economist is inclined to think "EDUCATION" as a process which makes man economically creative member of the society. The subject matter of education is more important. The word "Education" is derived from the Latin educate, meaning "To nourish" or "To rise". University provides not only trained manpower but also improve, functional efficacy of more engaged in different kinds of productive work, that i.e., it makes values contribution to the acceleration of development. Education is vital to human resource and their empowerment in any country.

## STATEMENT OF THE PROBLEM

Cost of the students find so different to just enter into the Field of education from which they can gain more Knowledge. Some more students discontinue their Education because of lack of money to meet the cost of Education. The problem of the money, which prevails among the students in solved to the

nationalized and Private sector banks come forward to grant the educational Loan to the need subject to some condition.

## OBJECTIVES

- To know the source of awareness towards educational loan among the students.
- To study the various factors that influences the students to avail the educational loan.

## SCOPE OF STUDY

The study will be beneficial to the students and banks for the timely disbursement of adequate finance to the needy students so that they can attain their higher education dream in this globally competitive environment. By understanding the needs of the students and benefits of quality education, granting loans for higher education, which should be seen as an investment for economic development and prosperity. The results of the study would act a feedback to the regulators so that they can correct their pitfalls and thereby they can motivate the Indian banks in



implementing the educational loans scheme, without hurting the interest of the students. The present study incorporates all the important aspects related to educational loan in student perspectives.

**RESEARCH METHODOLOGY**

In this study have been comprised both descriptive & analytical methods. The Primary data have been collected from the respondents are beneficiaries of the study. The secondary data have collected from the journals, magazines, newspaper, website and so on.

- **Sampling Design**  
The researcher has been collected the data from 115 respondents in students perception on educational loan in Coimbatore city.
- **Geographical Coverage**  
This study covered in Coimbatore city only.

**LIMITATION OF THE STUDY**

- Geographical area is restricted to Coimbatore District
- The sample size has been restricted to only 115 respondents for educational loan availed from both public and private sector banks due to time
- The study does not include the aspects of

- *M. Jayadev “An Analysis of Educational Loans”* Economic and Political Weekly, Vol. 52, Issue No.51, December 2017
- P. Geetha Rani “Financing Higher Education and Education Loans in India Trends and Troubles”, Journal of Social Sciences, December 2016

**ANALYSIS AND INTERPRETATION**

**AWARENESS ABOUT EDUCATIONAL LOAN**

FACTORS	NO OF RESPONDENTS	PERCENTAGE
Friends and relatives	29	25.2
Advertisement	40	34.8
Educational institutions	41	35.7
Bankers	5	4.3
<b>Total</b>	<b>115</b>	<b>100</b>

Source: Questionnaire

**INTERPRETATION**

The above table shows that how the respondents come to know about educational loan.25.2% of them know by friends and relatives,34.8% of them know by

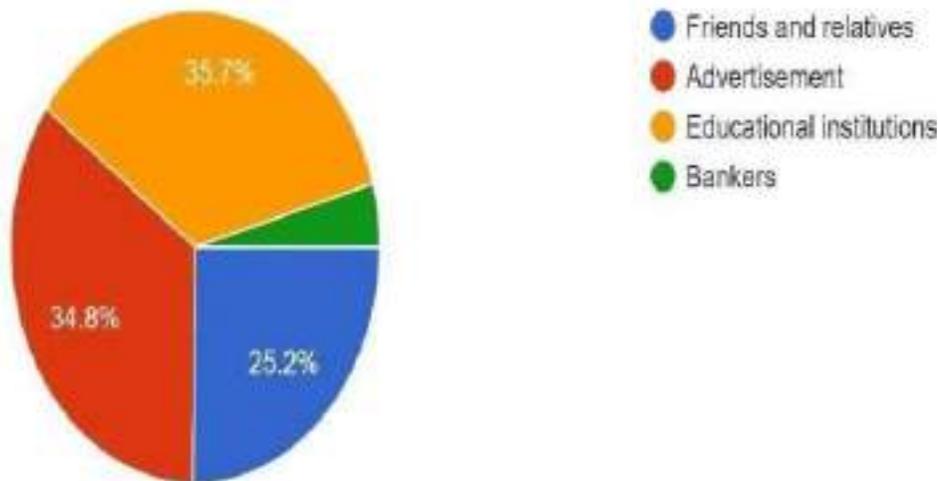
repayment of loan and the students availed educational loan in India to study abroad.

**LITERATURE REVIEW**

- **Jayadev.M(2017)34**, in the article titled “ An Analysis of Educational Loans”, found that educational loans are a relatively new phenomenon when it comes to funding higher education in India. There has been a significant rise in the volume of outstanding educational loans with an annual growth rate of 12% since March 2008. Banks are concerned about increasing non-performing assets with respect to educational loans. This paper argued for a statutory framework that addresses all aspects of funding higher education through loans and scholarships.
- **Geetha Rani. P (2016.)33**, in the article titled “Financing Higher Education and Education Loans in India Trends and Troubles “, attempts to investigate the trends in financing higher education which convey that student loans is the dominating source of financing higher education in India. It is concluded that fees, scholarships and student loans need to be examined in the context of increasing cost and role of markets in higher education along with affordability within the domain of family characteristics.

advertisement,35.7 of them know by educational institutions, 4.3% of them know by bankers.

**Majority of 35.7% of them know by educational institutions**



#### CATEGORY OF BANK FROM WHICH EDUCATIONAL LOAN AVAILED

CATEGORY OF BANK	NO OF RESPONDENTS	PERCENTAGE
Public sector	55	47.8
Private sector	60	52.2
<b>Total</b>	<b>115</b>	<b>100</b>

Source: Questionnaire

#### INTERPRETATION

The above table shows category of bank from which the education loan is availed by respondents. 47.8% are public sector banks, 52.2% are private sector banks.

**Majority of 52.2 % of respondents availed education loan from private sector banks**

#### NO. OF VISIT TO BANK

NO OF VISIT	NO OF RESPONDENTS	PERCENTAGE
Less than 3 times	38	33
3 to 4 times	45	39.1
4 to 5 times	26	22.6
Above 5 times	6	5.2
<b>Total</b>	<b>115</b>	<b>100</b>

Source: Questionnaire

#### INTERPRETATION

The above table shows the no of visit to the bank by respondents for getting loan. 33% of them visited less than 3 times, 39.1% of them visited 3 to 4 times, 22.6% of

them visited 4 to 5 times. 5.2 % visited above 5 times.

**Majority of 39.1 % of the respondents visited to the banks 3 to 4 times for sanctioning the loan**



### CHI SQUARE ANALYSIS

#### RELATIONSHIP BETWEEN PARENTAL OCCUPATION AND SOURCE OF INCOME TO BEGIN THE COURSE TILL THE SANCTIONING OF LOAN

S.NO	OCCUPATION	SOURCE OF INCOME TO BEGIN COURSE TILL SANCTIONING OF LOAN				TOTAL
		Family savings	Borrowing from money lenders	Friends and relatives	Financial institution	
1	Daily wages	6	7	4	0	17
2	Government employees	9	15	8	2	34
3	Private employees	5	21	10	6	42
4	Business	11	8	3	0	22
	<b>TOTAL</b>	<b>31</b>	<b>51</b>	<b>25</b>	<b>8</b>	<b>115</b>

To find out the association between the parental occupation and source of income to begin course till the sanctioning of loan to the respondents, chi square test is used and result is given below.

#### HYPOTHESIS

There is no significant between parental income and source of income to begin the course till the sanctioning of loan to the respondent.

### CHI-SQUARE TEST

Factor	Calculation value	Df	Table value	Remarks
Parental occupation	15.798 <sup>a</sup>	9	16.92	Accepted

#### INTERPRETATION

It is clear from the above table show that, the calculated value of chi-square at 0.05% level is more than the table value. Hence the hypothesis is accepted. So there

is no significant relationship between occupation and source of income to begin course till the sanctioning of loan to the respondents.

### WEIGHTED AVERAGE ANALYSIS

#### LEVEL OF AWARENESS REGARDING TO THE FOLLOWING ASPECTS OF EDUCATIONAL LOAN

FACTOR	1(5)	2(4)	3(3)	4(2)	5(1)	TOTAL	MEAN SCORE
DOCUMENTATION PROCEDURE	55	42	11	2	5	115	4.217
	275	168	33	4	5	485	
REPAYMENT SCHEDULE	15	60	32	6	2	115	3.695
	75	240	96	12	2	425	
RATE OF INTEREST	36	23	46	3	7	115	3,678
	180	92	138	6	7	423	
TIME TAKEN FOR LOAN SANCTIONED	24	46	31	11	3	115	3.669
	120	184	93	22	3	422	
BORROWING LIMIT	39	21	39	6	10	115	3.634
	195	84	117	12	10	418	



**INTERPRETATION**

The above table shows the level of awareness regarding the following aspects of educational loan.

Documentation procedure has the highest mean score of **4.217**.

**RANKING ANALYSIS**

**FACTORS INFLUENCING AVAILING EDUCATIONAL LOAN**

FACTOR	1(5)	2(4)	3(3)	4(2)	5(1)	TOTAL	RANK
FAMILY CONDITION	54	38	23	7	3	115	I
	270	152	69	14	3	508	
LATER REPAYMENT	12	60	32	10	7	115	III
	60	240	96	20	7	423	
LOW RATE OF INTEREST	36	23	53	9	8	115	II
	180	92	159	18	8	457	
ADVERTISEMENT	20	49	34	12	10	115	IV
	100	196	102	24	10	432	
BORROWING LIMIT	31	29	45	7	10	115	V
	155	116	135	14	10	430	
EXPENSES COVERED	24	35	37	17	8	115	VI
	120	140	111	34	8	413	
LOAN AVAILABLE FOR STUDY IN ABROAD	20	37	40	13	10	115	VII
	100	148	120	26	10	404	

**INTERPRETATION**

The above table shows the factors influencing to avail educational loan.

Family condition ranks first, Later repayment ranks II, Low rate of interest ranks III, Advertisement ranks IV, Borrowing limit ranks V, Expenses covered ranks VI, Loan available for study in abroad ranks VII.

**FINDINGS**

- Majority 53% of respondents are male
- Majority 38.2% of respondents are between 16-20 years and between 20-25 years
- Majority 71% of the respondents are unmarried
- Majority 51% of them are from urban area
- Majority 41.7% of them have 3 no of earnings in their family
- Majority 36% are private employees
- Majority of respondents 40% of their annual income is 1,00,000-2,00,000
- Majority of 72% of the respondents are first graduate in their family
- Majority of 35.7% of them know by educational institutions
- Majority of 31.3% of them motivated by advertisement
- Majority of 42.6% of them visited the bank less than 3 times
- Majority of 52.2% of the respondents availed educational loan from private sector banks
- Majority of 34.8% of the respondents availed the loan amount of 2,00,000-3,00,000
- Majority of 40% of the banks took 1 to 2 months



for processing loan

- Majority of 32.2% of the respondents availed loan for less than 5%
- Majority of 39.1% of the respondents visited to the banks 3 to 4 times for sanctioning loan
- Majority of 44.3% of the respondents borrowed from money lenders for source of income till sanctioning loan
- Majority of 42.6% of the respondents sanctioned 50 to 60% of loan amount
- Majority 48.7% of the respondents recommend educational loan to others sometimes

### CHI SQUARE ANALYSIS

- The hypothesis is accepted. So there is no significant relationship between occupation and source of income to begin course till the sanctioning of loan to the respondents.
- The hypothesis is rejected. So there is a significant relationship between annual income and amount of loan availed by the respondents.

### RANK ANALYSIS

Ranking analysis shows the factors influencing to avail educational loan. In that majority of the respondents availed educational loan because of their family condition.

### WEIGHTED AVERAGE ANALYSIS

1. Documentation procedure has a high mean score of **4.217** in level of awareness about educational loan
2. Rules and regulation of RBI has the highest mean score of **4.365** in level of opinion with banking policy
3. CIBIL score plays a vital role in educational loan has the highest mean score of **3.834** in problems faced in availing and repayment of educational loan

### Websites

- [www.google.com](http://www.google.com).
- [www.wikipedia.com](http://www.wikipedia.com).

### SUGGESTIONS

- Government and Aided college students have got the highest benefit of loan when compared to the self-finance colleges. Hence it is suggested that certain Necessary steps can be introduced to create awareness and to provide services on educational loan among self finance college

students.

- It is suggested that the banker should create more awareness through various sources of media about the factors considered for sanctioning education loan that the students are unaware of various aspects like period for loan processing, eligibility Criteria, Adequacy of loan sanctioned, repayment schedule, third party guarantee, expenses covered, RBI rules and regulations and collateral securities.
- The Government should initiate more schemes for education loan to promote higher education.

### CONCLUSION

Education is the backbone of a cultured society, but it has become more commercial or money-making and in order to ensure the best possible education, it is an expensive affair, because the Aided, the Government and the Self-financing colleges follow different fee level from their students. At the same time all the students are not supportive of this fee structure. So, there is a need of educational loan for their studies. The current study attempts to focus on student education loan through banking services which includes the role of various banks in providing education loan services and its effect on the education system of India.



# A STUDY ON CUSTOMER SATISFACTION ABOUT BIG BASKET WITH SPECIAL REFERENCE TO COIMBATORE CITY

DRNGPASC 2020-21 COM121

*\*Chandru.S, \*\*Mr. K. Ponnunani*

*\*Student, Department of Commerce, Dr. N.G.P Arts and Science College, Coimbatore- 48.*

*\*\*Assistant Professor, Department of Commerce, Dr. N.G.P Arts and Science College, Coimbatore- 48.*

## ABSTRACT

*In this growing world, Internet plays a major role. With the rising trend of this internet services, many new online businesses has been launched and are growing vastly. When it comes to online grocery shopping, earlier, people preferred buying at stores, however internet development has changed that and now-a-days people tend to purchase grocery online. Here we speak about India's largest online grocery shopping platform Big Basket and its customer satisfaction. This study reveals expectations of customers while buying groceries online and how it helps them in their routine and its other few factors influencing them to purchase online. The study has been carried out with 150 respondents within Coimbatore city.*

**KEYWORDS:** *Internet, Rising Trend, Big Basket, Online Grocery shop.*

## INTRODUCTION

Over the past two decades, the Indian e-commerce sector has witnessed a rising trend. Major factors that have led to this rise are increasing net convenience and internet penetration. Also, growing acceptableness of on-line payments and favourable demographics has modified the approach corporations communicate, act and do business with customers. It has altered the approach of how the Indian e-commerce sector works. The buying behavior of people has changed significantly from brick and mortar to click and mortar or what we call asetailing. In the early years e-commerce was considered to be an aid to the business. In the meantime it has become more or less business enabler. The emergence of e-commerce also significantly lowered barriers to entry in selling many types of goods; many small home-based proprietors are able to use the internet to sell the goods. Established suppliers had to close their shops and had to change their business model to an E-commerce model to stay profitable and in the business.

## STATEMENT OF THE PROBLEM

Indian organized retailing is under transition today, bringing a lot of changes in format of retailing. In this regard measuring customer satisfaction in organized „Big basket online store study taken in Coimbatore, preferences and experiences will be of use to shape the online store and their offerings. The changing attitude of consumers led them to step forward from unorganized retail stores to the organized online grocery shopping formats.

## OBJECTIVES OF THE STUDY

- To study the socio-economic characteristics of the respondents.
- To study attitude of customers towards online grocery shopping.
- To find out the preferences of the consumer regarding the attributes of online shopping in big basket.
- To identify the issues faced by the user while online grocery shopping in big basket.



- To determine the parameters for choosing the particular shopping Centre for purchase of grocery items.
- To determine whether online grocery shopping will be beneficial and on what factors.

### RESEARCH METHODOLOGY

Research methodology is a way to systematically solve the research problem. It specifies the approach, the researcher intends to use with respects to proposes steady scientifically. The scope of research methodology is wider than that of research methods, thus we talk of the research methodology, we use the context of our research study and explain why we are using a particular methods or technique any why we are not using others so that research results are capable of being evaluated either by the researcher himself or by others.

### TOOLS USED IN THE STUDY

The following tools were used in this study,

- Percentage Analysis
- Chi square analysis
- Weighted average method
- Ranking Analysis

### LIMITATIONS OF THE STUDY

- The research does not cover the whole market of Coimbatore.
- The bias of the respondents may pose as a limitation of the study.
- The sample size was confined to hundred respondents keeping in view time and cost constraints.
- The survey was conducted only in urban sectors respondents. Thus it cannot be generalized.
- Due to constraints in depth research work could not be carried out.

### REVIEW OF LITERATURE

Vellido et al. (2019), pointed out in his research, that there are nine factors associated with user's perception of online shopping. Among those factors the risk perception of users was demonstrated to be the main discriminator between people buying online and people not buying online. Other discriminating factors were control over, and convenience of, the shopping process, affordability of merchandise, customer service and ease of use of the shopping site.

Bhatnagar, Misra, and Rao (2019), in their recent study made an attempt to study the risk, convenience and Internet shopping behaviour. They

found that marital status has no effect on purchase behavior and found mixed results based upon gender (except for specific gender-related products), years on the Internet, and age.

### ADVANTAGES OF ONLINE GROCERY SHOPPING

- There are many advantages of purchasing grocery online shopping as opposed to shopping from a traditional grocery store:
- The primary benefit of online grocery shopping is convenience. By ordering online, one can quickly search for the products the customer needs and order them without having to physically walk through expansive aisles.
- It also saves travel expenses and time going to the grocery store. Considering the wide availability of the Internet.
- It also means grocery shopping can be done from remote locations or in the middle of doing other tasks. For instance, using an online grocery store can allow a person to do all grocery shopping during the lunch break at work.
- It is also very useful for those without a car or who may be physically unable to move around easily, since the food is delivered right to their doors.
- Customers can shop anytime they want, at their own convenience, 24 hours a day, 7 days a week.

### DISADVANTAGES OF ONLINE GROCERY SHOPPING

- Perhaps the largest disadvantages of shopping online are that it costs extra money, since food must be delivered, and that the food ordered is not obtained immediately.
- If someone were making a certain recipe and discovered he needed an additional ingredient, he would probably not be able to order it online and get it quickly enough to finish his dish. In the same way, it forces a person to plan his food buying in advance of when he will need it-if delivery will take a day or two, a person needs to plan to have an extra day or two of essential foods available before he runs out.
- Another disadvantage is that online shopping forces the customer to be home during a certain period to collect the food when it is delivered.
- Also, online grocery stores will often only cover specific delivery areas.



## DATA ANALYSIS AND INTERPRETATION

The analysis and interpretation of the study is based on the response fetched from a sample of 150 respondents.

1. Simple percentage analysis
2. Chi-square Analysis

### 1. SIMPLE PERCENTAGE ANALYSIS

**TABLE NO: 1  
SHOPPING ITEMS**

S.No	Shopping items	Number of Respondents	Percentage (%)
1	Fruits	12	8
2	Vegetables	33	22
3	Grocery items	66	44
4	All of the above	39	26
	<b>Total</b>	<b>150</b>	<b>100</b>

#### INTERPRETATION

The above table shows that 8% of the respondents say their shopping item is Fruits, 22% of the respondents say Vegetables, 44% of the respondents say Grocery items and 26% of the respondents say All the above.

#### INFERENCE

**Here mostly 44% of the respondents say their shopping item is Grocery items.**

**TABLE NO: 2  
PAYMENT MODE**

S.No	Payment mode	Number of Respondents	Percentage (%)
1	UPI	78	52
2	Debit card	34	23
3	Credit card	22	15
4	Cash	16	10
	<b>Total</b>	<b>150</b>	<b>100</b>

#### INTERPRETATION

The above table shows that 52% of the respondent's payment mode is UPI, 23% of the respondent's payment mode is Debit card, 15% of the respondent's payment mode is credit card and 10% of the respondent's payment mode is cash.

#### INFERENCE

**Here majority 52% of the respondent's payment mode is UPI.**



## CHI-SQUARE ANALYSIS

**TABLE NO: 3**  
**ANALYSIS BETWEEN SHOPPING ITEM AND OPINION ON PACKAGE**

### NULL HYPOTHESIS (H0):

There is no significant relationship between shopping item and opinion on package.

### ALTERNATIVE HYPOTHESIS (H1):

There is a significant relationship between shopping item and opinion on package.

Package Item	Highly satisfied	satisfied	Neutral	Dissatisfied	Highly Dissatisfied	Total
Fruits	4	26	11	2	1	44
Vegetables	1	2	3	3	4	13
Grocery items	23	22	9	4	3	57
All of the above	17	6	2	2	5	32
<b>Total</b>	45	56	25	11	13	150

### Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	25.211 <sup>a</sup>	8	.006
Likelihood Ratio	27.320	8	.005
Linear-by-Linear Association	4.325	1	.034
N of Valid Cases	150		

7 cells (46.7%) have expected count less than 5. The minimum expected count is 14

### INTERPRETATION

Hence the p value is grater then 0.05, so, null hypothesis is accepted which states that there is no significant difference between shopping item and opinion on package.

### SUGGESTIONS

- Customer like best quality product on any price, so company should add latest technology to their products.
- After sales services is the area where online grocery shopping Company can highly satisfy the existing customer, because they can make more customer through their word of mouth. So online shopping should provide latest and reliable service to their customers.
- Customer's behavior always looks for some extra benefit with purchasing. They demand for affordable price for product and gifts with purchasing.

- They should keep a close eye on competitor strategy.

### CONCLUSION

The analysis can be concluded by saying that all the independent factors that have been identified and studied have significant influence on the overall perception of the consumers which in turn influences their buying behavior. As quality is a major influencing factor, Big Basket should ensure that all the quality parameters like expiry date products, packaging and damaged goods should be controlled to develop the trust of consumers. Also to take advantage of second most influencing factor price, Big Basket should collaborate with maximum payment vendors to offer best price and discounts to its members. Also the benefits provided to the members should be distinct on the volume of purchase to provide varied benefits and privileges. Big Basket is already providing free delivery services and that too at varied time slots but in order to make



the delivery process more efficient it should ensure shorter waiting time and training delivery personnel. In order to break the conventional buying behavior of buying groceries monthly, Big Basket should launch lucrative weekly deals which would prompt the buyers to improve the frequency of purchase.



# **SOCIAL MEDIA AND LEARNING OF BUSINESS SUBJECTS IN SENIOR SECONDARY SCHOOLS IN IKORODU LOCAL GOVERNMENT AREA OF LAGOS STATE**

**Fasae, Felicia Bosede Kehinde**

*Department of Office and Information Management Bamidele Olumilua University of Education,  
Science and Technology, Ikere-Ekiti*

Article DOI: <https://doi.org/10.36713/epra5611>  
DOI No: 10.36713/epra5611

## **ABSTRACT**

*This study investigated social media and the learning of business subjects in some selected secondary schools in Ikorodu Local Government Area of Lagos State. The research design for the study was survey of the descriptive type. Five schools were randomly selected from which 100 students were further randomly selected, forming the sample for the study. A self-structured close ended questionnaire containing the bio-data of the respondents and 10 items eliciting responses on the topic was used. The instrument was validated by experts with a reliability coefficient of 0.87. Data collected were analyzed using descriptive statistics of mean and percentage to answer the research questions while inferential statistics of chi-square ( $X^2$ ) and t-test were used to test the hypotheses at 0.05 level of significance. Findings revealed a significant influence of social networking on students' learning of Business studies and a significant difference in the mean responses of male and female students on the influence of social media. It was concluded that social media has highly contributed towards effective learning of business subjects in Ikorodu Local Government Area of Lagos State. Also, gender influences the use of social media. It was recommended among others that there should be adequate provision of social media facilities by the government for all senior schools to cater for the need of the students and enhance effective teaching; students should be allowed to have access to available social media in the schools such as computers and internet so that they will be familiar with the usage in the school system.*

**KEYWORDS:** *Social Media, Business Studies, Gender, Learning, Senior Secondary School.*

## **INTRODUCTION**

In today's society, especially our generation, social media has become a part of our everyday lives. We have access to all types of information in the palm of our hands through our cellphones, iPads and other handheld devices. They can provide us with a weather forecast in ten seconds or less, e-mails, banking, and most importantly, social media. Social media, such as Facebook, Twitter, etc., has taken the technology world to a whole new level (Tara, 2016).

Amadi & Ewa (2018), in an overview of social media, noted that it has emerged as a term frequently used (and variously defined) to describe different types of communication platforms and electronic ways of interacting. According to Kietzmann (2012), social media is that means that employs mobile and web based technology to create highly interactive platforms via which individuals and community share, co-create, discuss and modifies user-generated content It is a website that does not just give you information but



interact with you while giving you information. It is a group of internet based application that allows the creation and exchange of users generated content.

Academic excellence or achievement plays an important role in an individual placement, be it in the academic institutions or job placement. Due to this, many people are concerned with the ways they can enhance their academic achievement. The role of academic achievement as one of the predictors of one's life success and also in the aspect of academic placement in schools to higher institutions as well as the level of employability in one's career is inevitable (Kyoshaba, 2009).

According to Benson, Filippaios and Morgan (2010), online social network have become increasingly popular in recent years providing a different and user-friendly way to maintain social connections and share information. Social media provides students with a variety of tools for independent work, reflection, construction and collaboration and value resources for using the web as a tool in order to develop their understanding and solve problems, whether in school, at work, or in their private lives. Although today's students are regarded as "net generation students", they only embrace Facebook which they use to connect with people and make new friends. The use of social media in academic activities is far from adequate. Even many lecturers in Nigerian universities are not competent in the use of social media as a teaching tool.

Social media has been with us over time and the effects cannot be overemphasized, especially its use in the classroom. Kist (2012) noted that having social media in the classroom has been a controversial topic for the last several years as many parents and educators have been fearful of the repercussions of having social media in the classroom. As a result, cell phones have been banned from classroom and schools have blocked many popular social media websites. However, despite adult's apprehensions, students are using social media as schools have realized that they need to incorporate these tools into the classroom and rules are changing.

For instance, The Peel District School Board (PDSB) in Ontario in 2013 PDSB introduced a "Bring Your Own Device" (BYOD) policy and have unblocked many social media sites. Fewkes and McCabe (2012) have researched about the benefits of using Facebook in the classroom. They noted that in early 2013, Steve Joordens, a professor at the University of Toronto, encouraged the 1,900 students enrolled in his introductory psychology course to add content to Wikipedia pages featuring content that

related to the course as he argued that the assignment would not only strengthen the site's psychology-related content, but also provide an opportunity for students to engage in critical reflection about the negotiations involved in collaborative knowledge production. However, Wikipedia's all volunteer editorial staff complained that the students' contributions resulted in an overwhelming number of additions to the site, and that some of the contributions were inaccurate. Also, Tara (2016) noted that although we see how it can serve as a positive thing by being a good source of communication, it can also serve as a negative thing such as cyber bullying and the new phrase "cat fishing..

Rabiu (accessed 2021) sees Business Studies as a subject which provides us with the knowledge, understanding and skills needed for productive work or activity. Productive activity involves using business resources to make goods and services that satisfy human needs and wants. Business studies can also be regarded as the study of the methods and techniques of setting up and running a business venture profitably. Business studies learning is important because according to Rabiu (2021), it teaches students how to establish and run businesses (private or public) efficiently; it develops and prepares students for office occupations in future; it equips students with the basic skills with which to begin an occupation, if they do not have an opportunity for further training; it allows students to understand the necessity for the existence of various businesses whereby students are able to differentiate between types of businesses, and it enable students to develop keen interest in various forms of business which they can engage in (set up) after leaving school. The key components or branches of business include Office Practice, Commerce, Book-keeping, Shorthand and Keyboarding.

Social networking sites have been noticed to influence students' learning greatly. For instance, Lau (2012) reported that online social networks help initiate learning activities among students. Students who use online social networks can develop their knowledge based on extensive communications and knowledge sharing from the social network sites. Williams (2008) noticed that the current generations of teens live in a fast-paced technological world with many different types of communication happening all at the same time. For example, he or she may be on the computer on a SNS, while also talking on the phone, sending instant messages to a friend, and emailing someone else all at the same time. Nicole-Ellison (2007) affirmed that teens and teenagers have especially recognized these internet sites to be able to contact their peers,



share information, reinvent their personas, and showcase their social lives. Facebook represents a potentially useful tool in educational contexts, allowing for both asynchronous and synchronous open dialogue via a familiar and regularly accessed medium; supports the integration of multimodal content such as student-created photographs and video and URLs to other texts, in a platform that many students are already familiar with. It also allows students to ask more minor questions that they might not otherwise feel motivated to visit a professor in person during office hours to ask (Moody 2010). It also allows students to manage their own privacy settings, and often work with the privacy settings they have already established as registered users. It is one alternative means for shy students to be able to voice their thoughts in and outside of the classroom. It allows students to collect their thoughts and articulate them in writing before committing to their expression. Further, the level of informality typical to Facebook can also aid students in self-expression and encourage more frequent student and-instructor and student-and-student communication.

Twitter promotes social connections among students as it can be used to enhance communication building and critical thinking. Junco, Heiberger, and Loken (2011) in Tara (2016) completed a study of 132 students to examine the link between social media and students' engagement and social media and grades and found that students in the Twitter group had higher GPAs and greater engagement scores than the control group. Gao, Luo, and Zhang (2012) reviewed literature about Twitter published between 2008 and 2011 and concluded that Twitter allowed students to participate with each other in class (back channel), and extend discussion outside of class. They also reported that students used Twitter to get up-to-date news and connect with professionals in their field. Moran, Seaman and Tinti-Kane (2012) observed that YouTube is the most frequently used social media tool in the classroom as students can watch videos, answer questions, and discuss content. They can also create videos to share with others. Eick and King (2012) found that videos kept students' attention, generated interest in the subject, and clarified course content.

Junco's (2012) study on "Too much face and not enough books: The relationship between multiple indices of Facebook use and academic performance" found that time spent on Facebook and checking Facebook were negatively related to overall GPA, and time spent on Facebook is slightly negatively related to time spent studying. In addition, the ability of time spent on Facebook to significantly

predict overall GPA shows that there may be negative academic effects for students who use Facebook in certain ways. Paul, Baker, Cochran (2012) researched on effect of online social networking on students' academic performance and found a statistically significant negative relationship exists between time spent by students on OSN and their academic performance as time spent on OSN is shown to negatively impact academic performance. As time spent on social networking sites increases, the academic performance of the students is seen to deteriorate.

On the influence of gender influence on usage of social media, it has been observed that results are mixed as to which group spends more time on the Internet as well as on social media networks. Studies have shown that boys have been online more than girls in previous decades because of earlier forms of technology such as video or computer games (Lin & Subrahmanyam, 2007).

According to most research done on the topic, the number of teenage girls and boys who communicate on these social media networks are equally divided. Research has shown that though girls and boys are both likely to have a SNS account, the reasons for the accounts may vary based on gender. For girls, social networking sites are primarily placed to reinforce pre-existing friendships; for boys, the networks also provide opportunities for flirting and making new friends, however, boys are more likely to create an account simply because they are trying to meet a significant other, or because they are already in a relationship with someone who has requested them to join (Bonds-Raacke & Raacke, 2008). In a recent study, it was shown that boys seem to benefit more from social media use and communication technology than girls do (Peter & Valkenburg, 2009).

Merten and Williams (2009) noted that girls are more likely than boys to share personal information about their daily lives as their recent study involving Facebook, MySpace, and Xanga showed that though most teenagers aged 13-17 used these sites for fun and positive reasons, 55% of girls shared personal stories about depression, anxiety, and relationship problems. Only 15% of boys shared any personal information besides their hobbies, interests, and friendships. It was also found that adolescents use SNS when dealing with a death of a peer, and use forums and member profiles to help their grieving process.

As regards the use of social media in schools, social media networks, as well as other new forms of communication technology, are also a concern to many school professionals because of the level of distraction



they create within the school (Greenfield & Subrahmanyam, 2008). Even though many schools have created many strict rules that forbid the use of handheld technology during school activities or that block certain social networking websites, many students are still able to connect during lecture hours as they please. This has caused distractions during instruction time and has had a negative impact on the learning environment.

#### **STATEMENT OF THE PROBLEM**

In spite of the advantages to the use of social media in the classroom, it has been observed that students' learning is being much affected because too much time is dedicated to the social media at the expense of their studies. Khan (2009) observed that social media users often time experience poor performance academically. Similarly, Englander, Terregrossa and Wang (2010) posit that social media users devoted lesser time to their studies in comparison to non-users did. It has been observed that students' learning is facing a lot of neglect and challenges as students at every educational level are being distracted and seem to devote more attention to social media than they do to their studies which have impacted on their academic performance. Students spend their time chatting and making friends via the social media than they focus on their studies.

#### **PURPOSE OF THE STUDY**

The study investigated the influence of social media on:

1. Senior Secondary School students' learning of business subjects in Ikorodu Local Government Area of Lagos State and
2. ascertained the extent to which gender influences the use of social networking.

#### **RESEARCH QUESTIONS**

1. In what ways does social networking influence students' learning of business subjects?
2. Does gender influence the use of the social media among senior secondary school students?

#### **RESEARCH HYPOTHESES**

1. Social networking does not have significant influence on students' learning.
2. Gender has no significant influence on senior secondary school students' use of social media.

#### **RESEARCH METHOD**

The research design adopted for the study was a descriptive survey. The population of the study consisted of all the students in Commercial class from Senior Secondary Schools in five secondary schools in Ikorodu Local Government Area of Lagos State. The sample for the study was 100 respondents selected through the simple random sampling technique. The instrument for data collection for the study was the questionnaire containing two sections: Section A dealt with respondents' bio-data while section B dealt with items to which respondents were to give their opinion, in the Likert scale of SA – Strongly Agree; A – Agree, D – Disagree and SD – Strongly Disagree, containing 10 items in all. Content and face validity structures of the instrument were ensured by experts in the department of Business Education. The reliability of the instrument was also ensured and a reliability coefficient of 0.87 was obtained which implies high reliability of the instrument. Data collected were analysed. For the research questions, frequency and percentages were adopted in the presentation and analysis of the data generated for the study. t-test and chi-square statistics were used for testing the research hypotheses at 0.05 level of significance.



**RESULTS**

**Research Question 1:** In what ways does social networking influence students' learning of business subjects?

**Table 1: Influence of social networking on students' learning of Business Studies**

Mean greater than 2.50 'Agreed' otherwise 'Disagreed'

S/N	Items	SA	A	D	SD	Mean	Decision
1.	It helps me to gain more relevant information	20 (20%)	30 (30%)	30 (30%)	20 (20%)	2.50	Agreed
2.	It gives me opportunity for formal learning.	10 (10%)	65 (65%)	10 (10%)	15 (15%)	2.75	Agreed
3.	It facilitates my learning and skill development outside school.	40 (40%)	50 (50%)	10 (10%)	0 (0%)	3.20	Agreed
4.	It has helped me to improve my performance academically.	45 (45%)	40 (40%)	15 (15%)	0 (0%)	3.15	Agreed
5.	It has improved my ability to search for information.	27 (27%)	50 (50%)	15 (15%)	8 (8%)	2.96	Agreed

The result presented in Table 1 revealed the influences of social networking on students' learning of business studies. Majority of the respondents indicated that social networking helps them to gain information (50%), it gives them opportunity for formal learning (75%), it facilitates their learning and skill development outside the school (90%), it has helped them to improve on their performance academically (85%) and improved their ability to search for information (75%).

The mean responses in the table are greater than 2.50 which justified that respondents agreed that social media has influence on students' learning of Business studies.

**Research Question 2:** Does gender influence the use of the social media among senior secondary school students?

**Table 2: Gender influence of social media**

S/N	Items	SA	A	D	SD	Mean	Decision
1.	Male students have access to social media than the female students	45 (45%)	55 (55%)	0 (0%)	0 (0%)	3.45	Agreed
2.	Male students outperform their female counterparts in Business Studies due to their frequent use of social media.	45 (45%)	40 (40%)	0 (0%)	15 (15%)	3.30	Agreed
3.	Social media influence female students negatively than their male counterparts.	27(27%)	50(50%)	15 (15%)	8 (8%)	2.96	Agreed
4.	Female students make use of social media for leisure and chatting thereby reducing their concentration and attention.	40 (40%)	50 (50%)	10(10%)	0 (0%)	3.20	Agreed
5.	Social media influence both male and female students' performance in Business Studies	45 (45%)	40 (40%)	15(15%)	0 (0%)	3.15	Agreed

Mean greater than 2.50 'Agreed' otherwise 'Disagreed'



The result of analysis presented in table 4 revealed the extent to which gender influences the use of social media among students. Majority of the respondents (100%) indicated that male students have access to social media than the female students, 85% indicated that male students outperform their female counterparts in Business Studies due to their frequent use of social media, 75% indicated that social media has negative influence on female students than their male counterparts. They indicated that female students make use of social media for leisure and chatting thereby reducing their concentration and attention.

Thus, 85% agreed that there is influence of social media on male and female students' learning in Business Studies. The mean response in the table is greater than 2.50 this implies that majority of the respondents agreed that the influence of gender on the use the social media on students' performance in business studies is high.

### TESTING OF HYPOTHESES

H<sub>01</sub>: There is no significance influence of social networking on students' learning in Business studies

**Table 3: Chi-square of influence of social networking on students' learning**

	Calculated Value	df	Asymp. Sig. (2-sided)	Table value
Pearson Chi-Square	52.22 <sup>a</sup>	4	0.00	
Likelihood Ratio	83.91	4	0.00	6.11
Linear-by-linear Association	20.18	1	0.00	
N of Valid Cases	100			

P<0.05

The result of analysis in Table 3 revealed that Chi-square ( $X^2$ ) = 52.22, P<0.05, was greater than table value of 6.11 which led to rejection of null hypothesis one. This implies that there was significant influence of

social networking on students' learning of Business studies.

H<sub>02</sub>: There is no significance difference between the influence of social media on male and female students.

**Table 4: t-test statistics for difference in the influence of social media on male and female students**

Variables	N	Mean (X)	St. D.	df	t-cal	t-tab
Male	50	3.74	0.71			
Female	50	2.86	0.96	98	2.85	1.96

P<0.05 (Significant)

The result presented in table 4 showed that calculated t-value of 2.85 was greater than the critical t-value of 1.96; as such the hypothesis is rejected. This means that there is significant difference in the mean responses of male and female students on the influence of social media. The influence of social network was high on male students than female students.

### DISCUSSION

The study revealed a significant influence of social networking on students' learning of Business studies. This means that the use of social networking sites provide benefits for students. Majority of the respondents indicated that social networking helps them to gain information, gives them opportunity for formal learning, facilitates their learning and skill development outside the school, helped them to improve on their performance academically and improved their ability to search for information. This

agrees with Nicole-Ellison (2007) who affirmed that teens and teenagers have especially recognized these internet sites to be able to contact their peers, share information, reinvent their personas, and showcase their social lives.

The finding of the study further showed that was that there is a significant difference in the mean responses of male and female students on the influence of social media. Influence of gender on the use the social media by students is high. The study contradicted the finding of Merten and Williams, (2009) that girls are more likely than boys to share personal information about their daily lives but agrees with Peter and Valkenburg's (2009) study that boys seem to benefit more from social media use and communication technology than girls do. Majority of the respondents in this study indicated that male students have access to social media than the female students, that male students outperform their female



counterparts in Business Studies due to their frequent use of social media, that social media has negative influence on female students than their male counterparts, among others. Thus, the study concluded that social media influences male students more than female students.

## CONCLUSION

Based on the findings of the study, it was concluded that social media has highly contributed towards effective learning of business studies and equally improve junior secondary school students' performance in the subject.

## RECOMMENDATIONS

The study therefore provides the following recommendation for the study.

1. There should be adequate provision of social media facilities by the government for all junior schools to cater for the need of the students and enhance effective teaching.
2. Students should be allowed to have access to available social media in the school such as computers and internet so that they will be familiar with the usage in the school system.
3. There is need to properly monitor the students in their use of social media so that the aims of introducing it would be achieved.
4. There is need for teachers to be properly trained on how to effectively use the media to enhance effective teaching and learning in the school so that they can guide students to use it correctly.

## REFERENCES

1. Amadi, E. C. & Ewa, C. J. (2018). An overview of social media on the academic performance of university students in Nigeria. *International Journal of Innovative Information Systems & Technology Research*. 6(1), 1 – 14. Jan-Mar. ISSN: 2467-8562.
2. Benson, W. Fillippaios, F. & Morgan, S. (2010). Changing the face of business education career planning. *International Journal of e-business management*. 4(1), 20 – 33. DOI10.3316/IJEBMO401020.
3. Bonds-Raacke, J. & Raacke, J. 2008. MySpace and facebook: Applying the uses and gratifications theory to exploring friend-networking sites. *Cyber Psychology and Behavior*, 11, 169-174.
4. Eick, C.J. & King, D.T. (2012). Non-science majors' perceptions on the use of YouTube video to support learning in an integrated science lecture. *Journal of College Science Teaching*, 42(1), 26-30.
5. Englander F.; Terregrossa, R. A. & Wang, Z. (2010). *Educational Review*, 62(1): 85 -96.

6. Fewkes, A. & McCabe, M. (2012). Facebook: Learning Tool or Distraction? *Journal of Digital Learning in Teacher Education*, 28(3), Retrieved from <http://eric.ed.gov/?id=EJ972449>.
7. Gao, F.; Luo, T. & Zhang, K. (2012). Tweeting for learning: A critical analysis of research on microblogging in education published in 2008-2011. *British Journal of Educational Technology*, 43(5), 783-801.
8. Greenfield, P. & Subrahmanyam, K. (2008). Online communication and adolescent relationships. *The Future of Children*, 18, 119-140. Retrieved from: <http://www.futureofchildren.org>.
9. Junco, R., Heiberger, G., & Loken, E. (2011). The effect of Twitter on college student engagement and grades. *Journal of Computer Assisted Learning*, 27(2), 119-132.
10. Kietzmann, H. (2012). "Social media? Get serious! Understanding the functional building blocks of social media". *Business Horizons* 54: 241–251.
11. Kist, W. (2012). Class get ready to tweet: Social media in the classroom. Our children. Retrieved from <http://files.eric.ed.gov/fulltext/EJ991339.pdf>.
12. Kyosha M (2009). Factors affecting academic performance of undergraduate students at Uganda Christian University. Retrieved December 4, 2013 from <http://mak.ac.ug/documents/Makfiles/theses/Kyosha%2520Martha.Pdf>.
13. Khan, U. (2009). "Facebook students underachieve in exams," *Daily Telegraph*, at <http://www.telegraph.co.uk/education/educationnews/5145243/Facebookstudents-underachieve-in-exams.html>.
14. Lau (2012). Review of Use of Animation as a Supplementary Learning Material of Physiology Content in Four Academic Years. *The Electronic Journal of E-Learning*, 10(4), 377-386.
15. Lin, G. & Subrahmanyam, K. (2007). Adolescents and the net: Internet use and wellbeing. *Adolescence*, 42(168), 659-675. Retrieved from: [http://findarticles.com/p/articles/mi\\_m2248/is\\_168\\_42/ai\\_n27483301/](http://findarticles.com/p/articles/mi_m2248/is_168_42/ai_n27483301/)
16. Merten, M. & Williams, A. (2009). Adolescents' online social networking following the death of a peer. *Journal of Adolescent Research*, 24, 67-90.
17. Moran, M., Seaman, J., & Tinti-Kane, H. (2012). How today's higher education faculty use social media. Retrieved from <http://www.pearsonlearningsolutions.com/pdfs/pearson-social-media-survey-2012-color.pdf>.
18. Moody, M. (2010). Teaching Twitter and beyond: Tips for incorporating social media in traditional courses. *Journal of Magazine and New Media Research*. 11(2), 1 – 9. Spring.
19. Nicole-Ellison, C. S. (2007). The benefits of Face book "Fiends;" *Social Capital and College*



- Students' Use of Online Social Network Sites. Journal of Computer Mediated Communication.*
20. Paul, J., Baker, H., & Cochran, J. (2012). *Effect of online social networking on student academic performance. Elsevier, 1, 2118-2119:2123. Retrieved from <http://www.elsevier.com/locate/comphumbeh>*
  21. Peel District School Board. (2014) *BYOD. Retrieved from <http://www.peel.schools.org/aboutus/21stCentury/byod/Pages/default.aspx>*
  22. Peter, J. & Valkenburg, P. (2009). *Social consequences of the internet for adolescents: A decade of research. Psychological Science, 18(1), 1-4.*
  23. Rabi, I. M. (accessed 2021). *Business Studies JSS 1. file:///C:/Users/User/Downloads/BUSINESS\_STUDIES\_JSS\_1.pdf*
  24. Tara, M. H. (2016). *The effects of social media use in undergraduate students. Theses and Dissertations. Rowan Digital Works.*
  25. Williams, A., Boyd, S., Densten, R., Chin, D., Diamond, & Morgenthaler, C. (2009). "Social Networking Privacy Behaviors and Risks", *In Proceeding of CSIS Research Day, Seidenberg School of CSIS, Pace University, USA.*
  26. Wise, B. (2009). *Adolescent literacy: The cornerstone of student success. Journal of Adolescent and Adult Literacy, 52, 369-375.*



## **GROUNDWATER SCENARIO OF AJMER DISTRICT, RAJASTHAN AN ENVIRONMENTAL ISSUE**

**Dr. Tripti Yadav**

*Assistant Professor, Dept. of Botany, SS Jain Subodh College of Global Excellence, Sitapura,  
Jaipur*

### **ABSTRACT**

The district is situated between 25° 38' & 26° 58' North latitude and 73° 54' & 75° 22' East longitude covering geographical area of 8,481 sq km. Name of Ajmer is derived from Ajeymeru (the invincible hill). Ajmer is one of the Division which is further sub-divided into 4 sub-divisions namely Ajmer, Beawar, Kekri & Kishangarh and comprises of 6 tehsils & 8 blocks. Total number of villages in the district is 1022 (2001 census). Rural & Urban population of the district is 13,06,398 & 8,74,128 respectively. Decennial population growth rate of the district is 26.09% since 1991. The district is known for Khwaja Moinuddin Chisti's Dargah and religious Pushkar town, where temple of Lord Bhrama, is situated. Systematic Hydrogeological survey in the district was carried out by Central Ground Water Board from 1970 to 1980. Reappraisal hydrogeological survey of entire district was carried out during 2004-05. Under exploratory programme 45 exploratory boreholes, 2 observation boreholes and 1 slim hole have been drilled. Since 1969, monitoring of water level is being carried out four times a year from 38 National Hydrograph Network Stations.

Mean annual rainfall (1987-2006) of the district is 453.2 mm whereas normal rainfall (1901-70) is lower than average rainfall and placed at 433.8. Almost 95% of the total annual rainfall is received during the southwest monsoon, which enters the district in the last week of June and withdraws in the middle of September. Probability of average annual rainfall exceeding 300 mm is only 90%, except at Mangliawas. However, there is 10% probability that the average rainfall exceed 600 mm. Drought analysis based on agriculture criteria indicates that the district is prone to mild and normal type of droughts. Severe and very severe type of drought is very rare and occurred only twice during 1987 & 2002 (Srinagar); 1977 & 1987 (Todgarh); & 1991 & 1993 (Vijaynagar). January is the coldest month with mean maximum and minimum temperatures being lowest at 22.70 C & 7.60 C. Temperature in summer month, June, reaches up to 39.50 C. There is drop in temperature due to onset of monsoon and rises again in the month of September. Atmosphere is generally dry except during the monsoon period. The humidity is highest in August with mean daily relative humidity 80%. The annual potential evapotranspiration in the district is 1565.6 mm and is the highest in the month of May (243 mm).

### **INTRODUCTION**

The distinguishing feature of the Ajmer district is Aravalli hill ranges, which divides plains of Marwar from the high table land of Mewar. Hill ranges runs parallel to each other giving rise to elongated valleys. Highest range is 970.3 mamsl at Bhutia Dunga. Sand dunes and cluster of sand mounds cover a large part of the Sarsuti valley and area around Picholian & Pushkar valley. These features are formed due to abrupt termination of a hill range or existence of wind gaps in

the hills. Index map 5 The district falls in the Banas (64.88%), Luni (23.74%) & Shekhawati Basin. There is no important river in the district. Khari, Dai, Sarsuti or Saraswati, Sagarmati, Bara, Mashi and Roopnagar Rivers are ephemeral and flow only in response to precipitation. Banas River enters the district from the southeast near Khera & Jitpura villages and flows from south to north for about 3 km. It changes the direction and flows from southwest to northeast. Pushkar & Bud Pushkar are two natural lakes near the Ajmer city. The



Pushkar Lake is nearly rectangular and about 500 x 600 m in dimension. The Budh Pushkar Lake has greatly dwindled in size due to heavy pumpage from the original size of 1.5 sq km to a few hundred sq m only.

Soils of the district are classified as follows:  
Sierozeme: This is arid soil, sandy loam to sandy clay, deep, brown and calcareous, found in the northern part in Silora block. Cultivation is limited due to climatic factors. Lithosols and Regosols of hills: This type of soil is found in the western part on the Aravalli hills and hill slopes. These are found at shallow depths with gravels near surface, reddish brown to grayish brown. Cultivation is limited due to limited root zone. Brown soils (Saline phase): These soils are pale brown to yellowish brown and are developed mainly from Proterozoic and Archaean rocks and alluvium. These are associated with seasonal water table and saline. Cultivation is limited due to salinity. Alluvium: These are found in plains and derived from alluvium. The richest soil is obtained from the sand hills of Pushkar. These are non-calcareous, semi-consolidated to unconsolidated, brown, loamy sand to sandy loam and occupy gently sloping terrains in central and eastern part of the district. Total forest area is 54,737 ha (6.49 %) mainly. Cultivable area of the district is 6,49,149 ha (77.06%) whereas uncultivable area is 1,38,189 ha (16.40%). The major Kharif crops are bajra, jowar, pulses, maize and groundnut. Main Rabi crops are wheat, barley, gram and oilseeds. Cotton is an important cash crop that is grown in the district. Net area under irrigation is 92,807 ha (11.01% of the total geographical area). There is no major irrigation project, only 3 medium viz Lasariya & Narayan Sagar (Banas Basin) & Phool Sagar, Jaliya (Luni Basin) and 384 minor irrigation projects exists in the district whereas 3 minor irrigation projects are ongoing. Dug wells are the main source of irrigation (83.32%). Bore wells and tube wells are limited due to low discharge.

## HYDROGEOLOGY

Major water bearing formations are alluvium, schist, gneiss, granites, limestone and phyllite of Bhilwara Supergroup & Delhi Supergroup. Ground water occurs under unconfined to semi-confined conditions in weathered and fractured part of the consolidated formation. These form generally poor aquifers compared to alluvium. Granite gneiss covers 4811 sq km (56.73%) and found in the eastern part falling in Kekri, Arain, Bhinia and parts of Masuda, Srinagar, Silora and Jawaja blocks. Quality of water varies from potable to brackish. Yield is generally poor and varies from 30 to 90 m<sup>3</sup> /day

Schist is confined to 2,690 sq km (31.72%) in the western part of the district falling in parts of

Pisangan, Srinagar, Silora, Masuda and Jawaja blocks. Open wells tapping schist yield 40 to 80 m<sup>3</sup> /day whereas wells located along the intrusions of quartz vein and pegmatites yield 100 to 170 m<sup>3</sup> /day

Alluvium covers only 494 sq km (5.83%) and found at isolated locations in eastern (Kekri block) & western part (Pisangan, Srinagar & Silora block) of the district. Thickness of alluvium near Srinagar is 20 m whereas in the Roopnagar valley it is quite thick and extends up to 40m. Yield of tube wells in alluvium varies from 50 to 150 m<sup>3</sup> /day. Quartzite forms aquifer is different disconnected areas of limited extent in topographic lows in the western part of the district in the vicinity of Roopnagar, Kishangarh, Ajmer, Beawar and west of Nasirabad. Yield of wells tapping quartzite very from 40 to 100 m<sup>3</sup> /day.

Limestone occurs between Bassi & Nand along Sasuti valley; confluence of Sasuti & Sagarmati Rivers in the north and Baktawarpura in the south. These do not form potential aquifer. Yield of wells at isolated location may goes up to 100 m<sup>3</sup> /day. Depth of dug wells is below 50 m, generally restricted to weathered thickness. Nearly 90% wells are in the depth range of 10 to 25 mbgl. The yield of shallow wells varies from 20 to 30 m<sup>3</sup> /day and it may go up to 150 m<sup>3</sup> /day depending upon formation. Bore wells/ tube wells are generally 60 to 175 m deep. Depth to water level as recorded in 28 NHS (2006) ranges from 3.13 to 30.80 and 1.45 to 28.89 mbgl during pre-monsoon and post monsoon respectively.

## GROUND WATER QUALITY

Ground water quality in shallow aquifer is deteriorated in northern part of Arian, southeastern part of Srinagar, southwest Bhinai and central part of Jawaja blocks where electrical conductance exceeds 3000 mmhos/cm at 250 C. Groundwater of electrical conductance less than 750 mmhos/cm at 250 C occurs in Kekri, Pisangan & southern part of Jawaja block. In rest of the area electrical conductance varies between 750 & 2000 mmhos/cm at 250 C. As compared to shallow aquifer, deeper aquifers are brackish to saline with electrical conductance ranges between 670 & 12320 mmhos/cm at 250 C. Groundwater is brackish (more than 3000 to 18030) at Bhilwara – Ajmer border along the Khari River. High conductivity in groundwater makes the area unfit for non-salt tolerance crops. Salt tolerant crops are suggested in these areas. Fluoride concentration in groundwater exceeding permissible limit (1.5 mg/l) has been reported from all the blocks. Higher values of fluoride have been observed at Goela (10.6), Bogla (7.56), Arian (5.54), Nasirabad (4.8), Bandanwara (4.43), Ludiana (3.85), Taragarh (2.85), Baglia (2.84), Kekri (2.28), Jawaja



(2.04), Kishangarh (1.95) & Tabiji (1.65). Deeper aquifer has relatively better quality water in respect of fluoride contamination and varies from 1.0 to 7.96 mg/l. Higher concentration of Iron (permissible limit 1.0 mg/l) were observed in hydrograph stations at Bogla (16.5), Ghugra (8.05), Jawaja (6.08), Sanpla (1.14) & Ludiayan (1.09) in shallow aquifer.

## GROUND WATER DEVELOPMENT

The ground water development in the district is being done by dug wells, bore wells and dug cum bore wells. Dug wells with horizontal boring are very common. Diameter of dug well varies from 1 m to 4 m with depth ranging from 5 m to 50 m. The present stage of ground water development in the district is 122.79%, which indicates that the scope of ground water development is already exhausted. Out of 8 blocks, 6 falls under "Over-exploited" category and 2 under "Critical" category. Gneiss, schist and alluvium form the aquifers in different parts of the district.

Alluvium area is restricted to riverbeds. Ground water occurs under unconfined to semi-confined conditions. Depth and diameter of the dug wells and bore wells depend on formation and geomorphology. However, general depth of dug well ranges from 5 to 25m, tube wells between 30 & 45m & bore wells between 65 & 175m.

Ajmer town falls in Pisangan block with total urban population 5,05,311 with 22% decadal growth since 1991. Most of the dug wells dried up during pre monsoon period. Water was previously supplied from Sagarmati and Sasuti River. Presently Leela Sewri, Ganhera & Budha Pushkar supplying water to Ajmer town. Most of the water supply to the town is being supplied from Bisalpur Project. Ajmer district has eight major towns namely Ajmer, Kishangarh, Beawar, Nasirabad, Kekri, Sarwar, Vijaynagar and Pushkar. The Vijaynagar town is covered under fluoride project and connected to Bisalpur dam recently. While Pushkar has its own source and Ganhera water is used for piped water supply system. Remaining all the towns of the district are covered by piped water supply schemes through Bisalpur Dam. All the schemes except for Nasirabad are maintained by the Public Health Engineering Department of the state. Water for Nasirabad town is supplied by the PHED in bulk quantities to the Cantonment Board for civilians and to MES for the Military requirement.

Due to scanty rainfall and poor hydrogeology of the area, yield from ground water sources has been negligible. During the period 1984-94, there has been acute water crisis in the area resulting in reduction in frequency of water supply to the urban towns of Ajmer, Beawar and Kishangarh to as low as once in 48 to 96

hours, for a duration of half to one hour only, in the various zones. In view of the unprecedented scarcity Bisalpur water supply project, for augmenting water supply to Ajmer, Kishangarh, Beawar, Kekri, Nasirabad and Sarwar towns, was sanctioned in the year 1987. The scheme envisaged construction of a dam across the seasonal river Banas, near village Bisalpur, approximately 120 kms south of Ajmer. The water stored during the monsoon season was purported to use for the requirement of water for the six urban towns of Ajmer district.

Pushkar Sarovar having storage capacity of 0.57 Mcm with full reservoir level of 6.7m is depleting its reservoir in the past few years. In addition to 950 m<sup>3</sup> /day of water is being put into the Saraovar from Pushkar (720 m<sup>3</sup> /day) and (230 m<sup>3</sup> /day) from well field as a short-term measure. It is proposed to direct 1870 m<sup>3</sup> /day of water from Leela Sewri and Ganhera well field, which is presently being supplied water to Ajmer City by PHED. Major part of the district (about 90%) is covered by hard formation where success failure ratio is 81:09. High yield i.e. more than 500 lpm was recorded in 7% (total 44 wells) of wells, yield between 250 & 500 lpm in 25% wells, between 100 & 250 lpm in 16% yield between 50 & 100 lpm in 20% whereas yield less than 50 lpm was registered in 23% of wells. About 9% wells have yielded negligible quantity of water

Stage of ground water development in the district is 122.79%, which indicate that the scope of ground water development is already exhausted in 6 blocks where 17 groundwater development has already exceeded 100% and categorized as "Over-exploited". Only 2 blocks fall under "Critical" category where ground water development is approaching 100%. Most of the boreholes have been drilled in the northern & western part of district falling in Silora, Srinagar & Pisangan blocks. There is no scope for further development in the over exploited blocks of the district for irrigation or industrial use. However, exploratory drilling can be taken up in Masuda and Kekri blocks and unexplored area for estimation of aquifer parameters.

## WATER CONSERVATION AND ARTIFICIAL RECHARGE

Due to over development, further exploitation of precious resource must be checked. For sustainable development of ground water, artificial recharge measures to be employed to augment ground water and surface water resources. Exploratory drilling results show potential zone having inferior quality water, which can be blended with fresh water for irrigation use. Since the stage of ground water development has



already crossed 100%, artificial recharge is the only solution to augment ground water through construction of bunds, anicuts, and rooftop harvesting structures. The area has undergone polyphase deformation in geological past, which has resulted in a complex structure (folded, faulted and jointed) that may not be conducive for such structures. Therefore, site of these structures should be selected carefully. Impact assessment of check dams revealed that increase in water level, cropping area, cropping intensity, crop production and labor employment observed in the project area. Erosion from nalah bank minimizes. Cropping pattern and cropping intensity changed. Harvested water provides supplementary irrigation during long dry spell. In view of the above, such artificial recharge programmes may be taken up in the district for further development of surface water and ground water resources to enhance agricultural production.

## **GROUND WATER RELATED ISSUES & PROBLEMS**

### **Decline in Water level**

Majority of blocks (6 out of 8 blocks) falls in over-exploited category whereas two blocks falls in Critical category, approaching to over exploited category. This has been resulted due to depletion in water level. Long term (1997-06) declining rate is more in urban areas falling in Pisangan (2.54 m/yr) and Srinagar block (1.02m/yr). Quality constraints Presence of fluoride in ground water is major problem in entire district. Situation is more pronounced in Vijaynagar & Masuda blocks where fluoride values exceed 10 mg/l. These blocks are now depended on water supply from Bisalpur dam. Fluoride is higher in shallower aquifer as compared to deeper aquifer.

### **Water scarcity**

Almost entire district is facing problem of ground water scarcity, though water supply from Bisalpur dam solved drinking water problem to certain extent in urban areas. Over the greater part of the district occupied by hard formation the well yields are very poor. As such the depth of weathered zone is generally restricted up to 50m, which control the occurrence and movement of groundwater. Deep-seated fractures below 100m are very rare. This causes reduction in the well yield drastically during the summers creating acute water shortage of domestic water supply. However, in selective areas located on structural weak planes connected to some recharge source wells continue to yield moderate quantity of water. Deeper levels are either devoid of water or of poor quality of ground water (brackish to saline).

Alluvium occurs at limited places along the major drainage/ valley fill and has shallow thickness. The well yield varies considerably year to year in different parts of the district and over the season. Thus the availability of surface as well as ground water is very scarce in low rainfall years & especially in summer months.

### **Mass awareness Programme (MAP)**

A Mass Awareness Programme on “Ground Water Management in Pushkar Valley” was organized at Pushkar, Ajmer district on 14th February 2002. Dr D K Chaddha, Chairman, Central Ground Water Authority, New Delhi presided over the function. Shri Ramzan Khan, MLA, Pisangan (Ajmer district) & Shri Hira Singh, MLA, Raipur, (Pali district) were special guests on the occasion. Shri S S Chauhan, Member (ED & MM), Central Ground Water Board, Faridabad also graced the occasion as special guest. Shri Ram Singh Vishnoi, Minister for Public Health & Engineering Department also graced the occasion. During the programme, all the members and local people presented their views to check declining ground water levels in Pushkar Valley

### **Water Management Training Programme (WMTP)**

A one day Training Programme on “Rainwater Harvesting for Artificial Recharge to Ground water” was organized at Ajmer on 13th December 2005. Prof M L Chhipa, Vice Chancellor, Maharshi Dayanand Saraswati University (MDSU), Ajmer was the Chief Guest during inaugural function. The function was presided over by Shri Mahaveer Singh, Collector, Ajmer. Prof A K Sinha, Department of Geology, University of Rajasthan and Prof K C Sharma, Head of Department, Environment Studies, MDSU, Ajmer were Special Guests. Shri A D Joseph, Regional Director, Central Ground Water Board, Western Region, Jaipur & other officers from CGWB imparted training. Lectures were also delivered by Prof A K Sinha and officers from various State Government Agencies including Ground Water Department, Irrigation Department and Public Health & Engineering Department, etc. Representative of non-government organization participated in the training. An exhibition was also organized during the training programme.

### **Areas Notified by CGWA**

Pushkar valley, Ajmer district was Notified on 30th September 2003 for registration of groundwater abstraction structures. In response to this notification, 521 groundwater abstraction structures were registered with Central Ground Water Authority. It was again Notified on 5th December 2005 for groundwater



regulation and management making it mandatory to seek permission for any structure propose to drill for groundwater abstraction. Advisory Council under the Chairmanship of District Collector is constituted to take up all the issues related to Notified area of Pushkar valley.

## RECOMMENDATIONS

1. Ground water draft is very high in Pisangan, Srinagar, Jawaja, Bhinai & Silora blocks. Stage of ground water development in the district has reached 122% due to indiscriminate use. It has to be controlled by preventing further development.
2. Revival of traditional ground water storage system i.e. Baori, open wells, Tanka etc for rainwater conservation for use in day to day life will reduce ground water draft.
3. Awareness programmes and training on rainwater harvesting will be beneficial to check the decline in water level and justified use.
4. Taking advantage of uneven topography of the area, small check dams or earthen dams, upstream of irrigation commands, at suitable sites, may be constructed to store rainwater. This will increase recharge to ground water which ultimately result in increase of yield of wells.
5. An area of 547.37 sq km is occupied by forest. To protect the area from environmental degradation, extensive programme of afforestation and soil conservation measures may be taken up.
6. Modern agricultural management techniques have to be adopted for effective and optimum utilization of the water resources. Maintaining irrigation through minimum pumping hours as per minimum requirement of water by the crop and also selecting most suitable cost effective cropping pattern can achieve this.
7. Alluvial tracts along river channels of Banas, Kothari, Khari, Manusi and Chandrabhaga are most feasible locations where shallow wells can be constructed to harness the shallow water table aquifers being potentially recharged by the flash flood and surface runoff. These wells can be used for water supply, wherever feasible.
8. Surface runoff can be harnessed by constructing tanks at feasible sites in the area occupied by the hard rock terrain for supplementing irrigation potential to increase the agricultural production.

9. High water requirement crops be discouraged. Proper agriculture extension services should be provided to the farmers so that they can go for alternate low water requirement economical crops.

## REFERENCES

1. APHA (1995) *Standard methods for the examination of water and wastewater, 19<sup>th</sup> edn*, American Public Health Association, Washington, D.C.
2. BIS (1991) *Drinking water specifications: (First revision), IS: 10500: 1991*.
3. BROWN, D.W. and ROBERSON, C.E. (1977) *Solubility of natural fluorite at 25°C, USGS Jour. Res., v.5(4), pp.506–517*.
4. BULUSU, K.R. and NAWLAKHE, W.G. (1990) *Defluoridation of water with activated alumina, batch operations. Indian Jour. Environ. Health, v.32, pp.197–218*.
5. CHOUBISA, S.L. (2001) *Endemic fluorosis in southern Rajasthan, Fluoride, v.34, pp.61–70*.
6. DATTA, P.S., TYAGI, S.K., MOOKERJEE, P. BHATTACHARYA, S.K., GUPTA, N. and BHATNAGAR, P.D. (1999) *Groundwater NO<sub>3</sub> and F contamination process in Pushkar valley, Rajasthan as reflected from <sup>18</sup>O isotopic signature and <sup>3</sup>H recharge studies. Environ. Monitor. Assess, v.56, pp.209–219*.
7. DESHKAR, S.M., DESHMUKH, A.N. and VALI, S.A. (1999) *Safe limit of fluoride content in drinking water in different climatic zones of India. Indian Jour. Envir. Health, v.2, pp.17–20*.
8. FREEZE, R.A. and CHERRY, J.A. (1979) *Groundwater. Prentice-Hall Inc, New Jersey, 603p*.
9. GACIRI, S.J. and DAVIES, (1993) *The occurrence and geochemistry of fluoride in some natural water of Kenya. Jour. Hydrol., v.143, pp.395–412*.
10. GARG, V.K. (2000) *Bioreclamation of sodic waste land — a case study, Land Degrad. Develop, v.11, pp.487–498*.



## AVAILABLE COVID-19 VACCINES FOR PUBLIC AND THEIR CHARACTERISTICS: A CASE STUDY

**Balwant Singh<sup>1</sup>, Sakshi Tripathi<sup>2</sup>, Shivangi Tripathi<sup>3</sup>**

<sup>1</sup>Research Scholar, Department of Botany, Dr. Ram Manohar Lohiya Avadh University Ayodhya, Uttar Pradesh India

<sup>2</sup>Post Graduate Student, Department of Zoology, B. P. P.G. College Narayanpur Maskanwa Gonda, Uttar Pradesh, India

<sup>3</sup>Junior Research Fellow, Department of Microbiology, King Georg Medical University Lucknow, Uttar Pradesh, India

### ABSTRACT

*Covid-19 is an infectious disease that caused by newly evolved zoonotic corona virus (SARS CoV-2). It becomes largest pandemic disease since 1965 were corona virus firstly identified. Covid-19 spread more than 200 countries and affected approximate 30 million positive cases with about 1 million deaths globally till May 2021. Only vaccine to be supposed as blocks the Covid-19 outbreak. More than 200 vaccine candidates for covid-19 being developed in which, about 12 vaccines are approved to peoples. These vaccines have different working mechanism based on its type. In this article we are expressed the knowledge about vaccine type and their characteristics, efficacy, and their advantages for general awareness to the peoples with also the level of academicians and researchers.*

**KEY WORDS:** Covid-19, SARS CoV-2, Corona Virus, Vaccine.

### INTRODUCTION

First Corona virus appearance was reported in 1965 as human common cold virus <sup>(1)</sup>. Since 1965, a number of zoonotic viruses with the same crown like morphology evolved and some of these become pandemic time to time <sup>(2)</sup>. Corona virus pandemic was outbreak before the evaluation of SARS CoV-2 which is becomes 3<sup>rd</sup> pandemic of human. Before the SARS CoV-2, two HCoV pandemic SARS-CoV and MERS-CoV were reported from China and UAE during year 2002 and 2012 respectively. SARS CoV-2 cause respiratory illness and named Covid-19 which also originated from Hubai Province of China at the end of year 2019. From 2020, Covid-19 becomes a challenging outbreak infectious viral disease and thousands of researchers working for the cure of this pandemic <sup>(1)(2)</sup>. Since December 2020, over than 200 vaccine candidates for Covid-19 (SARS CoV-2) being developed, of these, at least 52 candidates vaccine are in Human trail. The trail of vaccine running under three

phases Phase-I, Phase-II and Phase-III. Typically, many vaccine candidates will be evaluated before any are found to be both safe and effective and also having lots of different vaccines in development increases the chances that there will be one or more successful vaccines that will be shown to be safe and efficacious for the intended prioritized populations. Of the vaccines that do make it to clinical trial, just one in five is successful <sup>(3)</sup>. In this article we are express knowledge about the vaccine development globally and its type with different characteristics that become useful for researchers as well as society.

### TYPE OF VACCINES

There are three main approaches to be designing by the researchers for vaccine. Their differences lie in whether they use a whole virus or bacterium, just the parts of the germ that triggers the immune system or just the genetic material that provides the instructions for making specific proteins



and not the whole virus. By these approaches following types of vaccines are evaluated by researchers. The functional advantages of different type of vaccines are also displayed below (Table 1).

**Inactivated vaccines:** They are produced by growing SARS-CoV-2 in cell culture, usually on Vero cells, with the chemical inactivation of the virus. Because the whole virus is presented to the immune system, immune responses are likely to target not only the spike protein of SARS-CoV-2 but also the matrix, envelope and nucleoprotein <sup>(4)(5)(6)(7)</sup>.

**Live attenuated vaccines:** They are produced by generating a genetically weakened version of the virus that replicates to a limited extent, causing no disease but inducing immune responses that are similar to that induced by natural infection. Attenuation can be achieved by adapting the virus to unfavorable conditions (for example, growth at lower temperature, growth in non-human cells) or by rational modification of the virus <sup>(4)(5)(6)(7)</sup>.

**Recombinant protein vaccines:** They can be divided into recombinant spike-protein-based vaccines; recombinant RBD-based vaccines and virus-like particle (VLP) based vaccines. These recombinant proteins can be expressed in different expression systems including insect cells, mammalian cells, yeast and plants; it is likely that RBD-based vaccines could also be expressed in *Escherichia coli* <sup>(4)(5)(6)(7)(8)</sup>.

**Replication-incompetent vectors:** They represent a large group of vaccines in development. Such vaccines are typically based on another virus that has been engineered to express the spike protein and has been disabled from replication in vivo by the deletion of parts of its genome <sup>(5)(9)</sup>.

**Replication-competent vectors:** They are typically derived from attenuated or vaccine strains of viruses that have been engineered to express a transgene, in this case the spike protein. In some cases, animal viruses that do not replicate efficiently and

cause no disease in humans are used as well. This approach can result in a more robust induction of immunity, because the vector is propagating to some extent in the vaccinated individual and often also triggers a strong innate immune response <sup>(4)(5)</sup>.

**Inactivated virus vectors:** Some SARS-CoV-2 vaccine candidates that are currently under development rely on viral vectors that display the spike protein on their surface but are then inactivated before use<sup>32</sup>. The advantage of this approach is that the inactivation process renders the vectors safer because they cannot replicate, even in an immune-compromised host <sup>(4)(5)(6)(7)</sup>.

**VLPs (Virus-Like Particles):** Vaccine development based on the recombinant proteins and VLPs is a more innovative approach. Antiviral vaccines are usually developed on the basis of surface proteins that form VLPs. Production of VLPs in the cells with further reconstruction into the stable and immunogenic forms is a multi-stage process <sup>(4)(6)</sup>.

**DNA vaccines:** They are based on plasmid DNA that can be produced at large scale in bacteria. Typically, these plasmids contain mammalian expression promoters and the gene that encodes the spike protein, which is expressed in the vaccinated individual upon delivery. The great advantage of these technologies is the possibility of large-scale production in *E. coli*, as well as the high stability of plasmid DNA <sup>(4)(5)(6)(7)</sup>.

**RNA vaccines:** They are a relatively recent development. Similar to DNA vaccines, the genetic information for the antigen is delivered instead of the antigen itself, and the antigen is then expressed in the cells of the vaccinated individual. Either mRNA or a self-replicating RNA can be used. Higher doses are required for mRNA than for self-replicating RNA, which amplifies itself, and the RNA is usually delivered via lipid nano-particles (LNPs) <sup>(4)(5)(6)(7)(10)</sup>.

**Table 1: Functional Advantages of Type of Covid-19 Vaccines <sup>(9)(11)</sup>.**

S.N.	Vaccine Type	Advantages
1	Live-attenuated	✓ Strong and long-lasting immune response ✓ Broad antigenic profile
2	Inactivated	✓ Broad antigenic profile
3	Protein subunit	✓ Noninfectious ✓ Targeting key antigens
4	VLP	✓ Noninfectious ✓ Broad antigenic profile
5	Non-replicating viral vector	✓ Fast to produce ✓ Reusable platform ✓ Strong in both cell- and antibody-mediated immune responses
6	Replicating viral vector	✓ Fast to produce ✓ Lower doses/single dose



		<ul style="list-style-type: none"> <li>✓ Reusable platform</li> <li>✓ Strong in both cell- and antibody-mediated immune response</li> <li>✓ Less infectious</li> </ul>
7	DNA	<ul style="list-style-type: none"> <li>✓ Fast to produce</li> <li>✓ Scalable</li> <li>✓ Noninfectious</li> <li>✓ Reusable platform</li> <li>✓ Stable at room temperature</li> </ul>
8	RNA	<ul style="list-style-type: none"> <li>✓ Fast to produce</li> <li>✓ Noninfectious</li> <li>✓ No genome integration risk</li> <li>✓ Reusable platform</li> <li>✓ Stimulates strong T cell response</li> <li>✓ Simple formulations</li> </ul>

## DISCUSSION

Covid-19 becomes a global problem which can be spread more than 200 countries as pandemic cause of human infection. The invention and production of a corona virus vaccine is a critical issue, but it is likely to take many months to resolve. Although many companies have announced that the corona virus vaccine will be ready soon, this will be sophisticated to do in reality<sup>(3)(4)</sup>. Rapid production of a vaccine to prevent Covid-19 is a global imperative, and defining the stakes and potential hurdles is critical because regulatory and medical decisions are based on benefit and risk<sup>(4)</sup>. Different types of vaccine are

evolved in different country with their specific characteristics, type and efficacy (Table 2). In all, Most of vaccines has same administrative mode remaining few of them. These different candidate vaccines can be grouped based on the technological platform exploited to elicit a protective immune response. However, almost every vaccine project has its peculiarities that make it unique and which could have significant consequences regarding the efficacy or duration of the induced protection or the safety of the vaccine. The present article is most useful for general awareness to academicians as well as researchers.

**Table 2: Type of Vaccines and their characteristics with global scenario.**

Vaccine Name	Vaccine Type	Trade Name	Other Name	Developer	Country
Pfizer	mRNA	Comirnaty	BNT162b2	Pfizer BioNTech	Canada
Pfizer	mRNA	Fosun		Fosun BioNTech	China
Moderna	mRNA	Moderna	TAK-919, CX-024414	NIAID + BARDA	USA
Astra Zeneca	Viral Vector	Vaxzevria	AZD-1222, ChAdOx1-S	Oxford	UK/USA
Astra Zeneca	Viral Vector	CoviShield		SII	India
Covaxin	Inactivated	Covaxin	BBV-1252	BB + ICMR	India
Sputnik	Viral Vector	Sputnik-V	Gam-COVID-Vac	GRIEM	Russia
Janssen	Viral Vector	Janssen	Ad26.COVS.2.S, JNJ-78436735	J P + J & J	Netherland
Novavax	Subunit	Novavax	NVX-CoV2373, SARS-CoV-2-rS	Novavax + CEPI	UK
Novavax	Subunit	Covovax	TAK-019	Novavax + SII	India
Corona VaC	Inactivated	CoronaVac	SinoVaC	Sinovac Biotech	China
AD5-nCOV	Viral Vector	Convidecia	CanSino	CanSino Biologics	China
BBIBP-CorV	Inactivated	BBIBP-CorV	Sinopharm	SBIBP	China
Inovio	DNA	INO-4800		I F	South Korea
CoVLP	VLP	CoVLP	Medicago	Medicago + GSK	Canada/US
VAT00002	Subunit	Sanofi-GSK	VAT00008	SP + GSK	USA
MRT-5500	mRNA			SP + TranslateBio	USA



**Table 2:** Continue...

Efficacy	Administration	Dose Quantity	Requirement	Minimum Interval	References
95-98%	Intramuscular	0.3 ml./ Dose	Dual Dose	21 Days	(12)(13)(14)(15)(16)
95-98%	Intramuscular	0.3 ml./ Dose	Dual Dose	21 Days	(12)(13)(14)(15)
94-97%	Intramuscular	0.5 ml./Dose	Dual Dose	28 Days	(12)(16)(17)(18)
76-81%	Intramuscular	0.5 ml./Dose	Dual Dose	28 Days	(12)(16)(19)(20)
76-81%	Intramuscular	0.5 ml./Dose	Dual Dose	28 Days	(12)(13)(14)(16)(21)
78-88%	Intramuscular	0.5 ml./Dose	Dual Dose	28 Days	(12)(13)(21)(22)
92-95%	Intramuscular	0.5 ml./Dose	Dual Dose	21 Days	(23)(24)
72-82%	Intramuscular	0.5 ml./Dose	Dual Dose	28 Days	(16)(25)
89-95%	Intramuscular	0.5 ml./Dose	Dual Dose	28 Days	(12)(26)
89-95%	Intramuscular	0.5 ml./Dose	Dual Dose	28 Days	(9)
51%	Intramuscular	0.5 ml./Dose	Dual Dose	21 Days	(16)(27)(28)(29)
66%	Intramuscular and Intranasal	0.5 ml./Dose	Single Dose		(30)(31)
78-86%	Intramuscular	0.3 ml./Dose	Dual Dose	21 Days	(12)(16)
	Intramuscular	0.5 ml./Dose	Dual Dose	28 Days	(12)(32)
	Intramuscular		Dual Dose	21 Days	(33)
	Intramuscular		Dual Dose	28 Days	(12)(14)(34)
	Intramuscular		Dual Dose or Single Dose	21 Days	(9)

**ABBREVIATIONS**

- BARDA Biomedical Advanced Research and Development Authority
- BB Bharat Biotech
- CEPI Coalition for Epidemic Preparedness Innovations
- Covid-19 Corona Virus Disease 2019
- GRIEM Gamaleya Research Institute of Epidemiology and Microbiology
- GSK Glaxo Smith Kline
- HCoV Human Corona Virus
- ICMR Indian Council of Medical Research
- J & J Johnson and Johnson
- JP Janssen Pharmaceutical
- MERS Middle East Respiratory Syndrome
- NIAID National Institute of Allergy and Infectious Disease
- RBD Receptor Binding Domain
- SARS Severe Acute Respiratory Syndrome
- SBIBP Sinopharms Beijing Institute of Biological Products
- SII Serum Institute of India
- SP Sanofi Pasteur
- VLP Virus like Particle



**Figures: Image of Vaccines (1.Pfizer, 2.Covishield, 3.Covaxin, 4.AstraZeneca, 5.Janssen, 6.CoronaVac, 7.SputnikV, 8.Moderna)**

## REFERENCES

1. Singh B., Kumar V., Tripathi S. (2020) A Review of Covid-19 Based on Current Evidences, *International Research Journal of Modernization in Engineering Technology and Science*, 2(8): 1449-1459. [www.irjmets.com](http://www.irjmets.com)
2. Singh B., Tripathi S., Tripathi S. (2020) Structural and Molecular Organization with their Functional Status of Corona Viruses: A Review, *International Research Journal of Modernization in Engineering Technology and Science*, 2(11): 359-372. [www.irjmets.com](http://www.irjmets.com)
3. Evenett S.J., Hoekman B., Rocha N., Ruta M. (2021) The Covid-19 Vaccine Production Club: Will Value Chains Temper Nationalism?, *Macroeconomics, Trade and Investment Global Practice*: 1-4
4. Dwivedi S. (2021) An Overview of COVID-19 Vaccine Development Worldwide, *International Journal of Drug Development and Research*, 13(159): 1-4. <https://www.ijddr.in/>
5. Krammer F. (2020) SARS-CoV-2 vaccines in development, *Nature*, 586: 516-527. <https://doi.org/10.1038/s41586-020-2798-3>
6. Defendi H.G.T., Madeira L.D.S., Borschiver S. (2021) Analysis of the COVID-19 Vaccine Development Process: an Exploratory Study of Accelerating Factors and Innovative Environments, *Journal of Pharmaceutical Innovation*, Springer. <https://doi.org/10.1007/s12247-021-09535-8>
7. Forni G., Mantovani A. (2021) COVID-19 vaccines: where we stand and challenges ahead, *Cell Death & Differentiation*, 28: 626-639. <https://doi.org/10.1038/s41418-020-00720-9>
8. Abdelmageed et al. (2020) Design of a Multi-epitope-Based Peptide Vaccine against the E-Protein of Human COVID-19: An Immunoinformatics Approach, *BioMed Research International Article ID 2683286*: 1-12. <https://doi.org/10.1155/2020/2683286>
9. Kaur S.P., Gupta V. (2020) COVID-19 Vaccine: A comprehensive status report, *Virus Research*, 288. <https://doi.org/10.1016/j.virusres.2020.198114>
10. Kowalski P.S., Rudra A., Miao L., Anderson D.G. (2019) Delivering the Messenger: Advances in Technologies for Therapeutic mRNA Delivery, *Molecular Therapy*, 27(4): 710-728. <https://doi.org/10.1016/j.ymthe.2019.02.012>
11. Li Y., Tenchov R., Smoot J., Liu C., Watkins S., Zhou Q. (2021) A Comprehensive Review of the Global Efforts on COVID-19 Vaccine Development, *ACS Central Science*, 7: 512-533. <https://doi.org/10.1021/acscentsci.1c00120>
12. Anon, 2020. COVID-19 Treatment and Vaccine Tracker. <https://airtable.com/> Milken



- Institute. <https://airtable.com/shrSAi6t5WFwqo3GM/tblEzPQSS5fnc0FHyr/wiweymxOAtNvo7yH?blocks=bipZFzhJ7wHPv7x9z>.
13. Anon, 2020. UW–Madison, FluGen, Bharat Biotech to develop CoroFlu, a Coronavirus vaccine. <https://www.businesswire.com>. [Online] April 02. <https://www.businesswire.com/news/home/20200402005666/en/UW%E2%80%9393Madison-FluGen-Bharat-Biotech-develop-CoroFlu-coronavirus>
  14. Anon, 2020. Draft landscape of COVID-19 candidate vaccines. <https://www.who.int/>. [Online] June 22, 2020. [Cited: June 23, 2020.]. <https://www.who.int/publications/m/item/draft-landscape-of-covid-19-candidate-vaccines>
  15. Anon, 2020. A Trial Investigating the Safety and Effects of Four BNT162 Vaccines Against COVID-2019 in Healthy Adults. <https://clinicaltrials.gov/>. [Online] May 8. <https://clinicaltrials.gov/ct2/show/NCT04380701>
  16. Pandey A., Belbase P., Parajuli A. (2020) COVID-19 Vaccine Development to Vaccination, *Journal of Nepal Health Research Council*, 18(49): 807-809. <https://doi.org/10.33314/jnhrc.v18i4.3351>
  17. Anon, 2020. Safety and Immunogenicity Study of 2019-nCoV Vaccine (mRNA-1273) for Prophylaxis of SARS-CoV-2 Infection (COVID-19). <https://clinicaltrials.gov/>. [Online]. <https://clinicaltrials.gov/ct2/show/NCT04283461?term=vaccine&cond=covid-19&draw=2>
  18. Jackson, Lisa A., Anderson, Evan, J., et al., 2020. An mRNA Vaccine against SARS-CoV-2— Preliminary Report. *N Engl J Med.* (July).
  19. Anon, 2020. A Study of a Candidate COVID-19 Vaccine (COV001). <https://clinicaltrials.gov/>. [Online]. [Cited: June 8, 2020.]. <https://clinicaltrials.gov/ct2/show/NCT04324606?term=vaccine&cond=covid-19&draw=2>
  20. Folegatti, Pedro M, Ewer, Katie J, et al., 2020. Safety and immunogenicity of the ChAdOx1 nCoV-19 vaccine against SARS-CoV-2: a preliminary report of a phase 1/2, single-blind, randomised controlled trial. *The Lancet* (July)
  21. Thiagarajan K. (2021) Covid-19: India is at centre of global vaccine manufacturing, but opacity threatens public trust, *BMJ*, 372(196): 1-3. <http://dx.doi.org/10.1136/bmj.n196>
  22. Myupchar, 2020. Race for COVID-19 vaccine: Covaxin and ZyCoV-D begin human trials in India, Moderna publishes preliminary data from phase 1. <https://www.firstpost.com/>. [Online] July 15, 2020. [Cited: August 01, 2020.]. <https://www.firstpost.com/health/race-for-covid-19-vaccine-covaxin-and-zycov-d-begin-human-trials-in-india-moderna-publishes-preliminary-data-from-phase-1-8600211.html/amp>
  23. Anon, 2020. An Open Study of the Safety, Tolerability and Immunogenicity of the Drug "Gam-COVID-Vac" Vaccine against COVID-19. <https://clinicaltrials.gov/>. [Online] June 22, 2020. [Cited: June 22, 2020.]. <https://clinicaltrials.gov/ct2/show/NCT04436471?term=vaccine&cond=covid-19&draw=4>
  24. Anon, 2020. An Open Study of the Safety, Tolerability and Immunogenicity of "Gam-COVID-Vac Lyo" Vaccine Against COVID-19. <https://clinicaltrials.gov/>. [Online] June 22, 2020. [Cited: June 22, 2020.]. <https://clinicaltrials.gov/ct2/show/NCT04437875>
  25. Johnson & Johnson Announces a Lead Vaccine Candidate for COVID-19, 2020. Landmark New Partnership with U.S. Department of Health & Human Services; and Commitment to Supply One Billion Vaccines Worldwide for Emergency Pandemic Use. <https://www.prnewswire.com/>. [Online]. <https://www.prnewswire.com/news-releases/johnson-johnson-announces-a-lead-vaccine-candidate-for-covid-19-landmark-new-partnership-with-us-department-of-health-human-services-and-commitment-to-supply-one-billion-vaccines-worldwide-for-emergency-pandemic->
  26. Anon, 2020. Evaluation of the Safety and Immunogenicity of a SARS-CoV-2 rS (COVID-19) Nanoparticle Vaccine With/Without Matrix-M Adjuvant. <https://clinicaltrials.gov/>. [Online] May 27, 2020. [Cited: June 15, 2020.]. <https://clinicaltrials.gov/ct2/show/record/NCT04368988>
  27. Anon, 2020. Sinovac gets regulatory approval to assess Covid-19 vaccine.. <https://www.clinicaltrialsarena.com/>. [Online] April 15. <https://www.clinicaltrialsarena.com/news/sinovac-covid-19-vaccine-trial-approval/>
  28. Anon, 2020. Sinovac reports positive data from Phase I/II trials of CoronaVac.. <https://www.clinicaltrialsarena.com/>. [Online] June 15, 2020. [Cited: June 20, 2020.]. <https://www.clinicaltrialsarena.com/news/sinovac-coronavac-data/>
  29. Anon, 2020. Sinovac COVID-19 Vaccine Collaboration with Butantan Receives Approval from Brazilian Regulator for Phase III Trial. <http://www.sinovac.com/>. [Online] July 06, 2020. [Cited: August 01, 2020.]. [Sinovac Biotech Limited. http://www.sinovac.com/?optionid=754&auto\\_id=907](http://www.sinovac.com/?optionid=754&auto_id=907)
  30. Anon, 2020. Countries where COVID-19 has spread [www.worldometers.info](http://www.worldometers.info). [Online] July 30, 2020. [Cited: July 31, 2020.]. <https://www.worldometers.info/coronavirus/countries-where-coronavirus-has-spread/>.
  31. Zhu, Feng-Cai, Guan, Xu-Hua, et al., 2020. Immunogenicity and safety of a recombinant adenovirus type-5-vectored COVID-19 vaccine in healthy adults aged 18 years or older: a randomised, double-blind, placebo-controlled, phase 2 trial. *The Lancet* (July).
  32. Anon, 2020. Safety, Tolerability and Immunogenicity of INO-4800 for COVID-19 in Healthy Volunteers. <https://clinicaltrials.gov/>. [Online] 20 20.1. <https://clinicaltrials.gov/ct2/show/NCT04336410?term=inovio&cond=covid-19&draw=2&rank=1>
  33. Anon, 2020. COVID-19 Vaccine Development Program. <https://www.medicago.com/>. [Online]. [Medigaco Inc.. https://www.medicago.com/en/covid-19-programs/](https://www.medicago.com/en/covid-19-programs/)



34. Anon, 2020. *Sanofi joins forces with U.S. Department of Health and Human Services to advance a novel coronavirus vaccine.* <http://www.news.sanofi.us/>. [Online] Sanofi U.S., February 18, 2020. <http://www.news.sanofi.us/2020-02-18-Sanofi-joinsforces-with-U-S-Department-of-Health-and-Human-Services-to-advance-a-novel-coronavirus-vaccine>



# TEACHING STRATEGIES IN ONLINE DISTANCE LEARNING ON CRITICAL THINKING SKILLS AND TECHNICAL SKILLS OF THE STUDENTS

**April L. Trilles**

*Graduate School, Laguna State Polytechnic University, Santa Cruz, Laguna, Philippines*

Article DOI: <https://doi.org/10.36713/epra7397>  
DOI No: 10.36713/epra7397

---

## ABSTRACT

This study conducted to determine the effect of teaching strategies in online distance learning on the critical thinking skills and technical skills of the students of Liliw National High School, Liliw Laguna, specifically sought to answer the following questions. What is the level of teaching strategies in Online Distance Learning in terms of Lecture-Discussion Method/ Virtual Class; Inquiry-based Method; Visualization; Elaboration? What is the level of critical thinking skills of the student in terms of; Alertness; Flexibility; Decision making? What is the level of technical skills of the students in TLE in terms of; Mensuration and Calculation; Use of tool and equipment; Occupational health and safety? Are the teaching strategies in online distance learning have significant effect on the critical thinking skills of the Grade 7 and 8 TLE online students? Are the teaching strategies in online distance learning have significant effect on the technical skills of the students in Liliw National High School, Liliw, Laguna?

The researcher utilized a descriptive design and used the teaching strategies in technology and livelihood education to its effects on the critical thinking skills and technical skills of the students. Respondents are selected forty-five (45) online distance learning students from grade 7 and 8 levels in Liliw, Laguna. Purposive sampling technique was used to get the sample respondents for this study. The scheme was used to ensure that the student-respondents came from Liliw, Laguna. The main source of data of the study is the survey questionnaire prepared by the researcher and the statistical use of simple descriptive statistics such as mean and standard deviation to determine the mean level of the teaching strategies used by the teachers to measure the students' critical thinking and technical skills..

Based on the data gathered the teaching strategies in online distance learning in terms of lecture-discussion methods/ virtual class, inquiry-based method, visualization, and elaboration obtained a grand ( $M=4.27$ ,  $SD= 0.58$ ) which means that the respondents perceived that the level of teaching strategies was always performed. It could be concluded that the teaching strategies used in online distance learning were always perceived by the students on an excellent level.

The level of the critical thinking skills of the students in TLE in terms of alertness, flexibility, and decision making were always and excellently performed and for technical skills of the students in TLE in terms of mensuration and calculation, use of tools and equipment, and occupational health and safety were also resulted always and excellently performed.

The teaching strategies in online distance learning on critical thinking skills as to alertness in terms of lecture-discussion method/virtual class, inquiry-based method and elaboration resulted in significant analysis while in terms of visualization it resulted in not significant analysis. As for the Flexibility in terms of lecture-discussion method/virtual class, visualization and elaboration got the result to the analysis of not significant however in terms of inquiry-based method resulted as to significant analysis. And for decision making in terms of lecture-discussion method/virtual class, visualization and elaboration got also the result



to the analysis of not significant and in terms of inquiry-based method resulted as to significant analysis. The result has not sustained the research hypothesis, therefore; the null hypothesis was partially accepted.

In the effect of teaching strategies in the online distance learning on technical skills of the students as to mensuration and calculation and use of tools and equipment in terms of lecture-discussion, visualization and elaboration got the result the analysis of no significant effect and in terms of inquiry-based method got the result of the significant analysis. Lastly, as to occupational health and safety in terms of inquiry-based method, visualization and elaboration got the analysis of not significant, and lecture-discussion in the virtual class got the significant analysis. The effect of teaching strategies in online distance learning in terms of technical skills was also partially sustained the research hypothesis. Therefore; the effect of teaching strategies in online distance learning in terms of critical thinking skills and technical skills were both partially accepted.

School and teachers may adapt the results of this study called, “Teaching Strategies in Online Distance Learning on Critical thinking and Technical skills of the Students”, to maintain and enhanced the teaching strategies in teaching technology and livelihood education (TLE) to continue preparing for the current situation that our education system is facing today to bring out the best of the students’ performance for the benefit of our students and their future.

**KEYWORDS:** *critical thinking skills, online distance learning, ,teaching strategies, technical skills, TLE*

## I. INTRODUCTION

Teaching field learning in a remote modality clearly poses pedagogical and logistical challenges. Variety of potentially successful approaches to remote teaching of topics typically taught in the field, especially in teaching that needs to develop the critical and technical skills of the students. The education systems now a days changed by the pandemic that focused on the learning outcome types most frequently taught in typical field settings and most heavily impacted by modality shift: identification and natural history, field techniques, data collection, and study design.

Freeman et al., (2014), suggested activities and related resources are general rather than specific and may be applicable to a variety of synchronous or asynchronous remote courses that teach such learning outcomes. It assumed that more active and student - centered activities are generally more engaging to students and likely to produce positive outcomes in both face - to - face and remote environments. The challenges to inclusive teaching posed by shifting to distance - learning modalities that were most frequently identified by respondents were technology, student time, less engaging modality, and geography or transportation. A combination of institutional support, such as providing necessary equipment to students, and thoughtful remote course design, such as focusing on activities likely to be effective in a remote environment, may assist students in overcoming these faculty - perceived barriers. An important consideration, expressed is that remote teaching modalities may exacerbate existing inequalities between students, presumably because of correlation between access to technology and socioeconomic class or other factors.

Through this, a study of the teaching strategies in online distance learning has to think of interventions and techniques for the students to cope in this time. It determines problem of modalities coping the challenges in teaching TLE using the critical thinking skills and technical skills in order to find huge opportunities for the learner’s despite of the challenges that we are facing at the moment.

## II. OBJECTIVES

The study aimed to determine the teaching strategies in Online distance learning: its effect to the critical thinking skills of the students of Liliw National High School, Liliw Specifically, and this study intended to answer the following questions;

1. What is the level of teaching strategies in TLE in terms of :
  - 1.1 online distance learning;
    - 1.1.1 lecture discussion method/ virtual class;
    - 1.1.2 inquiry-based method;
    - 1.1.3 visualization; and
    - 1.1.4 elaboration?
2. What is the level of critical thinking skills of the students in TLE in terms of:
  - 2.1 alertness;



- 2.2 flexibility; and
- 2.3 decision making?
- 3. What is the level of technical skills of the students in TLE in terms of:
  - 3.1 mensuration and calculation;
  - 3.2 use of tool and equipment; and
  - 3.3 occupational health and safety?
- 4. Are the teaching strategies in online distance learning has a significant effect on the critical thinking skills of the selected grade 7 and 8 students of Liliw National High, Liliw Laguna?
- 5. Are the teaching strategies in Online distance learning has a significant effect on the technical skills of the selected grade 7 and 8 students of Liliw National High School, Liliw Laguna?

### III. METHODOLOGY

The respondents of the study were selected grade 7 and 8 online students in Liliw National High School, Liliw, Laguna for school year 2020-2021. The researcher selected a group of subjects for study from a larger group. Purposive sampling technique was used to get the sample respondents for this study. The scheme was used to ensure that the student-respondents came from Liliw Laguna The respondents of the study included the selected forty five (45) online distance learning students, it consists of twenty three from Grade 7 and twenty two Grade 8 of Liliw National High School, Liliw, Laguna

A validated researcher-made questionnaire was used as the major instrument to gather the adequate data and information from the respective subjects of the study. The copies of the questionnaire were multiplied based from the number of the respondents. Then it was administered with confidentiality, the gathered information was transferred in a tally sheet. Subsequently, codes were assigned to each indicator. The encoded data was given to the researcher's statistician for the descriptive analysis. The gathered data was interpreted and presented in textual and tabular forms and appropriate interpretation was made

Mean and standard deviation were used to determine the level of teaching strategies in online distance learning in terms of lecture/discussion, inquiry-based methods, visualization and elaboration on critical thinking skills of the students in terms of alertness, flexibility and decision making and technical skills of the students in terms of mensuration, use of tolls and equipment and occupational health and safety. In the other hand, Minitab 14 was used in computing the data gathered and treated them statistically using Linear Regression Analysis to know if there is a/no significant effect to teaching strategies' in TLE on critical thinking skills and technical skills of the students.

### IV. RESULT AND DISCUSSION

This chapter deals with the presentation, interpretation and analysis of data gathered to answer the sub problem relative to the main problem of this study on strategies on online distance learning on critical thinking and technical skills of the students. This part discusses the findings of the study based on the research questions.

#### Teaching strategies in online distance learning (ODL)

Teaching strategies in online distance learning in terms of lecture discussion method/ virtual class, inquiry-based method, visualization and elaboration was treated statistically accompanied by five-point rating scale made by a researcher. The table shows the indicative statement, weighted mean, standard deviation as well as the remarks.

**Table 1. Level of Teaching Strategies in Online Distance Learning**

Variables	Mean	SD	Remarks
Lecture Discussion Method/ Virtual Class	4.23	0.53	Always
Inquiry-based Method	4.35	0.56	Always
Visualization	4.30	0.60	Always
Elaboration	4.18	0.62	Often
<b>Grand Mean/SD</b>	<b>4.27</b>	<b>0.58</b>	<b>Always</b>
<b>Verbal interpretation</b>			<b>Excellent</b>



*Legend:*

Scale	Range	Remarks	Interpretation
5	4.20 – 5.00	Always	Excellent
4	3.40 – 4.19	Often	Very Satisfactory
3	2.60 – 3.39	Sometimes	Satisfactory
2	1.80 – 2.59	Rarely	Fair
1	1.0 – 1.79	Never	Poor

Table 1 shows the level of teaching strategies is based on lecture discussion method/ virtual class (M=4.23, SD= 0.53), inquiry-based method (M=4.35, SD= 0.56), visualization (M=4.30, SD= 0.60) and elaboration (M=4.18, SD= 0.62). It could be gleaned from the table that the level of teaching strategies obtained a grand (M=4.27, SD= 0.58) which means that the respondents perceived that the level of teaching strategies were *always* performed. It could be concluded that the teaching strategies used in online distance learning was always perceived by the students on an *excellent level*.

**Table 2. Level of Teaching Strategies in Online Distance Learning in Terms of Lecture Discussion Method/Virtual Class**

STATEMENT	Mean	SD	Remarks
<b>My teacher was able to:</b>			
1. Encourage us to brainstorm ideas for learning contracts with their online peers as well as negotiate the final contract with the instructor through email or online conferencing.	4.32	0.52	Always
2. Execute short lectures provide enough information to serve as a basis for further reading, research, or other learning activities.	4.22	0.56	Always
3. Place lecture notes, with links to related resources and other Web sites embedded in them, on a web page for the learners to review.	4.24	0.48	Always
4. Offer continuous feedback regarding progress toward accomplishing learning objectives especially in the laboratory in TLE.	4.20	0.55	Always
5. Have online lectures that could make our lesson be shorter and more to the point than lectures in live classrooms which often extend far beyond the attention span of the audience.	4.20	0.50	Always
<b>Grand Mean/SD Verbal interpretation</b>	<b>4.23</b>	<b>0.53</b>	<b>Always Excellent</b>

It can be seen from the table, statement no. 1 “encourage us to brainstorm ideas for learning contracts with their online peers as well as negotiate the final contract with the instructor through email or online conferencing” gained the highest (M= 4.32, SD=0.52). Next is statement no. 2 “Execute short lectures provide enough information to serve as a basis for further reading, research, or other learning activities” (M= 4.22, SD=0.56). Statement no. 3 “Place lecture notes, with links to related resources and other Web sites embedded in them, on a web page for the learners to review” (M= 4.24, SD=0.48). However, statement no. 4 offering continuous feedback regarding progress toward accomplishing learning objectives especially in the laboratory in TLE” and statement no. 5 “having online lectures that could make our lesson be shorter and more to the point than lectures in live classrooms which often extend far beyond the attention span of the audience” both got (M= 4.20, SD=0.50) which means that indicates that teachers got the remark of *always* and interpreted as *excellent* in engaging on it respectively. This meant that amidst the pandemic, teachers were able to show their competency in teaching in terms of lecture discussion method during virtual class.



**Table 3. Level of Teaching Strategies in Online Distance Learning in terms of Inquiry-based Method**

STATEMENT	Mean	SD	Remarks
My teacher was able to:			
1. Compose small groups' differing ability levels and use a variety of learning activities to master material initially developed by my teacher.	4.34	0.47	Always
2. Create forum for us to discuss more of our topic especially in the specific topic like mensuration and calculation.	4.27	0.63	Always
3. Find convenient and effective way to understand the online class by means of collaborative activities in such TLE activities in technical activities.	4.37	0.62	Always
4. Internalize the knowledge and skills acquired from tasks.	4.46	0.55	Always
5. Allow time for us to socialize and incorporate an icebreaker.	4.32	0.52	Always
<b>Grand Mean/SD Verbal interpretation</b>	<b>4.35</b>	<b>0.56</b>	<b>Always Excellent</b>

Table 3 above shows the level of teaching strategies in Online Distance Learning in terms of inquiry-based method statement no. 1 “Compose small groups' differing ability levels and use a variety of learning activities to master material initially developed by the teacher” as shown with (M= 4.34, SD=0.47). Statement no. 2, “Create forums for us to discuss more of our topic especially in the specific topic like mensuration and calculation” with (M=4.27, SD= 0.63). Statement no. 3, “Find convenient and effective way to understand the online class by means of collaborative activities in such TLE activities in technical activities” got ( M=4.37, SD= 0.62). Statement no. 4, “Internalize the knowledge and skills acquired from tasks” got (M=4.46, SD=0.55) and statement no. 5 “the teacher allow time for us to socialize and incorporate an icebreaker” with M=4.32, SD=0.52). The Grand mean of the table 3 resulted with M=4.35, SD= 0.56) with a remark of *always* with verbal interpretation of *excellent*. The result implies that the students perceived the teacher’s performed excellently amidst pandemic in terms of inquiry based method.

**Table 4. Level of Teaching Strategies in Online Distance Learning in Terms of Visualization**

STATEMENT	Mean	SD	Remarks
My teacher was able to:			
1. Explain what’s written on our module for further understanding.	4.10	0.66	Often
2. Teach natural and logical that you choose colorful and funny images over charts and tables.	4.34	0.68	Always
3. Combine them with the shapes and tools that are provided by the virtual classroom’s software to organize your lesson.	4.29	0.45	Always
4. Draw from the news, social media, and any other source you see fit to complete the lesson’s content.	4.46	0.59	Always
5. Involve the learners by jointly creating a presentation on a topic by using the virtual classroom’s additional screens as slides in the PowerPoint presentation.	4.29	0.51	Always
<b>Grand Mean/SD Verbal interpretation</b>	<b>4.30</b>	<b>0.60</b>	<b>Always Excellent</b>



Table 4 presents the level of teaching strategies in Online Distance Learning in terms of Visualization. Statement no. 1 “The teacher explains what’s written on our module for further understanding” resulted as (M=4.10, SD= 0.66) interpreted as often. Statement no. 2 that the teacher Teach natural and logical that you choose colorful and funny images over charts and tables with of M=4.34, SD= 0.68). Statement no. 3 “Combine them with the shapes and tools that are provided by the virtual classroom’s software to organize your lesson” with (M=4.29, SD=0.45). Statement no 4 “Draw from the news, social media, and any other source you see fit to complete the lesson’s content” got (M=4.46, SD=0.59). Statement no. 5, “teacher Involve the learners by jointly creating a presentation on a topic by using the virtual classroom’s additional screens as slides in the PowerPoint presentation” got (M=4.29, SD=0.51). Statements 2, 3, 4, 5 got the remarks of *always* verbal interpretation of excellent. To sum up the weighted mean, it resulted as (M=4.30, SD=0.60) with the remark *always* and verbal interpretation of *excellent*. This indicates that teachers were able to demonstrate their competency in teaching in terms of lecture discussion method during virtual class.

**Table 5. The Level of Teaching Strategies in Online Distance Learning in Terms of Elaboration**

STATEMENT	Mean	SD	Remarks
<b>My teacher was able to:</b>			
1. Keep our lessons short, with explanations clear-cut and concise but with better understanding.	4.20	0.55	Always
2. Divided, and pre-assigned or auto-assigned into smaller groups for more focused discussions on a particular topic.	4.29	0.67	Always
3. Integrate lesson to my daily living.	4.17	0.62	Often
4. Reconstruct more meaningful knowledge in her teaching TLE.	4.00	0.58	Often
5. Initiates questions that, developed through steps of investigations, attained to conclusion on certain phenomena in such topic in TLE.	4.24	0.62	Always
<b>Grand Mean/SD</b>	<b>4.18</b>	<b>0.62</b>	<b>Often</b>
<b>Verbal interpretation</b>			<b>Very Satisfactory</b>

Table 5 presents the Level of Teaching Strategies in Online distance learning in Terms of Elaboration. The statements are as follows: Statement no 1, “The teachers keep our lessons short, with explanations clear-cut and concise but with better understanding” got (M=4.20, SD= 0.55) with remarks of *always*. Statement no. 2, “Divided, and pre-assigned or auto-assigned into smaller groups for more focused discussions on a particular topic got (M=4.29, SD=0.67) also remarks as *always*. The statement no. 3 the teacher integrate lesson to the students daily living with the (M=4.17, SD=0.62) and remarks of *often*. Statement no. 4, “Reconstruct more meaningful knowledge in her teaching TLE” (M=4.00, SD=0.58) with remarks of *often*. Statement no. 5, “Initiates questions that, developed through steps of investigations, attained to conclusion on certain phenomena in such topic in TLE”, (M=4.24, SD= 0.62) and remarks of *always*. The overall weighted mean resulted as 4.18, standard deviation of 0.62 with *often* remarks and verbal interpretation of *very satisfactory*. This specifies that the teachers were able to show their competency in teaching in terms of elaboration in method during virtual class.

**Level of Critical Thinking Skills**

The level of Critical thinking skills in terms of alertness, flexibility and decision making were treated statistically using the weighted mean and standard deviation accompanied by a five-point rating scale. The table shows the indicative statement, weighted mean, standard deviation and remarks.



**Table 6. Level of Critical Thinking Skills of the Students in TLE in terms of Alertness**

STATEMENT	Mean	SD	Remarks
<b>As a Students, I am able to:</b>	3.85	0.75	Often
1. Learn experiences such as field trips, role playing, model building, assembling objects, games, and other physical activities are my interest.			
2. Prefer to do things with a well-structured and attainable plan.	3.95	0.70	Often
3. Consult consistently on facts rather than subjective opinions on decision making.	4.02	0.68	Often
4. Resolve group conflicts.	3.98	0.68	Often
5. I can resolve group conflicts.	3.88	-.71	Often
<b>Grand Mean/SD</b>	<b>3.94</b>	<b>0.71</b>	<b>Often</b>
<b>Verbal interpretation</b>			<b>Very Satisfactory</b>

Table 6 presents the level of critical thinking skills of the students in TLE in terms of Alertness. Statement no. 1, “The students learn experiences such as field trips, role playing, model building, assembling objects, games, and other physical activities are my interest” got (M=3.85, SD=0.75). Statement no. 2, “Prefer to do things with a well-structured and attainable plan” got (M=3.95, SD= 0.70). Statement no. 3, “Consult consistently on facts rather than subjective opinions on decision making” got (M=4.02; SD=0.68). Statement no. 4, “Resolve group conflicts with (M=3.98, SD=0.68). And lastly statement no. 5, “the students were able to resolve the group conflict” with (M=3.88, SD=-.71). The grand weighted mean resulted as 3.94; SD= 0.71 with overall remark of *often* and verbal interpretation of *very satisfactory*. This meant that amidst the pandemic, students were able to show apparently their critical thinking skills in terms alertness.

**Table 7. Level of Critical Thinking Skills of the Students in TLE in terms of Flexibility**

STATEMENT	Mean	SD	Remarks
<b>As a Students, I am able to:</b>			
1. Do things independently.	4.29	0.59	Always
2. Have a huge interest in interpersonally-oriented careers like teaching, counselling, social work, politics or managerial jobs.	4.32	0.56	Always
3. Use to handle, touch or manipulate on what is to be learned.	4.51	0.55	Always
4. Have the ability to switch between thinking about two different concepts or to think about multiple concepts simultaneously.	4.41	0.62	Always
5. Strive for my future.	4.32	0.52	Always
<b>Grand Mean/SD</b>	<b>4.37</b>	<b>0.58</b>	<b>Always</b>
<b>Verbal interpretation</b>			<b>Excellent</b>

Table 7 shows the result of the level of critical thinking skills of the students in TLE in terms of flexibility, the stamen are as follows: The students do the thing independently, (M=4.29, SD= 0.59); The students have a huge interest in interpersonally-oriented careers like teaching, counselling, social work, politics or managerial jobs, (M= 4.32, SD=0.56); the students use to handle, touch or manipulate on what is to be learned, (M=4.51, SD=0.55); have the ability to switch between thinking about two different concepts or to think about multiple concepts simultaneously, (M=4.41, SD=0.62); and the students strive for their future with (M=4.32, SD= 0.52). The overall weighted mean is 4.37 and SD of 0.58 with remarks of always and overall verbal interpretation of excellent. This indicates that in online distance learning, students were able to display their flexibility competency in the level of critical thinking skills.



**Table 8. Level of Critical Thinking Skills of the Students in TLE in terms of Decision Making**

STATEMENT	Mean	SD	Remarks
<b>As a Students, I am able to:</b>			
1. Enjoy working with numbers and equations.	4.27	0.50	Always
2. Remember information through numbers, sequence and patterns.	4.29	0.45	Always
3. Have high interest in courses like computer technology.	4.51	0.50	Always
4. Reading and writing, and comprehension gives me a sort of enjoyment more than anything else.	4.46	0.50	Always
5. Explore and investigate issues related to our present situation.	4.20	0.45	Always
<b>Grand Mean/SD</b>	<b>4.35</b>	<b>0.50</b>	<b>Always</b>
<b>Verbal interpretation</b>			<b>Excellent</b>

Table 8 shows the result on the level of critical thinking skills of the students in TLE in terms of decision making. Statement no. 1, “The students were able to enjoy working with numbers and equations”, got (M=4.27, SD= 0.50). Statement no. 2, “Remember information through numbers, sequence and patterns” with (M=4.29, SD= 0.45). Statement no. 3, “The students have high interest in courses like computer technology”, with (M=4.51, SD= 0.50). Statement no. 4, “Reading and writing, and comprehension gives me a sort of enjoyment more than anything else”, with (M=4.46, SD=0.50). Lastly statement no. 5, “Explore and investigate issues related to our present situation” with (M=4.20, SD= 0.45). The overall grand mean of 4.35, Standard deviation of 0.50 with remarks of always and verbal interpretation of excellent. The result indicates students were able to show their critical thinking skills in terms of decision making.

### Level of Technical Skills

The level of technical skills of the Students in TLE in terms of Mensuration and Calculation, use of tools and equipment and occupational health and safety were treated statistically. The table shows indicative statement, weighted mean, standard deviation and remarks.

**Table 9. Level of Technical Skills of the Students in Online Distance Learning in terms of Mensuration and Calculation**

STATEMENT	Mean	SD	Remarks
<b>As a Students, I am able to:</b>			
1. Perform measuring certain distance, time and mass needed for TLE subjects.	4.59	0.49	Always
2. Understand the different types of measuring.	4.37	0.53	Always
3. Share my knowledge in identifying the measure of materials used in cooking.	4.37	0.53	Always
4. Know the conversion of size e.g. meter to centimeter.	4.20	0.55	Always
5. Put the amount of the thing into numbers.	4.17	0.49	Often/
<b>Grand Mean/SD</b>	<b>4.34</b>	<b>0.54</b>	<b>Always</b>
<b>Always</b>			<b>Excellent</b>

Table 9 above shows the level of technical skills of the students in TLE in terms of mensuration and calculation the statements are as follows: statement no. 1, “The students were able to perform measuring certain distance, time and mass needed for TLE subject” resulted the (M=4.59, SD= 0.49); statement no. 2, “the students understand the different types of measuring” with the (M=4.37,SD= 0.53) same with the statement number three that the students were able to share knowledge in identifying the measure of materials used in cooking. Statement no. 4, “The students know the conversion of e.g. meter to centimeter” with a (M=4.20, SD= 0.55). Lastly statement no. 5, “The student put the amount of a thing into numbers” with the (M=4.17, .The overall weighted mean resulted with 4.34, standard deviation 0.54, remarks of *always* and verbal interpretation



of *excellent*. The result indicates that the respondents in online distance learning were able to show their technical skills in the mensuration and calculation.

**Table 10. Level of Technical Skills of the Students in TLE in terms of Use of Tools and Equipment**

STATEMENT	Mean	SD	Remarks
<b>As a Students, I am able to:</b>			
1. Identify the tools in the specific activity in TLE.	4.51	0.59	Always
2. Use the tool properly with the help of my teacher	4.59	0.54	Always
3. Demonstrate the uses of the tools in TLE.	4.46	0.63	Always
4. Use mixing bowl in proper stroke of its function.	4.29	0.51	Always
5. Arrange the kitchen utensils according to its function accordingly.	4.41	0.54	Always
<b>Grand Mean/SD Verbal Interpretation</b>	<b>4.45</b>	<b>0.57</b>	<b>Always Excellent</b>

The table 10 above result shows that the students were able to identify tools in the specific activity in TLE (M=4.51, SD= 0.59). The second statement stated that the student makes use of tool properly with the help of their teacher resulted of (M=4.59, SD= 0.54). The student demonstrates the uses of tools in TLE got the (M=4.46, SD= 0.63). The student used mixing bowl in proper stroke of its function, with (M=4.29, SD=0.51). And the student arranges the kitchen utensils according to its function accordingly in (M= 4.41, SD= 0.54). The overall weighted mean resulted in 4.45, standard deviation of 0.57 with remarks of *always* and verbal interpretation of *excellent*. This denotes that students were able to show their technical skills with the use of tools and equipment in TLE subject in online distance learning.

**Table 11. Level of Technical Skills of the Students in TLE in terms of Occupational Health and Safety**

STATEMENT	Mean	SD	Remarks
<b>As a Students, I am able to:</b>			
1. I wash my hand frequently.	4.54	0.50	Always
2. I always take vitamins.	4.37	0.53	Always
3. I eat nutritious food.	4.37	0.48	Always
4. I aware to the safety protocols.	4.44	0.50	Always
5. I watch news for me to become aware in the present situation especially in the health news.	4.44	0.54	Always
<b>Grand Mean/SD Verbal Interpretation</b>	<b>4.43</b>	<b>0.51</b>	<b>Always Excellent</b>

The table 11 above shows the result in the level of technical skills of the students in TLE in terms of occupation health and safety. Statement no. 1, “I wash hands frequently” with the (M=4.54, SD= 0.50). Statement no. 2, “I always take vitamins “, with (M=4.37, SD= 0.53). Statement no. 3, “I eat notorious food both resulted a (M=4.37, SD= 0.48). Statement no. 4, “I am aware to the safety protocols and statement no. 5, “I watch news to become aware in the present situation especially in health news, both got a (M=4.44, SD= 0.50), with the overall weighted mean of 4.43, standard deviation of 0.51, remarks of *always* and verbal interpretation of *excellent*. The students in online distance learning were able to show their technical skills in the terms of occupational health and safety amidst the pandemic

**Effect of teaching strategies in online distance learning on critical thinking skills and technical skills of the students in TLE**

This data shows based on the result the effect of online distance learning in the critical thinking skills and technical skills of the students. Minitab 14 was used in computing the data gathered and treated them statistically using Linear Regression Analysis. The computed p-values were compared to the level of significance at 0.05 to determine the Effect of teaching strategies in online distance learning on the critical



thinking skills and technical skills of selected grade 7 and 8 students. The table shows the variables, t-value, p-value, decision on  $H_0$  and the analysis

**Table 12. Effect of teaching strategies in Online Distance Learning on the critical thinking skills as to Alertness of the students**

Variables	t-value	p-value	Decision on $H_0$	Analysis
Lecture Discussion Method/ Virtual Class Alertness	3.96	0.000	Reject	Significant
Inquiry-based Method Alertness	2.36	0.024	Reject	Significant
Visualization Alertness	1.10	0.278	Accept	Not Significant
Elaboration Alertness	-2.27	.000	Reject	Significant

\*significant at .05 level of significance

Table 12 consists of the results on the effect of teaching strategies in Online Distance Learning in the critical thinking skills as to alertness of the selected students. The variable in the lecture discussion / virtual class results with the ( $t= 3.96$ ,  $p= 0.000$ ) decision on is to reject the  $H_0$  and analysis of *significant*. The inquiry-based method with the ( $t=2.96$ ,  $p=0.024$ ) the decision is to reject the  $H_0$  and analysis of *significant*. The visualization as to alertness got the ( $t= 1.10$ ;  $p= 0.278$ ) the decision is to accept the  $H_0$  and analysis of not significant. The elaboration as to alertness resulted with the ( $t= -2.27$ ,  $p=.000$ ) decision of reject  $H_0$  and has the analysis of *significant*. This conclude that teaching strategies in online distance learning in terms of lecture discussion, inquiry-based method and elaboration method effect the critical thinking skill of the students as to alertness, while visualization method has no significant effect on the critical thinking skill of the students as to alertness. This means that student prefer to do things with a well-structured and attainable plan.

**Table 13. Effect of teaching strategies in Online distance learning on the critical thinking skills as to Flexibility of the students**

Variables	t-value	p-value	Decision on $H_0$	Analysis
Lecture Discussion Method/ Virtual Class Flexibility	-0.16	0.873	Accept	Not Significant
Inquiry-based Method Flexibility	5.71	0.000	Reject	Significant
Visualization Flexibility	0.12	0.907	Accept	Not Significant
Elaboration Flexibility	-0.11	0.915	Accept	Not Significant

Table 13 shows the results in the effect of teaching strategies in online distance learning on critical thinking as to flexibility of the selected students. The results in the lecture discussion method/ virtual class in the ( $t=0.16$ ,  $p= 0.873$ , accept the decision on  $H_0$ , analysis is *not significant*. The inquiry-based on flexibility of the students with the ( $t= 5.71$ ,  $p= 0.000$ ) reject the decision on  $H_0$ , and analysis of *significant*. The Visualization as to flexibility of the students resulted in the ( $t=0.12$ ,  $p= 0.907$ ), the decision is to accept the  $H_0$  and analysis of *not significant*. Lastly, in the elaboration as to flexibility with ( $t= -0.11$ , p-value of 0.915), accept the decision on  $H_0$  and analysis is *not significant*. This conclude that teaching strategies in online distance learning in terms of lecture discussion/virtual class, visualization and elaboration has no significant effect to the critical thinking of the students as to flexibility, while inquiry-based method has significant effect to the critical thinking skills of



the students as to flexibility. This means that students like better sharing their different ideas and ways of thinking to the discussion.

**Table 14. Effect of teaching strategies in online distance learning on the critical thinking skills as to Decision Making of the students**

Variables	t-value	p-value	Decision on H <sub>0</sub>	Analysis
Lecture Discussion Method/ Virtual Class Decision making	1.67	0.104	Accept	Not Significant
Inquiry-based Method Decision making	5.25	0.000	Reject	Significant
Visualization Decision making	-0.25	0.803	Accept	Not Significant
Elaboration Decision making	-0.39	0.695	Accept	Not Significant

The table 14 above indicates the result in the effect of teaching strategies in online distance learning on critical thinking skills as to decision making of the TLE students. In the lecture discussion method/ virtual discussion with the (t=1.67, p= 0.104) decision is to accept the H<sub>0</sub>, analysis of *not significant*. The Inquiry-based method as to decision making has the t-value of (t= 5.25, p= 0.000), the decision is to reject the H<sub>0</sub>, with the analysis of *significant*. The visualization as to decision making with (t= -0.25, p= 0.803), the decision is to accept the H<sub>0</sub>, with the analysis of *not significant*. Elaboration on decision making has the (t= -0.39, p= 0.695), the decision is to accept the H<sub>0</sub>, the analysis is *not significant*. This conclude that teaching strategies in online distance learning in terms of lecture discussion,/virtual class, visualization and elaboration has no significant effect to the critical thinking skills of the students as to decision making, while-inquiry based method has significant effect to the critical thinking skills of the students as to decision making. This means that students engaged in a class with a questions or problem and strategies to develop subsequent solution and explanation.

**Table 15. Effect of teaching strategies in online distance learning on technical skills of the students as to Mensuration and Calculation**

Variables	t-value	p-value	Decision on H <sub>0</sub>	Analysis
Lecture Discussion Method/ Virtual Class Mensuration and Calculation	1.97	0.057	Accept	Not Significant
Inquiry-based Method Mensuration and Calculation	2.23	.032	Reject	Significant
Visualization Mensuration and Calculation	0.22	0.828	Accept	Not Significant
Elaboration Mensuration and Calculation	-0.79	0.436	Accept	Not Significant

Table 15 above shows the result on the effect of teaching strategies in online distance learning on technical skills of the selected student in Liliw National High School, Liliw Laguna. The results are as follows; the lecture discussion method/ virtual class as to mensuration and calculation it has the (t= 1.97, p= 0.05), accept the decision on H<sub>0</sub>, with the analysis of *not significant*. The inquiry-based method in mensuration and calculation has the (t= 2.23, p= 0.32), decision is to reject the H<sub>0</sub> and the analysis is *significant*. The visualization has the (t= 0.22, p= 0.828), decision is to accept the decision in H<sub>0</sub> with the analysis of *not significant*. Lastly in elaboration as to mensuration and calculation (t= -0.79, p= 0.436), the decision is to accept H<sub>0</sub> and the analysis is *not significant*. This conclude that teaching strategies in online distance learning in terms



of lecture discussion,/virtual class, visualization and elaboration has no significant effect to the technical skills of the students as to mensuration and calculations, while-inquiry based method has significant effect to the technical of the students as to mensuration and calculations. This implies that students prefer to do things that allow them to build knowledge through exploration, experience and discussion.

**Table 16. Effect of teaching strategies in online distance learning on the technical skills of students as to Use of tool and equipment**

Variables	t-value	p-value	Decision on H <sub>o</sub>	Analysis
Lecture Discussion Method/ Virtual Class Use of tool and equipment	0.57	0.572	Accept	Not Significant
Inquiry-based Method Use of tool and equipment	2.80	0.008	Reject	Significant
Visualization Use of tool and equipment	0.73	0.467	Accept	Not Significant
Elaboration Use of tool and equipment	0.48	0.635	Accept	Not Significant

The table 16 presents the effect of teaching strategies in online distance learning on technical skills as to use of tool and equipment of the students in Liliw National High School, Liliw Laguna. The result in the lecture discussion method/ virtual class is (t= 0.57, p= 0.572), decision is to accept the H<sub>o</sub> and the analysis is *not significant*. The inquiry-based method has the (t= 2.80, p= 0.008), the decision is to reject the H<sub>o</sub> and the analysis is *significant*. The visualization has the (t= 0.73, p=0.467), accept the decision on H<sub>o</sub>, the analysis is *not significant*. In elaboration (t= 0.48, p= 0.635), accept the decision on H<sub>o</sub>, and the analysis is *not significant*. This conclude that teaching strategies in online distance learning in terms of lecture discussion,/virtual class, visualization and elaboration has no significant effect to the technical skills of the students as use of tools and equipment, while-inquiry based method has significant effect to the technical of the students as to use of tools and equipment. This means that students learn to use tools and equipment with the aid of their teacher.

**Table 17. Effect of teaching strategies in Online Distance Learning on technical skills as to Occupational health and safety**

Variables	t-value	p-value	Decision on H <sub>o</sub>	Analysis
Lecture Discussion Method/ Virtual Class Occupational health and safety	3.04	0.004	Reject	Significant
Inquiry-based Method Occupational health and safety	1.94	0.060	Accept	Not Significant
Visualization Occupational health and safety	0.34	0.734	Accept	Not Significant
Elaboration Occupational health and safety	-1.63	0.111	Accept	Not Significant

Table 17 above shows the result in the effect of teaching strategies in Online Distance Learning on technical skills as to occupational health and safety of students. The statement has the result in the lecture discussion / virtual class has the (t= 3.94, p= 0.004), the decision is to reject the H<sub>o</sub>, and the analysis is *significant*. The inquiry-based method has the (t= 1.94, p= 0.060), the decision is to accept the H<sub>o</sub>, and the analysis is *not significant*. In the visualization the (t= 0.34, p= 0.734), and the decision is to accept the H<sub>o</sub>, with the analysis of *not significant*. The elaboration shows the result of (t= -1.63, p= 0.111), the decision is to accept the H<sub>o</sub> and the analysis is *not significant*. This conclude that teaching strategies in online distance learning in terms of inquiry based method, visualization and elaboration has no significant effect to the technical skills of



the students as to occupational health and safety, while lecture discussion/virtual class has significant effect to the technical skills of the students as to occupational. This means that students like better their teachers to deliver lecture virtually.

## V. CONCLUSION

Drawn the results of the study, the following results are set forth;

The effect of teaching strategies in online distance learning in the critical thinking skills of the students as to alertness, flexibility and decision making has not sustained the research hypothesis; therefore; the null hypothesis was partially accepted.

In the effect of strategies in online distance learning in the technical skills of the students as to mensuration and calculation, use of tools and equipment and occupational safety has partially sustained the research hypothesis therefore the null hypothesis was also partially accepted ..

## RECOMMENDATION

In the light of the findings and conclusion of the study, the following recommendations were drawn.

1. The strategies of teaching in teaching technology and livelihood education (TLE) needs to maintain and enhanced to bring out the best of the students' performance.
2. The lecture discussion in the virtual methods suggests having more engaging activities for the students to be motivated.
3. Continue to prepare for the current situation that our education system is facing today for the benefit of our students and their future.
4. The school must have continuous program implementation for LAC session or learning action cell training to develop passion in the teaching profession amidst pandemic.
5. For future researches, develop a research that could have a continuous monitoring in this study.

## REFERENCES

1. **Acar, O. A., & Tuncdogan, A.** (2018). *Using the inquiry-based learning approach to enhance student innovativeness: a conceptual model. Teaching in Higher Education, 1–15.* doi:10.1080/13562517.2018.1516636
2. **Adams, N. E.** (2015). *Bloom's taxonomy of cognitive learning objectives. Journal of the Medical Library Association : JMLA, 103(3), 152–153.* doi:10.3163/1536-5050.103.3.010.
3. **Al Akashee, Bushra.** (1991). *The brief college student hassles scale: Development, validation, and relation with pessimism. Journal of College Student Development, 32(3), 258–264.*
4. **Andrew W. Kruse, Andrey S. Alenin, J. Scott Tyo** (2019). *Review of Visualization Methods for passive polarization imaging* <https://doi.org/10.1117/1.OE.58.8.082414>
5. **Agarwal, S., & Kaushik, J. S.** (2020). *Student's Perception of Online Learning during COVID Pandemic. The Indian Journal of Pediatrics.* <https://doi.org/10.1007/s12098-020-03327-7>
6. **Antwi-Afari, M. F., Li, H., Wong, J. K.-W., Oladinrin, O. T., Ge, J. X., Seo, J., & Wong, A. Y. L.** (2019). *Sensing and warning-based technology applications to improve occupational health and safety in the construction industry. Engineering, Construction and Architectural Management.* doi:10.1108/ecam-05-2018-0188
7. **Assarroudi, A., Heshmati Nabavi, F., Armat, M. R., Ebadi, A., & Vaismoradi, M.** (2018). *Directed qualitative content analysis: the description and elaboration of its underpinning methods and data analysis process. Journal of Research in Nursing, 23(1), 42–55.* doi:10.1177/1744987117741667
8. **Bačić, D., & Fadlalla, A.** (2016). *Business information visualization intellectual contributions: An integrative framework of visualization capabilities and dimensions of visual intelligence. Decision Support Systems, 89, 77–86.* doi:10.1016/j.dss.2016.06.011
9. **Bozkurt, A. & Sharma, R. C.** (2020). *Emergency remote teaching in a time of global crisis due to CoronaVirus pandemic. Asian Journal of Distance Education, 15(1)* <https://doi.org/10.5281/zenodo.3778083>
10. **Brassey J, Witteloostuijn Av, Huszka C, Silberzahn T, Dam Nv** (2020) *Emotional flexibility and general self-efficacy: A pilot training intervention study with knowledge workers. PLoS ONE 15(10): e0237821.* <https://doi.org/10.1371/journal.pone.0237821>
11. **Catane, J.** (2000). *Conducting Research: A Practical Application.* JMC Press Inc., 388 Quezon Avenue, Quezon City
12. **Chen, James** (2019). *Investopedia. Technical Analysis Basic Education Skills*
13. **Dabbagh, R., & Yousefi, S.** (2019). *A hybrid decision-making approach based on FCM and MOORA for occupational health and safety risk analysis. Journal of Safety Research.* doi:10.1016/j.jsr.2019.09.021.
14. **Dumas, D., Organisciak, P., Maio, S., & Doherty, M.** (2020). *Four Text - Mining Methods for Measuring Elaboration. The Journal of Creative Behavior.* doi:10.1002/jocb.471
15. **Eun, B.** (2019). *The zone of proximal development as an overarching concept: A framework for synthesizing*



- Vygotsky's theories. *Educational Philosophy and Theory*, 51, 18-30
16. **Eshetu, F., & Assefa, S.** (2019). Effects of context-based instructional approaches on students' problem-solving skills in rotational motion. *EURASIA Journal of Mathematics, Science and Technology Education*, 15 (2), 1-13
  17. **Farrel, D., Ray, K., Rich, T., Suarez, Z., Christenson, B., & Jennigs, L.** (2018). A meta - analysis of approaches to engage social work students online. *Journal of Teaching in Social Work*, 38(2), 183 - 197. <https://doi.org/10.1080/08841233.2018.1431351> Crossref Web of Science@Google Scholar
  18. **Fernandez, R., Peralbo-Uzquiano, M., Duran-Bouza, M., Brenlla-Blanco, J. C., & García-Fernandez, M.** (2019). Virtual intervention programme to improve the working memory and basic mathematical skills in early childhood education. *Revista de Psicodidactica*, 24(1), 17–23. <https://doi.org/10.1016/j.psicoe.2018.09.003>
  19. **Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P.** (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences*, 111(23), 8410– 8415. <https://doi.org/10.1073/pnas.1319030111> Crossref CAS PubMed Web of Science@Google Scholar.
  20. **Giovannella, C.** (2020). Effect induced by the COVID-19 pandemic on students' perception about technologies and distance learning. *SLERD 2020*, at Bucharest (on-line) <http://slerd2019.uniroma2.it/paper-sessions/>
  21. **Gerald L. Ygay Mauro Allan P. Amparado** (2018) Cebu Normal University, Cebu City, Philippines Lecture-discussion Versus Inquiry-based Learning in the NCM 101 Academic Performance.
  22. **Hamilton, L. S., Kaufman, J.H., & Diliberti, M.** (2020). Teaching and Leading Through a Pandemic: Key Findings from the American Educator Panels Spring 2020 COVID-19 235 Educational Practices during the COVID-19 Viral Outbreak: International Perspectives Surveys. Creative Commons Attribution 4.0 International Public License. [https://www.rand.org/pubs/research\\_reports/RRA168-2.html](https://www.rand.org/pubs/research_reports/RRA168-2.html)
  23. **Ji, Z., Pons, D. J., & Pearse, J.** (2020). Integrating occupational health and safety into plant simulation. *Safety Science*, 130, 104898. doi:10.1016/j.ssci.2020.104898
  24. **Lim, C. D.** (2016). Exploring educational platforms and community behavior to support DLSU online blended learning initiative, <http://xsite.dlsu.edu.ph/conferences/dlsu-research-congress-proceedings/2016/GRC/GRC-LLI-002.pdf>
  25. **Linneman, Judith A.** (2018) Share, Show and Tell: Group Discussion or Simulation Versus Lecture Teaching Strategies in a research method course. September 20, 2018 Research Article Texas A&M University, College Station, TX, USA <https://doi.org/10.1177/0092055X18799405>
  26. **Masa, Juan Ariás et al.** (2019) Synchronous Virtual Classrooms in Problem-Based Learning to Mentor and Monitor Students in Higher Education Springer Nature Switzerland AG 2019 133 E. Smyrnova-Trybulska et al. (eds.), *Universities in the Networked Society, Critical Studies of Education* 10, [https://doi.org/10.1007/978-3-030-05026-9\\_8](https://doi.org/10.1007/978-3-030-05026-9_8)
  27. **McCoy, Charles Allan.** (2017). "Playing Goffman's Information Game: A Classroom Activity Involving Student Interactions." *Teaching Sociology* 45(3):260–68.
  28. **McLaren, Kristy** (2019). Why Technology skills so important to today's students? <https://www.immerse.education/resource/why-are-tech-skills-so-important-to-todays-students/>
  29. **Neneh, B. N.** (2019). From entrepreneurial alertness to entrepreneurial behavior: The role of trait competitiveness and proactive personality. *Personality and Individual Differences*, 138, 273–279. doi:10.1016/j.paid.2018.10.020
  30. **Ngurukwem, C. C., & Ede, G.** (2017). Lifelong learning in the vanguard for reskilling. *National Council for Adult Education Journal*, 22(1), 232-237.
  31. **Ni, A. Y.** (2016). Comparing the effectiveness of classroom and online learning: Teaching research methods. *Journal of Public Affairs Education*, 19(2), 199–215
  32. **Nnebedum, C., Obuegbe, A. S., & Nwafor, H. E.** (2021). Assessment of schools' reopening after COVID-19 closures. *International Journal on Studies in Education (IJonSE)*, 3(2), 86- 91. Vol 3, No 2, 86-91, 2021 ISSN: 2690-7909
  33. **Paudel, P.** (2020) . Online education: Benefits, challenges and strategies during and after COVID-19 in higher education. *International Journal on Studies in Education (IJonSE)*, 3(2), 70-85. <https://doi.org/10.46328/ijonse.32>
  34. **Peralbo-Uzquiano, M., Fernández-Abella, R., Durán-Bouza, M., Brenlla-Blanco, J.-C., & Cotos-Yáñez, J.-M.** (2020). Evaluation of the effects of a virtual intervention programme on cognitive flexibility, inhibitory control and basic math skills in childhood education. *Computers & Education*, 159, 104006. doi:10.1016/j.compedu.2020.104006
  35. **Resurreccion, P. F.** (2018). Understanding the blended learning readiness of students of a State University in Southern Philippines. *Editorial Staff*, 367
  36. **Rolffs JL, Rogge RD, Wilson KG.** (2018) Disentangling components of flexibility via the hexaflex model: Development and validation of the Multidimensional Psychological Flexibility Inventory (MPFI). *Assessment*. 2018; 25(4):458–82. <https://doi.org/10.1177/1073191116645905> PMID: 27152011
  37. **Schneider, D. W.** (2018). Alertness and cognitive control: Is there a spatial attention constraint? *Attention, Perception, & Psychophysics*. doi:10.3758/s13414-018-1613-9
  38. **Schönberg, S., Asher, R., Stewart, S., Fenwick, M. J., Ashton, L., Bucher, T., Shrewsbury, V. A.** (2020).



- Development of the Home Cooking EnviRonment and Equipment Inventory Observation form (Home-CookERITM): An Assessment of Content Validity, Face Validity, and Inter-Rater Agreement. Nutrients, 12(6), 1853. doi:10.3390/nu12061853*
39. **Sevilla, Consuelo G. et al.** (2007). *Research Methods*. Rex Printing Company. Quezon City'
  40. **Silvennoinen, M.; Mikkonen, J.; Manu, M.; Malinen, A.; Parviainen, T.; Vesisenaho, M.** (2019). *New Methods Deepening Understanding of Students' Experiences and Their Relation to Physiological Alertness Variations During Learning*. In Gómez Chova, L.; López Martínez, A.; Torres, Candel (Eds.) *EDULEARN19 Proceedings. 11th International Conference on Education and New Learning Technologies, EDULEARN Proceedings. IATED Academy*, 9219-9228. DOI: 10.21125/edulearn.2019.2290
  41. **S. Zollmann, R. Grasset, T. Langlotz, W. H. Lo, S. Mori and H. Regenbrecht.** (2017). "Visualization Techniques in Augmented Reality: A Taxonomy, Methods and Patterns," in *IEEE Transactions on Visualization and Computer Graphics*, doi: 10.1109/TVCG.2020.2986247.
  42. **Terry, Richard, et al.,**(2019). Chapter 21: *Successful teaching in virtual classrooms 15 October 2019, Monograph Chapter* : DOI: <https://doi.org/10.4337/9781788975087.00035> pages: 211–221 (11 total) Collection: *Business 2019*
  43. **Tambunan, H.** (2018). *Impact of Heuristic Strategy on Students' Mathematics Ability in High Order Thinking. International Electronic Journal of Mathematics Education*, 13(3), 321-328. <https://doi.org/10.12973/iejme/3928>
  44. **Tatiana Markova, Irina Glazkova and Elena Zaborova.** (2017). *Quality Issues of Online Distance Learning Ural State University of Economics*, 62, 8 Marta St, Yekaterinburg, 620144, Russia, doi: 10.1016/j.sbspro.2017.02.043
  45. **Udegbunam, J. M., & Koledoye, L. U.** (2017). *Enhancing employability through training and lifelong learning. National Council for Adult Education Journal*, 22(1), 233-246.
  46. **Wartono Wartono, Yohana Fransiska et. al.** (2019) Volume 8, no. 2 , March 2019 : *Inquiry-Scaffolding Learning Model: It's Effect on Critical Thinking Skills and Conceptual Understanding* <https://doi.org/10.24042/jipfalbiruni.v8i2.4214>



# **SWITCH IT UP: A SURVEY ON SWITCHING PRACTICES AMONG JUNIOR HIGH SCHOOL STUDENTS OF INTERNATIONAL SCHOOL FOR BETTER BEGINNINGS IN LUCENA CITY, QUEZON PROVINCE**

**Gian Placido Rodriguez Ramos**

*Laguna State Polytechnic University, Santa Cruz Main Campus, Laguna, Philippines*

## **ABSTRACT**

*This study focused on junior high school students' perception of code-switching as a language pattern. It aimed to identify the level of students' self-assessment of their English proficiency and their perception of code-switching when grouped according to sex, grade level, and academic performances in English subject and Filipino subjects. It employed the descriptive-quantitative method that used the adopted survey questionnaire proposed by Poplack (1995) which was modified by Alam (2016). The study respondents were 40 bilingual junior high school students of International School for Better Beginnings at Lucena City: - 20 of whom are males and 20 are females. Weighted mean and T-test were employed in analyzing and interpreting the data gathered. Analysis revealed that the students had a high English proficiency level as indicated by the overall mean of 4.06. This means that they could take part in conversations on a variety of topics. It was also revealed that there is a significant difference between the students' perception of code-switching practices when they were grouped according to sex, grade level, and academic performances in English and Filipino subjects as registered by the computed values of 144.278, 466.606, 192.601, and 197.886, respectively. Moreover, the computed value of ( $p= 0.00$ ) was lower than 0.05 level of significance, thus, the null hypothesis stating that there is no significant relationship between the students' perceptions of code-switching practices when grouped according to sex, grade level, and academic performance in English and Filipino subject was rejected.*

**KEYWORDS:** *English Proficiency, Language Pattern, Code-switching, Bilingualism, Sociolinguistics.*

## **INTRODUCTION**

Language discourse in a fast-paced world tends to emphasize the unprecedented cruciality of the English Language as the language of globalization. Thus, making a more significant proportion of the population of the world becomes either bilingual or multilingual. Linguistics, the study of language, helps the learners fill in the gap towards the world of English. Being considered the international language, English becomes a matter of subjective acceptance regardless of traditions, cultures, and ethnicity.

Filipinos, known as a multi-lingual race, consider the English Language as their Second Language. However, combining and mixing the vernacular and the international language is becoming a common practice among Filipinos in rural and urban areas, for it is commonly used as a socio-linguistic practice.

Bilingualism and Multilingualism have been an essential part of the Filipino people's experience. Generally, there have been debates and arguments about what role bilingualism and multilingualism play in the educational process. In 1973, an obsolete Bilingual Education Policy (BEP) was promulgated by the Department of Education and Culture (DEC, 1974). This policy requires English as the medium of instruction for English, Mathematics, and Science, and Filipino for all other subjects.

However, on an evaluation conducted on the policy, it was revealed that there was an apparent decline in learners' learning performance and achievement levels after its promulgation. Although the decline is most likely because of the holistic deterioration in other institutional and educational aspects, the implementation of BEP takes up all the blame.



Today, Bilingual Education Policy is still being blamed for the declension of the learners in English proficiency and poor performance in Filipino. Indeed, the BEP is being mourned as having produced a cohort of semi-linguals (Sibayan, 2000).

## BACKGROUND OF THE STUDY

Increased awareness of Taglish (Tagalog and English) can help acquire proficiency in the English Language. Though code-switching is coined taboo or unacceptable in the English classroom setup, it would also seem a priceless asset for students, for Taglish represents genuine Filipino conversation.

Even though code-switching is a common linguistic practice for teachers and students in a classroom setup, it still demonstrates the lack of differentiation since it is assumed that code-switching is the unintentional and unconscious activity that manifests the lack of linguistic control (Simon, 2001).

Adversarial critics of code-switching argue that some students may be disregarded if the majority of the learners do not share the same vernacular language. The educator's expertise towards the subject is also taken into consideration. On the other hand, supporters of code-switching believe that when code-switching is used effectively and efficiently, it will provide continuousness in speaking. This might help students cope with others within the circle as a member of the social interaction.

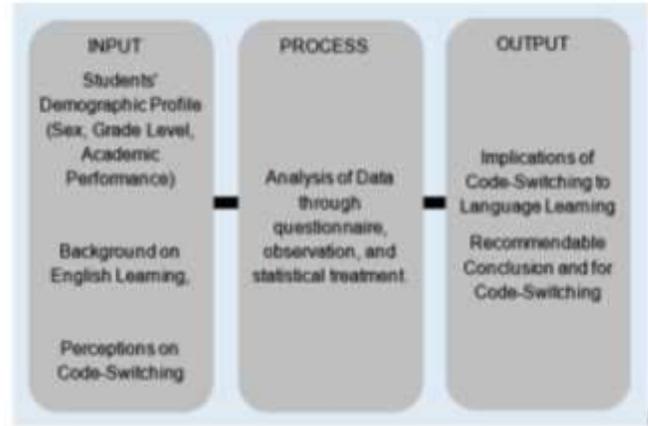
Educators' most commonly used teaching strategy is code-switching to attain some communicative goals (Probyn, 2010). Moreover, it helps facilitate the management and flow of classroom discussion, for the teachers do not have to allot so much time to explain something to students beyond their thinking capacities.

At present, code-switching has become a trend in many nations globally, especially in multi-lingual nations, thus becoming a new variety of languages. The researcher will attempt to examine the difference between students' range of code-switching practices and their perceptions of the second language, code-switchers, and the vernacular language when grouped accordingly.

## CONCEPTUAL FRAMEWORK

This research study zeroes in on the learners' code-switching practices by espousing the idea that their practices towards code-switching and code switchers, sex, and age are critical factors for their academic performance in language subjects such as English and Filipino. The researcher based the assumption from the Sociolinguistics Theory that society greatly impacted the use of vernacular language and the learned language in a single utterance.

## PARADIGM OF THE STUDY



## STATEMENT OF THE PROBLEM

1. What is the demographic profile of the students in terms of:
  - 1.1 Sex
  - 1.2 Grade Level
  - 1.3 Academic Performance in English
  - 1.4 Academic Performance in Filipino
2. What is the students' Self-Assessed English Proficiency Level?
3. What is the perception of the students about code-switching as a new language pattern?
4. Is there a significant difference between the students' perception of code-switching practices when grouped accordingly into:
  - 4.1 Sex
  - 4.2 Grade Level
  - 4.3 Academic Performances in English and Filipino subjects
5. What implications to language learning and recommendable conclusions can be drawn for code-switching from the data gathered?

## HYPOTHESIS

There is no significant relationship between the students' perceptions of code-switching practices when grouped according to sex, grade level, and academic performance in English and Filipino subjects.

## REVIEW OF RELATED LITERATURE AND STUDIES

Language is both a system of communication between individuals and a social phenomenon. A field of study that analyzes and investigates the language used in the society; the users, the manner it is used, the time it is used, the topic, and the purpose of communication; and with whom these languages are used is called sociolinguistics.



The term sociolinguistics consists of two words. Society, which pertains to any group of people drawn together for a particular purpose, and language, which pertains to the set of codes spoken and used by the member of a specific society (Wardhaugh, 2010). There are innumerable phenomena to the functions of language that can be observed and found in society, especially in multilingual societies. The common phenomenon found is code-switching. This phenomenon exists, for there is a social context that enables people who live in societies of more than one language to communicate and interact with people around them.

Every single day, people use different codes in different situations to communicate and interact with one another. People can use a specific or a diverse code to make the exchange of thoughts easier and more transparent, regardless of where they are in the world.

A code is a symbol of nationalism used by people to speak or communicate in a particular language, or dialect, or register, or accent, or style on different occasions and for different purposes (Stockwell, 2002). A conversation participant is required to select a particular code whenever he or she interacts with another person. This code, however, must be understandable and clear to both parties.

Similarly, Wardaugh (2006) also maintains that a code can be defined as a system used for communication between two or more parties used on any occasion. He also asserts that most speakers command several varieties of any language they speak, and bilingualism, even multilingualism, is the norm for many people worldwide rather than unilingualism.

People have often mistaken code-switching and bilingualism as having the same meaning, thus, using the terms interchangeably in their writings. This is what alarms the scholars of bilingualism and language acquisition.

When a speaker switches back and forth between two or more languages in the same sentence, using both with fluency, it is called code-switching. On the other hand, bilingualism is defined as the state of knowing two languages. Generally, bilingualism and multilingualism are regarded as an individual phenomenon. Lest, to code switch, the speaker must be either bilingual or multilingual (Hudson, 2006).

It is indeed unusual for a person to command or use only one code or system, whether it is dialect or style. This would probably appear as a rare phenomenon. Usually, speakers are required to select a particular code whenever they want to interact with other people, and they may decide to switch from one code to another or mix codes. These instances can also occur in extremely short utterances. Thus, creating a brand-new code.

Arguments have been made to underscore the importance of general bilingual language competencies in learning. There is already rather extensive research evidence on the positive

consequences of bilingualism on acquiring metalinguistic knowledge (Eviatar and Ibrahim, 2000).

Upon analyzing code-switching regarding bilingual speech, it is inevitable to language processing and acquisition and the inference to the vernacular. From the language processing perspective, the correlation between low L2 proficiency and transfer can be explained by the assumption that L1 morphemes remain highly active in the beginning L2 learners due to their higher frequency and are therefore easily selected for production (Poullisse & Bongaerts, 2004). However, Odlin (2009) pointed out that the correlation between low L2 proficiency and transfer applied primarily to negative transfer, whereas certain types of transfer, such as cognate vocabulary use, occur even at high proficiency levels.

According to some linguists, code-switching is not accepted as a typical way of speaking. However, familiar people usually use mixed codes in various social interactions and treat code-switched utterances as grammatically correct and accepted utterances (Agnihotri, 2008).

The researcher focuses on the use of code-switching in a conversational manner. Furthermore, it will deal with how students code switches from one language to another upon delivering or restating stories from the book. Code-switching can be a helpful strategy interaction if the aim is to make the meaning clearer and transfer the knowledge to students efficiently.

The researcher read, reviewed, and analyzed some related theories and published works of the same field of study. Code choice, especially code-switching, is not merely decided by internal linguistics but also by external linguistics or components of speech (Dewi, 2009). In conducting this code-switching technique, the write uses Holmes code-switching theory and Hymes components of speech.

Code-switching has gotten a bad rap, so to speak, in Philippine educational discourse. It has been identified as a problem that reflects poor linguistics knowledge and causes for Filipinos' deteriorating language skills. On the whole, code-switching is seen as a form of bilingual language behavior that would be harmful in the formal education context (Bernardo, 2005).

Amidst controversies about language and bilingualism, code-switching in academic settings is particularly relevant for the instruction of speakers who use dialects that are not considered to be Standard English (Wheeler & Swords, 2006).

## **THEORETICAL FRAMEWORK**

Language is used to communicate with others in society, anytime and anywhere. Without language, people will encounter circumstances when they communicate with others. The role of language towards the people in the community is significant.

Sociolinguistics is the scientific study of language and society. The word sociolinguistics contains two words: (1)



society, which means a group of closely related individuals who have specific purposes, and (2) language, which means the spoken words of the members of the society. Sociolinguistics studies all aspects that influence the choice of words in different communication contexts.

Most people certainly have reasonable control over two or more languages. The first one is the vernacular of the mother tongue, the language taught to them since they were young, and the other one is the second language, or a language learned later in life.

In the classroom setting of a bilingual class, code-switching often comes into both the educators' and the learners' utterances. Teachers are instructed to teach high-quality English. Lest the deteriorating level of English proficiency among learners has urged scholars to find out the possible solutions to this issue.

People who are exposed to two or more languages tend to switch between the two languages in communicating. This phenomenon, called code-switching, has attracted much attention from scholars and researchers alike.

With the aforementioned statements about the theory of sociolinguistics and code-switching, the researcher is resolute to find out whether or not code-switching has a significant relationship with the students' academic performance in English and Filipino subjects.

**DISCUSSION**

This chapter includes the presentation, analysis, and interpretation of the data gathered about the sociolinguistic survey on code-switching practices. The presentation is sequenced in such a way that follows the order of the specific problems identified in the earlier part of this paper.

**Table 1. Demographic Profile of the Respondents**

Grade Level	Grade Range	Performance in English				Performance in Filipino				Total
		Male		Female		Male		Female		
		f	%	f	%	f	%	f	%	
7	B 95%-97%	1	11%	1	11%	1	11%	1	11%	9
	C 90%-94%	1	11%	3	33%	4	44%	3	33%	
	D 85%-89%	3	33%	0	0%	0	0%	0	0%	
8	B 95%-97%	1	11%	2	22%	2	22%	2	22%	9
	C 90%-94%	3	33%	3	33%	2	22%	3	33%	
9	B 95%-97%	2	22%	1	11%	2	22%	1	11%	11
	C 90%-94%	3	33%	3	33%	4	44%	4	44%	
	D 85%-89%	1	11%	1	11%	0	0%	0	0%	
10	B 95%-97%	2	22%	3	33%	3	33%	4	44%	11
	C 90%-94%	3	33%	3	33%	2	22%	2	22%	

Table 1 shows the demographic profile of the students as described in terms of their sex, grade level, and their academic performances in English and Filipino subjects.

**Table 2. Students' Self-Assessed English History Background**

English speaking environment at home	Frequency	Percentage
Yes, sufficient	6	15.0%
Satisfactory	16	40.0%
Very little	15	37.5%
Not at all	3	7.5%
<i>Speaks English everyday</i>	Frequency	Percentage
Always	11	27.5%
Often	10	25.0%
Sometimes	19	47.5%
<i>To whom do you speak English mostly?</i>	Frequency	Percentage
Teachers	1	2.5%
Friends	4	10.0%
Family	2	5.0%
Family & Teachers	3	7.5%
Family & Friends	6	15.0%
Friends & Teachers	12	30.0%
Family, Teachers, & Friends	11	27.5%
Friends & Foreign Coach	1	2.5%
<i>Experience with foreign trips</i>	Frequency	Percentage
Yes	27	67.5%
No	13	32.5%
<i>How often do you go abroad?</i>	Frequency	Percentage
Once a year	17	42.5%
Twice a year	1	2.5%
Once in two years	6	15.0%
Once in five years	3	7.5%
Not at all	13	32.5%

As it gleans from the table on the previous page, 6 or 15% of the respondents have an excellent English-speaking environment at home, and 16 or 40% of the participants said they have an excellent English-speaking environment at home.

Meanwhile, 15 or 37.5% said they have a minimal English-speaking environment at home and 3 or 7.5% of the total respondents have no English speaking environment at home.



Studying in an International School made the students adapt to the norms of the said institution – speaking English. This is why 11 or 27.5% of the respondents said they always use English in their conversations, 19 or 47.5% said they sometimes use English to converse with other people, and 10 or 25% of them said they often use English.

When asked with whom the respondents use English: four or 10% of the respondents said they converse in English only with their Friends; one or 2.5% converse only to their Teachers; two or 5% use English to speak only to their family members, three or 7.5% converse to their family and teachers in English; six or 15% talk to their family and friends in English 12 or 30% use English with friends and teachers; 11 or 27.5% talk to their friends, family and teachers in English; and one or 2.5% converse to his/her foreign sports coach in English.

Traveling abroad and meeting foreign people can expose a learner to a language they must use. Among the 40 respondents of the study, 27 or 67.5% have foreign trip experiences, while the remaining 13 or roughly 32.5%, said they do not have any foreign trip experiences.

17 or 42.5% among 27 respondents who claimed they have foreign trip experiences said they travel once a year, 1 or 2.5% goes abroad twice a year, 6 or 15% travels abroad once in two years, and 3 or 7.5% go abroad once in five years. Meanwhile, 13 or 32.5% said they do not travel abroad at all.

**Table 3. Students’ Self-Assessment of their English Proficiency**

The students ...	Mean	S.D.	Verbal Interpretation
1. have a sufficient grammatical knowledge	3.98	0.530	High
2. have sufficient vocabulary to perform my everyday English	4.03	0.768	High
3. like to listen to English songs	4.60	0.545	Very high
4. like watching English movies	4.68	0.526	Very high
5. like reading English poems, stories, and/or novels	4.00	0.934	High
6. give more importance to fluency than accuracy	3.08	0.764	Moderate
<b>Overall Mean</b>	<b>4.06</b>		<b>High</b>

**Legend:**

- 4.20 – 5.00 *Very High*
- 3.40 – 4.19 *High*
- 2.60 – 3.39 *Moderate*
- 1.80 – 2.59 *Low*
- 1.00 – 1.79 *Very Low*

It can be deduced from table 3 that the students believed watching English movies (M=4.68, sd=0.526) or listening to English songs (M=4.68, sd=0.526) are of exceptionally high importance when it comes to improving their English proficiency.

Results also show that the students possess a high vocabulary to perform everyday English (M=4.03, sd=0.768), and high grammatical knowledge (M=3.98, sd=0.530).

On the other hand, the statement about giving more importance to fluency than accuracy (M=3.08, sd=0.764) is only of moderate importance in language learning to them.

Table 4 on the next page reveals the students’ perception of the different code-switching practices, together with the mean score, standard deviation, ranking, and verbal interpretation.

The statements ‘believe teenagers frequently code-switch from one language to another’ (M=4.38, sd=0.490), ‘mix any other language with my mother tongue in a day-to-day conversation’ (M=4.35, sd: 0.736), ‘code-switch in a day, most of the time’ (M=4.28, sd: 0.847), and ‘code-switch unconsciously’ (M=4.23, sd: 0.768), of all the 22 indicators, garnered the highest weighted means that fell under the remark *Highly Practiced*.

Moreover, the statements ‘think my English pronunciation is accurate’ (M=3.73, and sd: 0.877), and ‘prefer more frequent code-switches in a day’ (M=3.48, and sd: 0.877) gained the middle ranks of all the indicators and fell under the remark *Practiced*.

The statements that gained the remark *Not At All Practiced* were ‘think that code-switching is some interruption’ (M=2.50, sd: 0.961), ‘use slang words like ‘gonna,’ ‘wanna,’ ‘dunno’ and the like. In my essays or speeches’ (M=2.50 sd: 1.340), ‘think code-switching pollutes mother tongue’ (M=2.45, sd: 1.085), ‘mix different languages in my English writings’ (M=2.40 sd: 1.150), and ‘think code-switching means low knowledge on the subject’ (M=2.00, sd: 0.751).

Code-switching helps make the flow of classroom instruction smooth since the teachers do not have to spend so much time trying to explain to the learners or search for the most straightforward words to help clear the students’ understanding (Calizo, 2018).

Opponents of using code-switching inside the classrooms believe that some students may be neglected if not everyone shares the same mother tongue, while supporters of using code-switching in the classroom argue that it could provide continuity in speech when code-switching is used most efficiently and effectively.



**Table 4 Rank, Mean, and SD on Students' Perception on Code-Switching**

Indicators	Mean	S.D.	V. I.	Rank
1. mix any other language with my mother tongue in a day-to-day conversation	4.35	0.736	HP	2
2. think it is appropriate to use Filipino in an English class	3.20	0.939	MP	16
3. think Filipino can help me learn English	3.80	0.791	P	9
4. think that code-switching is some kind of interruption	2.50	0.961	RP	18
5. code-switch in my regular speeches	4.00	0.906	P	6
6. code-switch inside my English class	3.93	0.829	P	7
7. code-switch in a day, most of the time	4.28	0.847	HP	3
8. code-switch unconsciously	4.23	0.768	HP	4
9. frequently code-switch from English to Filipino in my English class	3.75	0.927	P	10
10. think my English pronunciation is accurate	3.73	0.877	P	11
11. I think my Filipino pronunciation is accurate	4.03	0.832	P	5
12. mix different languages in my English writings	2.40	1.150	RP	21
13. use slang words like 'gonna,' 'wanna,' 'dunno' etc. in my essays or speeches	2.50	1.340	RP	19
14. think code-switching is useful	3.90	0.744	P	8
15. prefer more frequent code-switches in a day	3.48	0.877	P	12
16. think code-switching means low knowledge on the subject	2.00	0.751	RP	22
17. think that code-switching depends solely on subject areas	3.48	0.847	P	13
18. believe teenagers frequently code-switch from one language to another	4.38	0.490	HP	1
19. think that code-switching is a matter of age	2.60	1.057	MP	17
20. think that code-switching pollutes one's mother tongue	2.45	1.085	RP	20
21. assume that code-switching is a new pattern of language in the Philippines	3.45	0.846	P	14
22. like the trend of this new language pattern of code-switching	3.38	0.838	P	15
<b>Overall Mean</b>	<b>3.44</b>		<b>Practiced</b>	

**Legend:**

- 4.20 – 5.00 *Highly Practiced (HP)*
- 3.40 – 4.19 *Practiced (P)*
- 2.60 – 3.39 *Moderately Practiced (MP)*
- 1.80 – 2.59 *Rarely Practiced (RP)*
- 1.00 – 1.79 *Not at all Practiced (NP)*



**Table 5. Difference between the Students' Perception on Code-Switching Practices Based on their Profile**

Profile	F-value	Critical Value	p-value	Analysis
Sex	144.278	3.963	0.000	<i>Significant</i>
Grade Level	466.606	3.963	0.000	<i>Significant</i>
Performance in English	192.601	3.963	0.000	<i>Significant</i>
Performance in Filipino	197.886	3.963	0.000	<i>Significant</i>

A significant difference was noted in the students' perception of code-switching practices when grouped according to sex ( $F=144.278$ ,  $p=0.000$ ).

Gender, or sex, to be more specific, is taken as one of the most important variables to determine differences in code-switching patterns and practices. It has been observed that in the conversations that either men or women were involved in, women tend to code-switch more than men do, but in mixed conversations, men tend to have more code-switching instances than women (Jagero and Odongo, 2011).

A significant difference was also noted in the students' perception of code-switching practices when grouped according to their grade level ( $F=466.606$ ,  $p=0.000$ ).

Teenagers and youngsters typically understand the social consequences of the choices they make when speaking. Most of the time, the shifts in their style are intentional and meaningful. Teenagers are expected to develop a range of styles as they begin to become aware that they are members of multiple communities simultaneously and as they begin to claim more power and independence and formulate their identities.

Adult language, on the other hand, as a generational variety, is mainly seen as static and not subject to development, whereby an increase in chronological age directly represents an increase in distance from the current sociocultural, linguistic norm (Coupland, 2001).

A significant difference was also noted in the students' perception of code-switching practices when grouped according to their academic performance in English subjects ( $F=192.601$ ,  $p=0.000$ ).

The results mean that students who belong to a certain grade range in English are different from those who belong to other grade ranges. It is possible that those in the lower grade range in English code-switch more for they do not have the same English proficiency as those in the upper part of the grade ranges. Students who have higher grades, whose English skills are expected to be excellent, can communicate and deliver ideas well in English

Lastly, a significant difference was noted in the students' perception of code-switching practices when grouped according to their academic performance in Filipino subjects ( $F=197.886$ ,  $p=0.000$ ).

Experts suggest that if students are given a task to perform in a second or foreign language, translating it or code-switching to the mother tongue helps the learners understand better what the task requires them to do, thereby clarifying doubts or misunderstandings created by them the target language. According to Lee (2012), code-switching to mother tongue brings better learning outcomes than English-only instruction among learners whose second language is English.

## CONCLUSION

The conclusions of the findings for the cited research questions regarding the students' perception of code-switching when grouped accordingly to sex, grade level, and academic performances in language subjects demographics are based on the data gathered about their English learning background history, self-assessed English proficiency level and perception on code-switching as new language pattern.

Code-switching is considered one of the most commonly repeated concepts among bilingual and multilingual speech communities in today's world. In order to be associated with bilingualism, one must know how to speak two languages in a way that the ideas needed to get through are delivered with ease. English proficiency level dramatically affects one's code-switching practices, for it allows a speaker to smoothly shift from one language to another, considering the tight grammatical structures of both languages without compromising the idea of the message.

It has also been found out that having traveled abroad and engaging in authentic verbal interaction with foreign people forces the speaker to use the language; hence, putting the learned communicative skills into practice.

One's mother tongue, or language spoken at home, plays an essential role in developing the language skills of a learner. The way people inside one's home talk to their kids, code-switching per se, allows them to bring the same practices outside their homes.

High school students believe that code-switching, as a new trend of oral language use, is very popular and common among the young generation (to sound stylish). Young people also tend to code-switch even when talking to strangers or people they do not personally know.

These respondents have a positive perception of code-switching, claiming they do it daily, consciously or unconsciously, and are relatively prepared to accept the changes it would bring to their language use. They viewed code-switching as a helpful tool in learning a language rather than a distraction or interruption because it allows them to convey their message with ease.



Female, as observed, code-switch more than male. Females tend to create their language with their circles through the use of code-switching. On the other hand, males are timid and less talkative, so they practically are not prone to using code-switching as much as the female does.

Students with higher English grades, as observed, can deliver a message or speech in straight English compared to those in the lower ranges. This is perhaps because vocabulary and grammatical knowledge play a crucial role in using a particular language.

To finally conclude the study, it has been observed that there is a significant difference in how students perceive code-switching when grouped according to their sex, grade level, and academic performances in the language subjects: English and Filipino.

## RECOMMENDATIONS

This study was conducted in an International School for the mere fact that code-switching is said to be shared among wealthy individuals. It is recommended that future researchers may conduct the same study on learners studying in a public school to test whether or not socioeconomic status affects the code-switching practices of an individual.

The finding showed that most of the code-switching parts happened during oral language use. There was an apparent lack of the written part of the language use. A study conducted on the code-switching practices among individuals in written media may yield more discussions and lead to more understanding of the context.

The code-switching practices emerged more in English classes and English teachers than in any other subjects. Although this study limits English classes only, it may also be worthwhile to examine the code-switching practices that happened inside other subject classes and to teachers of other subjects, like Filipino and/or Mathematics classes.

In this study, the respondents came from Junior High School students of ISBB. Since age is a common factor that affects code-switching, it is suggested that future researchers may conduct a future study on elementary or senior high school students of the same institution to examine if there is a difference between their use of language and their code-switching practices.

Mother tongue is a vital part of one's language acquisition journey. Based on this fact, it is suggested that future researchers may conduct a study on code-switching practices for students whose mother tongue is English to examine the difference in their perception with those whose mother tongue is Filipino

## REFERENCES

1. Agnihotri, R. K. (2008). *Mixed Codes and their Acceptance*. In R. K. Agnihotri, A. L. Khanna, & I. Sachdev (Eds.), *Social Psychological Perspectives on Second Language Learning* (pp. 215-230). Thousand Oaks, CA: SAGE.
2. Ahmad, B. H., & Jusoff, K. (2009). *Teachers' Code-Switching in Classroom Instructions for Low English Proficient Learners*. *English Language Teaching*, 2(2), p49.
3. Bernard, H. (2006/01/01). *Research Methods in Anthropology – Qualitative & Quantitative Approaches*. 2(3), p11.
4. Bloomer, A. (2006). *Projects in Linguistics. A Practical Guide to Researching Language*. London: Arnold HodderBrackin-Tellier.
5. Brice, A., & Rosemary-McKibbin, C. (2015). *Choice of Languages in Instruction: One Language or Two? Teaching Exceptional Children*, 33(4), 10–16.
6. Butchfield, RW. (2004). *Fowlers' Modern English Usage*, rev. 3rd edn. Oxford University Press, Oxford.
7. Calizo, M. et al. (2005). *The Functions of Code-Switching on ELT Classrooms*. Hacettepe University: Ankara, Turkey.
8. Cook, V. (2008). *Second Language Learning and Language Teaching* (4th edn.). London: Hodder.
9. Coupland, N. (2001). *Age in Social and Sociolinguistic Theory*. In N. Coupland, S. Sarangi, & C. Candlin. (Eds.) *Sociolinguistics and Social Theory*. London: Longman.
10. Eckert, P.; McConnell-Ginet, S. *Think Practically and Look Locally: Language and Gender as Community- Based Practice*. *Annual Review of Anthropology* 1992, 2, 461–490.
11. Eldin, A. A. T. S. (2014). *Socio Linguistic Study of Code Switching of the Arabic Language Speakers on Social Networking*. *International Journal of English Linguistics*, 4(6), p78
12. Eviatar, Zohar, and Raphiq Ibrahim. 2000. *Bilingual is as Bilingual Does: Metalinguistic Abilities of Arabic-Speaking Children*. *Applied Psycholinguistics* 21.451-471.
13. Gregory, G. H. (2008). *Differentiated Instructional Strategies: Training, Implementation and Supervision* (2nd edn.). Thousand Oaks, CA: Corwin Press.
14. Hakuta. (1991). *Mirror of Language: The Debate on Bilingualism* (pp. 11-12). New York: (Review by Genesse 1987 in Miami and Kennedy 1991).
15. Hansegard, N. E. (1975). *Bilingualism or Semilingualism? Invandrare och Minoreteler*, 3, 7-13.
16. Hirsh, Jacob, (2017). *The Psychology of Middle Power: Vertical Code-Switching, Role Conflict, and Behavioral Inhibition*. Vol. 42. *Academy of Management Review: USA*.
17. Holmes, J. (2000). *An Introduction to Sociolinguistics* (2nd ed.). Wellington: Longman.
18. Holmes, Jannet. (2001). *Learning About Language: An Introduction to Sociolinguistics*. New York: Longman.
19. Hudson, R.A. (2006). *Sociolinguistics*. Cambridge: Cambridge University Press.
20. Jagero, N. & Odongo EK. (2011). *Patterns and Motivations of Code-switching Among Males and Females in Different Ranks and Age Groups in Nairobi, Kenya*. *International Journal of Linguistics* 3(1): 1-13.



21. Karjo, C. H. (2006). *Investigating the Types and Functions of Code Switching on Twitter's Tweets by Male and Female Students of English Department, Binus University.*
22. Kiesling, Scott. (2007). *Men, Masculinities, and Language.* University of Pittsburgh. USA
23. Labov, W. (2005). *Sociolinguistic Patterns: Philadelphia.* University of Pennsylvania Press
24. Labov, W. (2007). *The Intersection of Sex and Social Class in the Course of Linguistic Change: Philadelphia.* University of Pennsylvania Press.
25. Lakoff, R. *Language and Woman's Place. Language in Society* 1973, 2, 45-79.
26. Liberman, M. (2008). *Code-switching conscious? Language Log.* USA.
27. Lin, A. M. Y. (2008). *Code-Switching in the Classroom: Research Paradigms and Approaches.* In K. A. King and N. H. Hornberger (Eds). *Encyclopedia of Language and Education, 2nd Edition, Volume 10: Research Methods in Language and Education.* New York: Springer 273-286.
28. Malakoff, Marguerite, and Kenji Hakuta. 1991. *Translation Skill and Metalinguistic Awareness in Bilingualism. Language Processing in Bilingual Children, ed. by Ellen Bialystok, 141-166.* Cambridge, UK: Cambridge University Press. Marian
29. McAlister, K. (2010). *Age of Onset of Exposure in Code-Switching.* Arizona: Arizona State University.
30. Mercado, J. (2015). *Code-switching. Encyclopedia of Cross-Cultural School Psychology.*
31. Myers-Scotton, C. (2008). *Code switching.* In F. Coulmas (Ed.), *The Handbook of Sociolinguistics* (pp. 217–238). Oxford: Blackwell Publishers.
32. Odlin, T. (2009). *Transfer and Code-switching: Separate Territories but Common Concerns on the Border: Bilingualism: Language And Cognition* 12:4.
33. Oulmoussa, H. (2017). *Code-Switching Practices among Males and Females. Mostaganem.* University of Abdelhamid Ibn Badis.
34. Poplack, S., & Sankoff, D. (1995). *Code Switching.* In U. Ammon, N. Dittmar, & K. J. Mattheier (Eds.), *Sociolinguistics: An International Handbook of the Science of Language and Society, second volume* (pp. 1173–1180). Berlin: Walter de Gruyter.
35. Poulisse, N., & Bongaerts, T. (1994). *First Language Use in Second Language Production. Applied Linguistics, 15* (1), 36-57.
36. Shuter, J. (2013). *Code-Switching in Society.* Science Leadership Academy.
37. Stockwell, Peter (2002) *Sociolinguistics: A Resource Book for Students, Routledge, Routledge English Language Introductions.*
38. Wardhaugh, R., & Fuller, J. M. (2014). *An Introduction to Sociolinguistics.* John Wiley & Sons.
39. Wheeler, R., & Swords, R. (2006). *Code-Switching: Teaching Standard English in Urban Classrooms.* Urbana, IL: National Council of Teachers of English.



# THE LIVED EXPERIENCES OF TEACHER AND STUDENTS IN PE AMIDST THE PANDEMIC

**Ma. Isabel O. Mojica**

*Graduate School, Laguna State Polytechnic University Santa Cruz, Laguna, Philippines*

Article DOI: <https://doi.org/10.36713/epra7342>

DOI No: 10.36713/epra7342

## ABSTRACT

*Conducting classes remotely to shift in teaching paradigm of learning due to the on-going pandemic has posed many challenges to the education sector. Despite these efforts, several arguments are associated with remote learning especially with online classes or e-learning amidst the pandemic. The study aimed to unveil the lived experience of teachers and student who are taking remote learning in physical education subject. The respondents must had experience and engaging in remote learning.*

*This study employed both qualitative and quantitative methods of research. The respondents must had experience and engaging in remote learning. This study answered the following: What is the demographic profile of teachers and students? What are the challenges encountered by teachers and students? What are the coping mechanisms of teachers and students during remote learning? Is there a relationship between challenges encountered and coping mechanisms of teachers and students? How do the profile of the teachers and students relate to the challenges encountered and their coping mechanisms? For the qualitative part, an Interpretative Phenomenological Analysis (IPA) method was used to interpret the meanings of experiences of human life, and focused on research question “What it is like to experience remote teaching and learning in physical education amidst the pandemic?”.*

*Considering the results of the study, it can be said that the major problems faced by both teachers and students are the poor internet connection. This hampers the communication between the two as well as the communication among students. This breeds to a series of problems that stem from the lack of connectivity. Moreover, the most common coping mechanisms employed by both groups are engaging into activities that will help them distress.*

*The recommendations in internet connectivity dilemma may address at the institutional level. Government may call upon the internet providers to supply an affordable and reliable internet connection whether it be data connectivity only or postpaid, University may broaden their student support by providing services such as counseling session for the student’s mental health and also provide guidelines for conducting remote learning classes considering the coverage, the amount of course requirements, schedule of submissions, assessments that may both protect the students and teachers from having unnecessary workload that may result to stress and anxiety, more trainings and supports for professional development in teaching during remote learning among teachers.*

**KEYWORDS:** *Coping Mechanism, Amidst pandemic, Coping Challenges, Remote learning*

## I. INTRODUCTION

This shift in teaching paradigm of learning due to the on-going pandemic has posed many challenges to the education sector. Any decisions that will be made by educational institutions must at all times consider the protection of students, faculty members, academic staff, communities, societies, and the nation as a whole. Thus, various learning modalities were explored.

There are about 3.5 million tertiary-level students enrolled in approximately 2,400 higher education institutions (HEI). Thus these institutions, have explored many learning modalities considering the capacity of their students or the availability of the facilities needed for learning. To address the needs of students, these institutions have implemented proactive policies for the continuance of education despite the closure ( Joaquin, Biana, & Dacela, 2020). These include conducting classes remotely.



HEIs have implemented various modes of remote learning such as synchronous or real time online classes, and asynchronous or delayed-time classes. Moreover, faculty members are now being taught the use of various learning management systems (LMS) as part of their preparation for online classes, trainings are also being held to equip faculty members with skills for synchronous and asynchronous classes such as use of platforms for video communications, and video recording and editing. Some are also being required to create course packs or modules that will be available for students who do not have access to the internet.

However, despite these efforts, several arguments are associated with remote learning especially with online classes or e-learning. According to Bao (2020), the sudden change in remote learning has caused challenges to faculty members such as lack of online teaching experience, early preparation, or support from educational technology teams. For students, accessibility, affordability, flexibility, learning pedagogy, and life-long learning are arguments raised related to online pedagogy (Dhawan, 2020).

Given these challenges, it is very timely to conduct a study on the experiences of both teachers and students utilizing remote learning especially in higher educational institutions.

## II. OBJECTIVES

This study determined the experiences of teacher and students during remote learning in higher education institutions in Cavite. Specifically, the study sought answers to the following questions:

1. What is the demographic profile of teachers and students of physical education?
  - 1.1 Age;
  - 1.2 Sex;
  - 1.3 Civil status;
  - 1.4 Tenure;
  - 1.5 Monthly income;
2. What are the challenges encountered by teachers and students of physical education during remote learning?
  - 2.1 Pedagogical
  - 2.2 Technological
  - 2.3 Social
  - 2.4 Institution
  - 2.5 Socio-economic

3. What are the coping mechanisms of teachers and students of physical education during remote learning?

- 3.1 Positive well-being
- 3.2 Time management
- 3.3 Openness to change
- 3.4 Peer mentoring
- 3.5 Collaboration
- 3.6 Socio economic

4. Is there a relationship between challenges encountered and coping mechanisms of teachers and students of physical education?

5. How do the profile of the teachers and students relate to the challenges encountered and their coping mechanisms?

For the qualitative part, an Interpretative Phenomenological Analysis (IPA) method was used to interpret the meanings of experiences of human life, and focused on research question “what it is like to experience remote teaching and learning in physical education amidst the pandemic?”.

## III. METHODOLOGY

This study used both qualitative and quantitative research design. For the qualitative design, this study utilized the phenomenological perspective in understanding the lived experiences of both teachers of physical education and students taking physical education following the Interpretative Phenomenological Analysis (IPA). The IPA method aimed to describe, and interpret the meanings of experiences of human life, and focuses on research questions such as what it is like to experience a particular situation, in this case remote teaching and learning. The study will delve into the perceptions, perspectives, understandings, challenges and feelings as consciously experienced by students and teachers.

For the qualitative design, following the Differentiated Instruction Theory and Anderson's Theory of Online Learning, the study utilized a survey questionnaire to determine the challenges and coping mechanisms employed both by the students and teachers. A set of challenges and coping mechanisms were identified based on literature. Teachers and students were then asked to evaluate how these variables apply to their experiences.



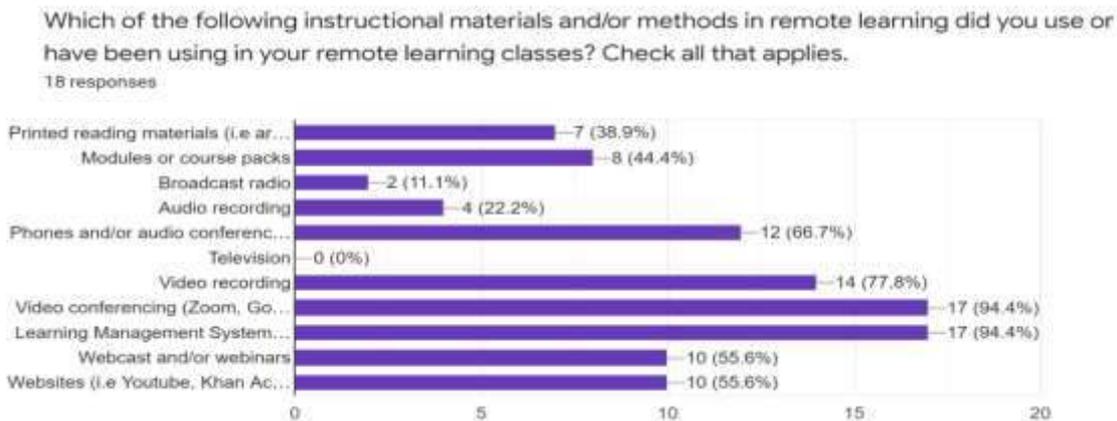
#### IV. RESULT AND DISCUSSION

This chapter discusses the findings of the study based on the research questions

	Characteristics	Frequency	Percentage
Age	18-20 years old	5	27.8
	21-23 years old	12	66.7
	24-26 years old	1	5.6
	<i>Total</i>	<i>18</i>	<i>100</i>
Sex	Male	5	27.8
	Female	13	72.2
	<i>Total</i>	<i>18</i>	<i>100</i>
Monthly Family Income	10,000 and below	3	16.7
	10,001-15,000	6	33.3
	15,001 - 20,000	5	27.8
	20,001 - 25,000	1	5.6
	25,001 and above	3	16.7
	<i>Total</i>	<i>18</i>	<i>100</i>

For Students a total 18 students from a selected state university in Cavite participated in the study. For the qualitative part, the following were found: among the

students, majority are 21-23 years old and female. In terms of family income, students are distributed in different levels



For remote learning modalities half of the respondents had experience engaging in remote learning before while the other half have experience them for the first time. Moreover, the two most often

used learning modalities based on their experience are video conferencing and the use of learning management systems.

Challenges	Mean	Verbal Interpretation
Individual	3.59	Agree
Technology	2.39	Disagree
Institutional	3.43	Neutral
Socio-economic	3.83	Agree
Community	3.59	Agree



In terms of challenges experienced during remote learning, mean score showed that they agree with the individual challenges, socio-economic challenges, and community challenges while they are neutral on institutional challenges. Surprisingly, they disagree on experiencing technological challenges based on the survey. However, during the interview, technology still appeared to be a problem. Yet, this time, it is mainly focused on poor internet connection unlike in the survey where it is a combination of infrastructure (devices), skills, and internet connectivity. Moreover, other challenges were identified during the interview. According to the

students, they also face problems on mental health and heavy workload. Students feel stressed and anxious with everything they need to accomplish during remote learning with some having breakdowns. Heavy workload also adds to this pressure as they also have other responsibilities outside their remote learning class. Working students said that they often face problems on conflict of schedules with their synchronous classes and their work schedule. Also, not having an environment conducive for learning is also a problem as students said they have been distracted by many things such as human and pet intrusions.

Coping Mechanisms	Mean	Verbal Interpretation
Individual Well-being	4.03	Agree
Time Management	3.72	Agree
Socio-economic	3.33	Agree
Peer Support	3.96	Agree
Collaboration	2.94	Neutral

Considering the coping mechanisms they used to handle the challenges of remote learning, the students agreed to have been employing, individual well-being, time management, socio-economic and peer support related coping mechanisms as identified in the literature. They are on the other hand neutral with peer support. Further pondering on their experiences revealed, that they have been employing other mechanisms as well such as having family time as they see their family as source of stress relief. Another is engaging into recreational activities like sports, arts and watching movies. Students have identified time management to be a key in improving their experience with remote learning.

Considering challenges and coping mechanisms, a negative correlation was found between technological challenges and peer support. Since the students disagree that they are encountering technological challenges, the negative correlations mean the students does not need their peers for technological support. A positive correlation was also found between community challenges and socio-economic coping mechanisms which means that the mobility restrictions of the students affect their means to access connectivity and other resources needed in remote learning. No significant differences were found in terms of challenges and coping mechanism when students are grouped according to their demographic profile.

	Characteristics	Frequency	Percent
Age	25-30 years old	6	35.3
	31-35 years old	6	35.3
	36-40 years old	4	23.5
	46 years old and above	1	5.9
	<i>Total</i>	<i>17</i>	<i>100.0</i>
Sex	Male	11	64.7
	Female	6	35.3
	<i>Total</i>	<i>17</i>	<i>100.0</i>
Civil Status	Single	9	52.9
	Married	8	47.1
	<i>Total</i>	<i>17</i>	<i>100.0</i>
Tenure	Job Order	13	76.5
	Contractual	2	11.8
	Permanent	2	11.8
	<i>Total</i>	<i>17</i>	<i>100.0</i>



**For Teachers** a total of 17 teachers from a selected state university in Cavite participated in the study. Their age is distributed in different age group while in terms of sex, majority are male. Moreover,

majority of the teachers are on job order status while in terms of civil status, 9 were single and 8 were married. Majority of the teachers also said they have prior experience teaching remotely.

Which of the following instructional materials and/or methods in remote learning did you use or have been using in your remote learning classes? Check all that applies.  
 17 responses:



In terms of the learning modality used, the prefer video recording, followed by video conferencing, and utilization of platforms such as

YouTube. Modules are also popular among the teachers.

Challenges	Mean	Verbal Interpretation
Pedagogical	1.96	Disagree
Technological	1.88	Disagree
Social	2.41	Disagree
Others	2.32	Disagree

In terms of the challenges experienced during remote learning, they all disagree with the predetermined variables. During the interview, the technological problem they experience are not on their part but on the side of the students. Hence, poor internet connection was one of the major theme in the interview. Another challenge identified are student related issues. According to them they have encountered numerous problems in terms of handling their students. From the students' failure to submit their requirements either because of lack of

connectivity or them just being lazy, to being available to them all the time and having the need to be considerate despite instances where students tend to be apathetic and disrespectful. Another challenge that they face is related on their skills. According to them there is a need for them to upgrade their teaching methods by levelling up their skills like through video editing or using social medias. This is especially crucial because of the nature of PE which often demand instructional materials that shows demonstrations of activities.

Coping Mechanisms	Mean	Verbal Interpretation
Positive Well-being	4.43	Agree
Time Management	4.22	Agree
Openness To Change	4.57	Strongly Agree
Peer Mentoring	2.27	Disagree
Collaboration	2.51	Neutral

In terms of coping mechanisms, the teachers agreed with having a positive well-being, time management and openness to change as a coping

mechanism while they disagree with peer mentoring and neutral with collaboration. The interview identified three coping mechanisms not mentioned in



the survey, these are: engaging to sports, family time, and recreational activities. Based on the interview, most of the coping mechanisms identified were related in destressing.

In terms of relationship of challenges and coping mechanisms, there were several significant relationships found between pedagogical challenges and all of the coping mechanisms except time management. There were also significant relationships found between technology and positive well-being, peer mentoring and collaboration. Moreover, all the coping mechanisms were found to be significantly correlated with social challenges while other challenges were found to be significant with peer mentoring and collaboration. When grouped according to their demographic profile, no significant difference where found.

## V. CONCLUSION

It was concluded therefore that the gap how students and teachers cope with remote learning within the Philippine context that is plagued by structural constraints and exacerbated by the current global crisis. Considering the results of the study, it could be said that the major problems faced by both teachers and students were the poor internet connection. This hampered the communication between the two as well as the communication among students. This bred to a series of problems that stemmed from the lack of connectivity. Moreover, the most common coping mechanism employed by both groups were engaging into activities that would help them destress.

## RECOMMENDATION

Based on the findings and conclusion of the study, the following recommendations were offered.

1. The problem in internet connectivity may address at the institutional level. For instance, government may call upon the internet providers to supply an affordable and reliable internet connection whether it be data connectivity only or postpaid. Singapore for example has a cheaper prepaid data bundle and at the same time with quality level of connection.
2. The university may broaden their student support by providing services such as counseling to protect student's mental health. These services may also be accessible despite being remote and may protect their privacy.
3. The university may provide guidelines for conducting remote learning classes considering the coverage, the amount of course requirements, schedule of submissions, assessments, etc. that may both protect the students and teachers from

having unnecessary workload that may result to stress and anxiety.

4. The university may provide more trainings and supports for professional development in teaching during remote learning among teachers. The same may also be provided to students to let them be familiar with the infrastructure needed in remote learning such as familiarization with the learning management systems.

## REFERENCES

1. Adedoyin, O., & Soykan, E. (2020). Covid-19 pandemic and online learning: the challenges and opportunities. *Interactive Learning Environments*.
2. Aksoy, Y., Çankaya, S., & Taşmektepligil, Y. (2017). *The Effects of Participating in Recreational Activities on Quality of Life and Job Satisfaction*. *Universal Journal of Educational Research*, 5(6): 1051-1058.
3. Alase, A. (2017). *The Interpretative Phenomenological Analysis (IPA): A Guide to a Good Qualitative Research Approach*. *International Journal of Education and Literacy Studies*.
4. Alipio, M. (2020). *Education during COVID-19 era: Are learners in a*. ZBW – Leibniz Information Centre.
5. Allen, J., Rowan, L., & Singh, P. (2020). *Teaching and teacher education in the time of COVID-19*. *Asia-Pacific Journal of Teacher Education*.
6. Arenas, D., Viduani, A., Bassols, A., & Hauck, S. (2021). *Peer support intervention as a tool to address college students' mental health amidst the COVID-19 pandemic*. *International Journal of Social Psychiatry*.
7. Bao, W. (2020). *COVID -19 and online teaching in higher education: A case study of Peking University*. *Human Behavior and Emerging Technologies*, 2(2), 113-115.
8. Besser, A. F.-H. (2020). *Adaptability to a sudden transition to online learning during the COVID-19 pandemic: Understanding the challenges for students*. *Scholarship of Teaching and Learning in Psychology*.
9. Burns, M. (2011). *Distance Education for Teacher Training: Modes, Models, and Methods*. Education Development Center, Inc.
10. Chandra, Y. (2020). *Online education during COVID-19: perception of academic stress and emotional intelligence, coping strateging among college students*. *Emerald Insight*.
11. Choi, M., Tessler, H., & Kao, G. (2020). *Arts and crafts as an educational strategy and coping mechanism for Republic of Korea and United States parents during the COVID-19 pandemic*. *International Review of Education*, 66, 715-735.
12. Coman, C., Mesesan-Schmitz, L., Tiru, L., & Stanciu, C. (2020). *Online Teaching and Learning in Higher Education during the Coronavirus Pandemic: Student Perspective*.



- Sustainability.
13. Cox, A., Solomon, B., & Parris, D. (2018). *Teacher well-being is a critical and often overlooked part of school health*. *Children Trends*, <https://www.childtrends.org/blog/teacher-well-being-is-a-critical-and-often-overlooked-part-of-school-health>.
  14. Daniel, J. (2020). *Education and the COVID-19 pandemic*. UNESCO IBE. Springer.
  15. Daum, D., & Buschner, C. (2012). *The Status of High School Online Physical Education in the United States*. *Journal of Teaching in Physical Education*, 86-100.
  16. De Villa, J., & Manalo, F. (2020). *Secondary Teachers' Preparation, Challenges, and Coping Mechanisms in the Pre-implementation of Distance Learning in the New Normal*. *IOER International Multidisciplinary Research Journal*, 2(3).
  17. Dhawan, S. (2020). *Online Learning: A Panacea in the Time of COVID-19 Crisis*. *Journal of Educational Technology Systems*.
  18. Ferri, F., Grifoni, P., & Guzzo, T. (2020). *Online Learning and Emergency Remote Teaching: Opportunities and Challenges in Emergency Situations*. *Societies*.
  19. Jeong, H.-C., & So, W.-Y. (2020). *International Journal of Environmental Research and Public Health*.
  20. Jimena, G.-R., Mulqueen, K., Zealand, R., Silverstein, S., Mulqueen, C., & BuShell, S. (2021). *Emergency Online Learning: College Students' Perceptions During the COVID-19 Pandemic*. *College Student Journal*.
  21. Kebritchi, M., Santiago, L., & Lipschuetz, A. (2017). *Issues and Challenges for Teaching Successful Online*. *Journal of Educational Technology Systems*.
  22. Kelly, M. (2020). *Largest COVID-19 contact tracing study to date finds children key to spread, evidence of superspreaders*. Princeton Environmental Institute, <https://www.princeton.edu/news/2020/09/30/largest-covid-19-contact-tracing-study-date-finds-children-key-spread-evidence>.
  23. Khan, H., Farooqi, M., Khalil, A., & Faisal, I. (2016). *Exploring Relationship of Time Management with Teachers' Performance*. *Bulletin of Education and Research*, 38 (2) pp. 249-263.
  24. Klapproth, F. F. (2020). *Teachers' experiences of stress and their coping strategies during COVID-19 induced distance teaching*. *Journal of Pedagogical Research*, 4(4), 444-452.
  25. Kohl, H., & Cook, H. (2013). *Educating the Student Body: Taking Physical Activity and Physical Education to School*. (C. o. Environment, F. a. Board, & I. o. Medicine, Eds.) Washington, DC: National Academies Press (US).
  26. Lee, K.-H., Na, G., Song, C.-G., & Jung, H.-Y. (2020). *How Does Pedagogical Flexibility in Curriculum Use Promote Mathematical Flexibility? An Exploratory Case Study*. *Mathematics*, [www.mdpi.com/journal/mathematics](http://www.mdpi.com/journal/mathematics).
  27. Li, C., & Lalani, F. (2020). *The COVID-19 pandemic has changed education forever*. *World Economic Forum*, <https://www.weforum.org/agenda/2020/04/coronavirus-education-global-covid19-online-digital-learning/>.
  28. Mahyoob, M. (2020). *Challenges of e-Learning during the COVID-19 Pandemic Experienced by EFL Learners*. *Arab World English Journal (AWEJ)*.
  29. Miller, K. (2020). *7 Time Management Tips for Online Students*. Northeastern University Graduate Program, <https://www.northeastern.edu/graduate/blog/time-management-tips-online-students/#:~:text=One%20of%20the%20most%20valuable,is%20to%20achieve%20your%20goals.&text=Effective%20time%20management%20not%20only,and%20in%20your%20personal%20life>.
  30. Mishra, L., Guptab, T., & Shreeb, A. (2020). *Online teaching-learning in higher education during lockdown period of COVID-19 pandemic*. *International Journal of Educational Research*.
  31. Montgomery, A. (2016). *Recreational Participation and Perceived Stress Levels of College Students*. Winthrop University.
  32. Motz, B. A., Quick, J. D., Wernert, J. A., & Miles, T. A. (2021). *A Pandemic of Busywork: Increased Online Coursework Following the Transition to Remote Instruction Is Associated with Reduced Academic Achievement*. *Online Learning*.
  33. Niemi, H., & Kousa, P. (2020). *A Case Study of Students' and Teachers' Perceptions in a Finnish High School during the COVID Pandemic*. *International journal of technology in education and science*.
  34. Poth, R. D. (2019). *The Importance of Being a Mentor and Having a Mentor*. *Getting Smart*, <https://www.gettingsmart.com/2019/02/the-importance-of-being-a-mentor-and-having-a-mentor/>.
  35. Rasheed, F., & Wahid, A. (2018). *THE THEORY OF DIFFERENTIATED INSTRUCTION AND ITS APPLICABILITY: AN E-LEARNING PERSPECTIVE*. <https://www.researchgate.net/>.
  36. Rotas, E., & Cahapay, M. (2021). *From stress to success: Exploring how Filipino students cope with remote learning amid COVID-19 pandemic*. *Journal of Pedagogical Sociology and Psychology*, 3(1).
  37. Rotas, E., & Cahapay, M. (2021). *From stress to success: Exploring how Filipino students*. *Journal of Pedagogical Sociology and Psychology*.
  38. Smith, J., & Osborn, M. (2015). *Interpretative phenomenological analysis as a useful methodology for research on the lived experience of pain*. *British Journal of Pain*, 9(1), 41-42.
  39. Stelitano, L., Sy, D., Woo, A., Diliberti, M., Kaufman, J., & Henry, D. (2020). *The Digital*



---

*Divide and COVID-19: Teachers' Perceptions of Inequities in Students' Internet Access and Participation in Remote Learning. Insights from the American Educator Panels.*

40. *The Department of Local Government, S. a. (2021). The relationship between organised recreational activity and mental health.*
41. *Thoma, P., Liu, H., & Umberson, D. (2017). Family Relationships and Well-Being. Innovation in Aging, 1(3): igx025.*
42. *Tomlinson, C. A. (2000). Differentiation of Instruction in the Elementary Grades. ERIC Digest. ERIC Clearinghouse on Elementary and Early Childhood Education.*
43. *Tria, J. (2020). The COVID-19 Pandemic through the Lens of Education in the Philippines: The New Normal. International Journal of Pedagogical Development and Lifelong Learning.*
44. *Williams, L. (2013). A Case Study of Virtual Physical Education Teachers' Experiences in and Perspectives of Online Teaching. Retrieved from University of South Florida.*
45. *Yu, L., Shek, D., & Zhu, X. (2018). The Influence of Personal Well-Being on Learning Achievement in University Students Over Time: Mediating or Moderating Effects of Internal and External University Engagement. Front. Psychol., 8:2287. doi: 10.3389/fpsyg.2017.02287.*
46. *Zote, J. (2020). Making Sense of the Different Types of Remote Learning. Wyzant, <https://www.wyzant.com/blog/types-of-remote-learning/>.*



# INSIGHTS IN TO THE EMPLOYEE TRAINING PROGRAMMES OF INDIAN CEMENT INDUSTRY: AN EMPIRICAL STUDY

<sup>1</sup>Ms. Jeevana Chitreddy, <sup>2</sup>Prof.G.L. Narayanappa

<sup>1</sup>Research Scholar, Dept. of Management, Dravidian University, Kuppam

<sup>2</sup>Dean, School of Commerce and Management, Dravidian University, Kuppam

Article DOI: <https://doi.org/10.36713/epra7433>

DOI No: 10.36713/epra7433

## STATEMENT OF THE PROBLEM

The 'ABC' Cement Industries Ltd has entrenched in the year 1955 in the most economically disadvantaged and industrially deprived location of Southern India. After words, the industry nourished as a very big cement industry in the region. Subsequently, the founders put their sustained efforts to emerge the ABC industry as a market leader. From the past half decade the company was creating thousands of employment opportunities to the unemployed youth in the region. At the outset the ABC cement industry produced only 200mts per day and later it has increased its production to 4000 TPDs after contraption. The then dynamic founder entrepreneur under whose custodianship the ABC cement industry was flourished, such founder was passed away and the industry is looked after by their heriditaries.

## IMPORTANCE OF EMPLOYEE TRAINING

The era of economic liberalisation and privatisation around the globe have been drastically streamlined the industrial sector in general and the cement industries in particular. The cement industry enormously encourages the growth of Indian economy during the cut-throat competition of industries.

The object of this study includes the importance of employee training factors which influence the role of training of employees to assess the nourishment of future economy of cement industry. It is realised that there is a need of convergence of employee training in cement industries for overall upward advancement of cement

industries in today's corporate world. Since, the advent of liberalisation with an object of moulding the cement industries sector more human resource oriented and expansion of the role of cement industries in the growing economy and the role of privatisation and the direct foreign investment have given the boost to the modern cement industry. The ABC Cement Industries Ltd. has realised the relative importance of employee training for deputing their vital employees for world class institutions for training of employees.

With the changing technology taken place in administration of cement industries, the designing of new employee training programmes keeping in view of the organisational skill requirements and employees calibre has become tough. In view of this catastrophic situation, the ABC cement industry should compile the new human resource plans and design the new employee training programmes with thousand eyes.

Further, it is realised that the analysis of specifications various methods of employee training programmes that are required for training the employees of this cement industry are vital parameters for successful running of the organisations. In addition, it is also noticed from the incidents of past era that the outdated employee training programmes are imbibing laggard technological skills into the minds of employees/workers of ABC cement industry. In spite of several attempts made by the ABC cement industry with regard to the employee training methods, several disruptions were taking place in attaining the proper implementation of this facets. Further, it is noticed that various skills imbibed into the minds of the employee/workers in the training



programme will immediately influence the total productivity of the ABC cement industry. Hence, the principle aim of training is overall augmentation of the productivity of the organisation.

In the era of globalisation, the success of cement industry very much depends upon the adoption of rational employee training programmes to their employees/workers by the ABC cement industry. The adoption of scientific methods for imparting of latest training methodologies for their employees is inevitable for ABC cement industry towards the maximisation of profits.

### SELECT REVIEW OF LITERATURE

Doris B. Collins (2002)<sup>1</sup> has stated that the best program for the organisation is the one where the indispensable structure of the organisation drives the content of the training program. Major issues emerge when the objectives and goals of the training program are not connected to the overall strategy of the organisation. To be suitable, the training program should initially be went through before by a prerequisite assessment to guarantee that the program targets meet the specific necessities of the organisation and are associates with the organisational strategy. The best programs incorporate adult learning abilities. Programs should represent the individual learning styles of a different gathering of pioneers and chiefs.

Desseler (2008)<sup>2</sup> observes the training further and stated that as the methods for giving new or current work force the skills they need to perform at their different jobs. Continuing, he considers training as the hallmark of good administration and in this way when managers ignore training, they are doing as such to the great disadvantages of the organizations they are managing. This is on the grounds that high potential workers do not still guarantee that they will perform on the job. This is the reason every employee should understand what the board wants him to do a how he must do it. Training therefore, has had a genuinely amazing record of affecting organizational effectiveness.

Monappa and Saiyadain (2008)<sup>3</sup> have defined training as “the teaching or learning activities carried on for the basic purpose of aiding individuals of an organization to gain and supply the knowledge, skills, abilities and attitude required by that organization. It is the act of increasing the knowledge and skill of an employee for doing a particular job.” Training in this way needs to be seen by managements of every organization as a long-term investment in its human resource.

Armstrong (2009)<sup>4</sup> has separated the training from development by articulating his idea that advancement is intended to procure new knowledge and abilities that help to advance into

some future occupation prerequisites while training helps in acquiring those capabilities that empower the workers to perform better in their current jobs.

Markos and Sridevi(2010)<sup>5</sup> have proposed the training and development as a significant factor of workers. It will prompt greater engagement on their part if they perceive more growth. Workers in these days are not satisfied with the old style of authoritarian management, as they require job satisfaction, operational autonomy and status.

Jehanzeb (2012)<sup>6</sup> has opined that the research shows the advantages of training and development for the employee and organisation. The old employees are more capable instead of the new workers for the organisation. But if any new technology or assignment is given to the employee than there is a need of training emerge. The more the workers gain proficiency with the more they become compelling for the organisation. At the end if his research it is clarifies that the employee is the resource or an asset for the organisation so that is the reason the training and development program is exceptionally fundamental for the workers.

### SCOPE OF THE STUDY

The scope this study is confined to the H.R. Planning practices of ‘ABC’ Cement industries and it can not be made any generalisation to other similar industries

### OBJECTIVES OF THE STUDY

The basic objectives of the study:

- (i) To explore the customary practice of employee training programmes in ‘ABC’ Cement Industries Ltd.;
- (ii) To appraise the level of satisfaction/dissatisfaction of employees/workers towards the customary practice of employee training programmes in ‘ABC’ Cement Industries Ltd.;
- (iii) To look out the factors for dissatisfaction of employees/workers towards the customary practice of employee training programmes in ‘ABC’ Cement Industries Ltd.; and
- (iv) To bestow the suitable remedial measures to surmount the discontentment prevailed among the employees/workers towards the customary practice of employee training programmes in ‘ABC’ Cement Industries Ltd.

### RESEARCH METHODOLOGY

The methodology consists of data collection from primary as well as secondary sources. Through the survey method the first hand information was



collected from 60 sample respondents from the study unit.

### **SAMPLE DESIGN AND SIZE**

A Purposive-cum-convenient sampling procedure was followed and 60 respondents were chosen as sample respondents.

### **ANALYSIS OF THE DATA**

The information collected from the sample respondents was processed and tabulated scientifically and several statistical tools like (i) Independent sample t-test; (ii) Weighted mean scores; (iii) ANOVA; and (iv) Correlation analysis are calculated at appropriate junctures and the inferences were drawn

### **RESEARCH FINDINGS**

- 1) Due importance is not given for organisational requirements while imparting training and while deputing the employees/workers to the various employee training programmes. Deputation of employees to the various training programmes is purely depends on the whims and fancies of higher officials. Really deserving and eligible employees/workers are not at all deputed for employee training programmes. (23.33%).
- 2) The very design of training is not designed in accordance with the needs of the organisation and hence there is a mismatch between the skills required by the organisation and the actual skills imparted in the training (21.66%).
- 3) The present training procedure is not at all imbibing any new skills to the employees/workers/participants to discharge updated technological professional responsibilities which involve certain technical knowledge. Whenever any technological problems arised in the operation of the plant and machinery the organisation needs to depend on outside technological experts which involves huge-expenditure (18.33%).
- 4) The present employee training programmes are not at all motivating the work attitude, professional conduct and character of the employee/workers. Due to this reason, the professional working performance of the employees/workers was not at all enhanced (20.00%).
- 5) The present programmes of employee training are not at all helping to develop the organisational performance and also not playing any vital role in enhancing the

employees' calibre and organisational productivity (16.66%).

### **SUGGESTIONS**

1. Proper importance and due weightage should be given to the organisational training requirements while deputing the employees to the various training programmes. Further, the skilled employees/workers who can grasp the training contents and inputs in short span should only be deputed for training. So, that they can learn, grasp and implement the skills learned in the training programme for organisational effectiveness. While deputing the employees for training, the too much involvement of higher officials should be minimised. So that the really deserving and result oriented employees can be deputed for training to achieve organisational effectiveness.
2. The basic design and scientific structure of training depending upon the requirements of the organisation should be fabricated by the senior officials of the organisation. So that the mismatch between the skills really required by the organisation and the actual skills imparted in the training can be ameliorated.
3. It is proposed to incorporate the latest contents into these training programmes such as professional technological responsibilities which involves certain portion of technical knowledge to discharge updated technological job responsibilities and the same should be imbibed into theses training progress. So that the concerned employees can update their skills in the relevant area and the dependence on outside experts for operation of plant and machinery, which involves huge expenditure can be minimised.
4. Further, the proposed employee training programmes should be capable of psychologically motivating the employees work attitude, behaviour, professional ethics, organisational culture, professional conduct and character of employees in order to increase the professional working performance of the employees/workers for maximising the organisational productivity.
5. The prime motto and outcome of the proposed training programmes for the employees should be primarily capable of building and developing the organisational performance in principle. Further, the proposed and enhanced calibre of the employees/workers should be capable of enormously enhancing the organisational productivity for maximisation



of further profits and building of reputation in the corporate sector.

## REFERENCES

1. Doris B. Collins Elwood F. Holton III, *The effectiveness of managerial leadership development programs: A meta-analysis of studies from 1982 to 2001*, *Human Resource Development Quarterly*, Volume15, Issue2 Summer 2004, Pp 217-248.
2. Dessler, G. (2008). *Human Resource Management 11th ed. Pearson International Edition*.
3. Monappa, A & Saiyadain, M. (2008). *Personnel Management 2nd ed. Tata McGraw-Hill, New Delhi*.
4. Armstrong, M. (2009). *Armstrong's handbook of human resource management practice (11th ed.)*. London (UK) and Philadelphia (USA): Kogan Page Limited.
5. Sridevi, M.S., Markos, S., (2010). *Employee Engagement: The Key to Improving Performance*. *International Journal of Business and Management*, 5(12), 89-96.
6. Khawaja Jehanzeb, D. N. (2012). *Training and Development Program and Its Benefits to Employees and Organizations*. *Far East Journal of Psychology and Business*, 59-71.



# ROLE OF EDUCATION IS A MILESTONE OF WOMEN EMPOWERMENT

**Ms. Parul Bhargava**

*Assistant Professor, S. S. Jain Subodh Management Institute, Jaipur*

## ABSTRACT

*In the present article the title shows the word empower the women via education. This statement true to fulfill the empowerment of women in various fields. Also shows that empowerment of women in 21<sup>st</sup> century play important role in the development of the country. Women constitute almost half of the population in the world and access to education has been one of the most pressing demands of these women's right movements. Women's education has also been a major preoccupation of both the government and civil society as educated women can also play a vital role in socio-economic factor. Through Education Women enhance the quality for improve the quantity of knowledge and Put every steps further to achieve her goals and aware the society by showing the power of women's empowerment. It is great to access that now situation to motivate the entire girl child for education .women are key of problems lock, to open with their authentic solution.*

*Education is a milestone of women empowerment because it enables them to respond to challenges, to confront their traditional role and change their life*

*"Countries and Nations which do not respect women have never become great nor will ever be in future" - Swami Vivekananda.*

*With the ongoing multi-faceted process for women empowerment confidently taking over social spaces, there has been a positive influence in the corporate world. Looking back 10 years from now, positions of power for women have increased substantially. As the landscape has changed, I have observed a trend of women with education, ambition and passion taking every industry by storm.*

## INTRODUCTION

Education is milestone of women empowerment because it enables them to responds to the challenges to confront their traditional role and change their life .Now just some year away, this can become reality only when the women of this nation became empowerment .Education enables a women to become strong physically by giving her knowledge about good physical health, which would ultimately benefit her mental health Agrawal and Salve Each and every field like teaching, Nursing care, Social work, medicine, Women proved to be better than men.

Women's power is crucial to economic, educational, family, spiritual moral and aesthetic growth. Education and literacy empowers women. The only way a society or aspire to economic growth and development is to just through education but especially education among the women's citizens. Education is considered as a basic requirement and a fundamental right for the

citizens of ay nation. It is a powerful tool for reducing inequality as it can give people the ability to become independent. Women, who come across discrimination in any spheres, have particular needs of this. Education is regarded as an important millstone of women empowerment because it enables them to face the challenges, to confront their traditional role and change their life. Education of women is the most important tool of change their position in the society.

## ROLE OF EDUCATION IN EMPOWERMENT OF WOMEN

1] Education Manumit-Education manumit the thinking, mind, thoughts, imagination, power, principle in various field for easy to survive and achieve knowledge through education .Empowerment of women brings equal status to women, opportunity and freedom to develop her which also means equipping women to be. Education makes the women's self sufficient in



every aspect, she is not depends on her father, husband nor son neither brother.

2] Education stay away from hurdles-Education gives equal rights to women in socially, politically, culturally, gender, religiously manner. She will bring equal status with men and that is the reason to fostering both national and international integration.

3] Education allows to take Decision-As education opens ways to take decision according to their choice whether it is relates to life style, life partner, job, career, eating style, sexuality etc. Education teach to learn what is wrong and right .Education push to stay independently on own feet.

4] Education Garner- Education will garnishing women to defence against crime, social devil, sexual harassment, marital rape and mental stress of society etc.

5] Educated women contributes to economy- If women are qualified and helpful for family to earn money that means she able to develop the economy status of family and also for nation. Women can help, through their work; get rid of problems like India's high maternal mortality rate, high rates of gender violence and other crime against women child sex abuse, female feticide, implement family planning and other schemes etc Sharma (2016).

6] Education enhances- Education enhances the quality of women and makes some strategies to grow upward, to gear the entire education system to play positive interventionist role in the empowerment of women. To widen women's access to vocational, technical and professional education at all levels, breaking gender stereotypes.

Above six statement proof that education play very vital role for empowering

women. Paraphra Singh a popular saying here-educated a man and you will educated one person, educate a woman and you will educated a whole family would like to say that educated women educated more generation.

According to the Country Report of the Government of India, "Empowerment means moving from a weak position to execute a power."Education of women in the education of women is the most powerful tool of change of position in society. Education reduces the inequality and increase the status of women in her family and also country where she works.

Education motivate, guide and train in all level for improving and enhancing her qualities. Government providing various schemes for girls and women in her education like, free schooling, midday meal, hostels, cloth, bicycle, scholarships, train concession etc. education makes the women not

only knowledgeable but very strong and powerful. Empowerment of a girl's starts even enterprise makes empowerment operation.

Women have a very in-distinctive position in our economy and are an indispensable part of the society. Yes, education and knowledge empower women. The only way a society or nation can move forward and aspire to economic growth and development is not just through education- but especially education among the women citizens.

"To awaken the people, it is the women who must be awakened. Once she is on the move, the family moves, the village moves, the nation moves." - Pt. Jawaharlal Nehru

Education is a milestone of women empowerment because it enables them to respond to challenges, to confront their traditional role and change their life.

Education is one of the ways to spread the message of women empowerment. However rich and humongous our country is no goals or dreams of our citizens will be achieved without effective education. Education not only educates a person but also helps her realize that she is a vital part to the society. Occupational achievement, self-awareness and satisfaction are among the many things that will be ensured by effective use of education. Guidance and counselling also provided through education, helps women select their jobs and build career paths. Education will help women to empower through the knowledge of science and technology to face the challenges of today's technological age. It also helps them in garnering information through the computer all over the world. Education not only educates a woman but enables her to take decisions and accept responsibilities at her home and outer world. Education helps a woman to understand her rights to equal treatment like a man in the society of this nation.

This statement true to fulfil the empowerment of women in various fields. Also shows that empowerment of women in 21st century play important role in the development of the country. Women constitute almost half of the population in the world and access to education has been one of the most pressing demands of theses women's right movements. Women's education has also been a major preoccupation of both the government and civil society as educated women can also play a vital role in socioeconomic factor. Through Education Women enhance the quality for improve the quantity of knowledge and put every steps further to achieve her goals and aware the society by showing the power of Importance of Women participation Women's participation may be used both for support by an agency and as a control device by the law-makers. Participation may be direct or indirect, formal or informal; it may be political, social or



administrative in nature. Women's participation in Panchayat Raj institutions may take many forms. It refers to all those activities which show the women's involvement in the processes and administration, that is, participation in policy formulation and programme planning, implementation and evaluation of policies and programmes meant for development target groups.

7. Indian women have been associated with politics since the pre-independence period. At the societal level male dominance in Parliament, bureaucracy, judiciary, Army, police all point towards gender inequality, notwithstanding the fact that it is often argued that women's political leadership would bring about a more cooperative and less conflict-prone world. Lack of political and economic powers add to the subservient and unequal position of women. 8 After Independence, in spite of having our own constitution, India was not able to achieve morals like fairness, equality and social justice. The condition of women didn't improve even having a woman prime minister for few numbers of years. Women's representation in politics all over the world began to assume importance from mid 1970s when United Nations (UN) declared 1975 as the 'International Women's Year'. This was followed by the UN's decade for Women from 1976-1985 and the theme was "Equality, Development and Peace". Women's participation in politics remained quite inconsequential in India even today but some sort of improvement took place by the 73rd and 74th constitutional amendment acts which gave boost to the status of women at the political level by giving opportunity to women in the process of decision-making.

9. The 73rd and 74th Amendments (1993) to the constitution of India have provided for reservation of seats in the local bodies of panchayats and Municipalities for women, laying a strong foundation for their participation in decision making at the local level.

10. Educational equality Another area in which women's equality has shown a major improvement as a result of adult literacy programs is the area of enrolment of boys and girls in schools. As a result of higher participation of women in literacy campaigns, the gender gap in literacy levels is gradually getting reduced. Even more significant is the fact that disparity in enrolment of boys and girls in neo-literate households is much lowered compared to the non-literate householders.

11. The world has achieved equality in primary education between girls and boys. But few countries have achieved that target at all levels of education. The political participation of women keeps increasing. In January 2014, in 46 countries more than 30% of members of parliament in at least one

chamber were women. In many countries, gender in equality persists and women continue to face discrimination in access to education, work and economic assets, and participation in government.

12. Women and girls face barriers and disadvantages in every sector in which we work. Around the world 62 million girls are not in school. Globally, 1 in 3 women will experience gender-based violence in her lifetime. In the developing world, 1 in 7 girls is married before her 15th birthday, with some child brides as young as 8 or 9. Each year more than 287,000 women, 99 percent of them in developing countries, die from pregnancy and childbirth-related complications. While women make up more than 40 percent of the agriculture labour force only 3 to 20 percent are landholders. In Africa, women owned enterprises make up as little as 10 percent of all businesses. In South Asia, that number is only 3 percent. And despite representing half the global population, women compromise less than 20 percent of the world's legislators. Putting women and girls on equal footing with men and boys have the power to transform every sector in which we work. 13 The gender equality and women's empowerment isn't a part of development but at the core of development. To get rid of this we have to make some educational awareness programmes on gender equality and women empowerment for cementing our commitment to supporting women and girls men's empowerment. It is great to access that now situation to motivate the entire girl child for education. Women are key of problems lock, to open with their authentic solution.

## SUGGESTION

→ Awareness of girls education is essential whether girls from rural or urban. As per

1. Paraphrased "educated mothers educated family."

→ Change the system towards women based sex discrimination.

→ Removal of gender inequality.

→ Encourage the women actively participate in social and political issues.

→ Spread the message that education of women is to build the strong women to create a

2. Incredible country.

→ Awareness needs to know the women are effectively good contributor of the socio-

3. Economic development of the nation.

→ Education plays important role to enhance the quality of women's and women's increase

4. The quantity of knowledge that use in various fields where she survives.

→ Motivate all girls and a woman belongs to rural areas and gives training to polishing their



5. Creativity.

–To make the women aware she should be encourage in every field.

–Through education entire girl child independent and free from their right and also

6. Freedom.

– Arrange different kinds of training, workshop and courses for grooming of girls and

## CONCLUSION

I can say that the number of women in the corporate world has been steadily increasing. Now in the 21st century when women are coming out in each field, empowering them is truly essential. By 2020 India is poised to be a superpower developed country and hence we cannot ignore the importance of women education in reference to women empowerment.

## REFERENCE

1. Agrawal, S. and Salve, S. (2013) “Women Empowerment :Need of Women Education. *Indian Journal of Education Research Experimentation and innovation (IJEREI)*.ISSN-2231-0495.Vol-3.Issue 4.
2. Alva,A and Hans V.B.(2013). “Higher Education in India-Opportunities, ChangesChallenges.”Available at <http://ssrn.com/abstract=2203706>
3. Balve S. (2015).”Women Entrepreneurship towards women Empowerment in India:



# DEVELOPMENT AND VALIDATION OF SELF-LEARNING MODULE IN HORTICULTURAL PRODUCTION

**Gerlin P. Gallardo**

*Graduate School, Laguna State Polytechnic University, Santa Cruz, Laguna, Philippines*

## ABSTRACT

*The development of a self-learning module is considered as an important educational goal to address the needs, and resources of every learner to ensure quality education. This study was conducted to Develop and validate self-learning module in Horticultural production for grade 9 utilizing the descriptive-evaluated method of research. Specifically, this study aimed to attain the following objectives: 1. Determine the level of appropriateness of developed self-learning module in Horticultural production in terms of its components such as: objectives, content, discussion, activities, and assessment. 2. Determine the level of Validity of developed self-learning module in Horticultural production in terms of: suitability, relevance, and aesthetic value. 3. Find out the significant difference on the level of appropriateness of developed self-learning module in Horticultural production made by the TLE master teachers and TLE teachers. 4. Find out the significant difference on the level of validity of developed self-learning module in Horticultural production made by the TLE master teachers and TLE teachers.*

*The level of appropriateness of developed self-learning module in Horticultural production in terms of its components such as objectives, content, discussion, activities, and assessment as rated by TLE teachers and TLE master teachers were very high. While the level of validity in terms of suitability, relevance, and aesthetic value, as rated by TLE teachers were Very Highly validated and only Highly validated as rated by TLE master teachers.*

*There is a significant difference on the level of appropriateness and validity of developed self-learning module as rate by the TLE master teachers and TLE teachers. This means that the groups of respondents have different evaluation on the developed of the self-learning module in Horticultural Production, therefore the hypothesis stating that there is no significant difference on the level of appropriateness and validity of developed self-learning module in Horticultural production was not sustained.*

*It is highly recommended that the developed and validated self-learning module be used as instructional materials in teaching grade 9 students as well as be used for the improvement of learning strategies as in modular modality.*

**KEYWORDS:** *Instructional Module, Horticultural Production, Objectives, Contents, Discussions, Activities, Assessments, Suitability, Relevance and Aesthetic value.*

## I. INTRODUCTION

Education is very important in everyone's life thus, learning in Horticulture Production is very relevant in man's daily life. Some students have no knowledge, skills, and ideas about Horticulture because of many reasons. In line with this, teachers who facilitate learning should prepare and apply different strategies and techniques, to help students understand the lessons especially in Horticulture production. Developing a self-learning module is a great effort a teacher could do in supporting students' learning.

Horticulture is an unfamiliar term to many students. Yet, when they are told that caring for houseplants, growing tomatoes in a garden, and mowing the lawn are horticultural activities, the term suddenly becomes much clearer. Horticulture is a segment of the agriculture industry. Horticulture includes the production and use of plants for food, comfort, and beautification.

The self-learning module and other alternative learning delivery modalities are in place to address the needs, situation, and resources of every learner to help the Department of education ensure that all the learners have access to quality basic education with face-to-face classes still prohibited due to the public health protocol because of the Corona Virus.



Quality education is viewed as a nation's pillar of success. It means quality employment for a better life. The implementation of K-12 curriculum in the Philippines Basic Educational System is the key to a nation's development. Though the government faces many problems in the long run of the implementation of the program, there is a need to implement it because the enhancement of the quality of education is very urgent and critical. Through the K-12 program, students will be able to get sufficient instructional time to do subject-related tasks which make them more prepared and well-trained in that subject area. It is in this context that the researcher got interested to conduct a study on the development and validation of self-learning module in Horticultural production. The researcher believes that the use of modules in teaching will facilitate the learning process. Hence it makes teaching more effective. Moreover, using module the students would benefit to have a better grasp of the lesson presented to them.

The researcher aims to provide opportunities for teachers and students to have equal footing with 21st century teachers and learners in TLE Cluster Division of Laguna. The developed learning module is used as the tool for the study targets to improve or enhance the teaching in TLE as well as the learner's knowledge, skills, and ideas in Horticultural production. Also, this will be an additional material to be used by the teachers for future learners.

Espinar et.al. (2016) states that, the lesson objectives are content validity, and the objectives followed the principle of SMART and should be relevant to the course topics, the lesson inputs section has content validity, and the lesson present clearly the key concepts and the background information needed to understand the lesson similarly, the lesson application of the work text possesses content validity. The activities and exercise in this section are relevant and in consonance with the course syllabus. All activities are adequate, sufficient, and appropriate to its users.

According to Jesse Hines, (2013), the ability to write clearly is crucial to getting the message across no matter what he is writing, whether it is an email, a blog post, a magazine, article, or a letter to a friend. Clear and concise writing is vital to having one's words read and understood. The whole purpose of most writing is to inform readers of something or to persuade people to do something. The more cleared and concise language, the easier the message will be understood, and the more likely the readers will respond to that message.

According to Morrison (2019) self-paced learning methods are also called individualized learning or self-instruction and has received the most attention in instructional design. As the principles of learning indicate, much evidence supports the belief that optimum learning takes place when a student works at his or her own pace, is actively involved in performing specific learning tasks, and experiences success in learning. He also added the necessary features of high-quality self-paced learning program such as learning activities are carefully designed to address specific objectives, activities and resources are carefully selected in terms of the required instructional objectives.

Stelzer, Et.al. (2010) state that activities before lecture and allowing time devoted to active learning aimed a modest increase in examination performance, the change dramatically improved student attitudes toward the course in general and lecture in particularly.

Fisher (2017) narrates that, student assessment is a critical aspect of the teaching and learning process. The measurement of student learning through assessment is important because it provides useful feedback to both instructors and students about extent to which students are successfully meeting course learning objectives. Forms and purposes of assessment

## II. OBJECTIVES

This study aimed to Develop and Validate of self-learning module in Horticultural production in Junior High School in TLE Cluster of Laguna, Division of Laguna, School Year 2020-2021.

Developing knowledge and skills was focused on the Philippine Educational Curriculum. It had long been targeted by schools and teachers throughout the country. But the development of equally important, creative thinking skills was given less priority.

Specifically, this study aimed to attain the following objectives:

1. Determine the level of appropriateness of developed self-learning module in Horticultural production in terms of its components such as:

- 1.1. objectives;
- 1.2. content;
- 1.3. discussion;
- 1.4. activities; and
- 1.5. assessment.

2. Determine the level of validity of developed self-learning module in Horticultural production in terms of:



- 2.1. suitability;
- 2.2. relevance; and
- 2.3. aesthetic value.
3. Find out the significant difference on the level of appropriateness of developed self-learning module in Horticultural production made by the TLE master teachers and TLE teachers.
4. Find out the significant difference on the level of validity of developed self-learning module in Horticultural production made by the TLE master teachers and TLE teachers.

### III. METHODOLOGY

Since the study was about the developed and validation of self-learning module in Horticultural production ten (10) TLE master teachers and twenty (20) TLE teachers from Junior High School in TLE Cluster of Laguna, Division of Laguna will be the respondents of the study. They were considered as evaluators of the study since they are knowledgeable, and they handled subject in TLE especially in Agriculture where Horticultural production is anchored.

This study utilized the purposive sampling technique. The researcher made contact of the potential respondents for the participation to this survey research. There were two (2) groups of respondents who serve as evaluators of the developed and validated self-learning module in Horticultural production.

Descriptive research according to Rick Penwarden (2014) is conclusive in nature, as opposed to exploratory. This means that descriptive research gathers quantifiable information that can be used for statistical inference on the target audience through data analysis. As consequence this type of research takes the form of closed-ended questions, which limits its ability to provide unique insights. However, if used properly it can help an organization better define and measure the significance of something about a group of respondents and the population they represent.

In this study development and validation of self-learning module in Horticultural production was developed by the researcher to aid students learning and acquiring skills in producing horticultural plants. The level of developed and validated of self-learning module in Horticultural production was determined by the weighted mean and standard deviation as well as described in terms of its components such as objectives, content, discussion, activities, and assessment.

It also used Minitab 14 in computing the data gathered and treated them statistically using Paired t-test. The computed p-values were compared to the level of significance at 0.05 to determine the significant difference among the ratings given by the group of respondents on the level of appropriateness of the develop self-learning module in Horticultural production.

### IV. RESULT AND DISCUSSION

This Chapter consists of the presentation, interpretation, and analysis of data. This also consists of different tables showing appropriateness and validity of the developed self-learning module in Horticultural production.

#### **Level of appropriateness of the Developed Self-Learning Module in Horticultural Production**

In this study, a self-Learning module in Horticultural production was developed by the researcher to aid students in learning and acquiring skills in producing horticultural plants. The level of appropriateness of the developed self-learning module in Horticultural production was determined by the weighted mean and standard deviation and described in terms of its components such as objectives, content, discussion, activities, and assessment.

#### **Level of appropriateness of the Developed Self-Learning Module in Horticultural Production in terms of Objectives**

The result shows that in terms of objectives, TLE teachers evaluated the level of appropriateness of the developed self-learning module in Horticultural production as *very high* shown by the grand (M=4.81, SD=0.42). This means that the objectives of the self-learning module in Horticultural production were very highly developed as perceived by the respondents.



**Table 1. Level of appropriateness of the Developed Self-Learning Module in Horticultural Production in terms of Objectives**

STATEMENT	TLE Teachers			TLE Master Teachers		
	Mean	SD	Remarks	Mean	SD	Remarks
<i>The Objectives of the module....</i>						
1. are clearly stated on what is expected of the learner.	4.80	0.40	VSA	4.00	0.73	SA
2. show clearly plan of the course content and training learning activities comprehensively.	4.70	0.46	VSA	3.70	0.75	SA
3. are measurable and attainable.	4.80	0.51	VSA	3.80	0.79	SA
4. guide the students to have a full grasp of the concepts to be discussed in each of the module.	4.70	0.56	VSA	4.00	0.77	SA
5. has topic that are practically related to each other.	4.90	0.30	VSA	3.60	1.04	SA
6. are feasible, workable, and attainable with the time frame for the course.	4.85	0.36	VSA	4.10	0.74	SA
7. provide learning task and videos that relates directly to the objectives.	4.70	0.46	VSA	3.60	0.99	SA
8. are aligned with the K-12 Learning Competencies	4.90	0.30	VSA	3.90	0.80	SA
9. focus on the development of critical and analytical thinking of the learner.	4.80	0.40	VSA	3.90	0.79	SA
10. contains discussion that are needed for better understanding of activities.	4.90	0.30	VSA	3.90	0.80	SA
<b>Grand Mean/SD</b>	<b>4.81</b>	<b>0.42</b>	<b>VSA</b>	<b>3.85</b>	<b>0.84</b>	<b>SA</b>
<b>Interpretation</b>	<b>Very High</b>			<b>High</b>		

**Legend:**

Scale	Range	Remarks	Interpretation
5	4.20 – 5.00	Very Strongly Agree (VSA)	Very High
4	3.40 – 4.19	Strongly Agree (SA)	High
3	2.60 – 3.39	Agree (A)	Moderately High
2	1.80 – 2.59	Slightly Agree (SIA)	Low
1	1.0 – 1.79	Disagree (D)	Very Low

However, TLE master teachers perceived, that the objectives of the self-learning module in Horticultural production were highly shown by the grand (M=3.85, SD=0.84). This means that the objectives of the self-learning module in Horticultural production were highly developed.

**Table 2. Level of appropriateness of the Developed Self-Learning Module in Horticultural Production in terms of Contents**

STATEMENT	TLE Teachers			TLE Master Teachers		
	Mean	SD	Remarks	Mean	SD	Remarks
The Module Content...						
1. allow equal opportunities among all Horticulture Students.	4.55	0.59	VSA	3.70	0.83	SA
2. provide clear and precise directions with descriptive direction.	4.55	0.67	VSA	3.60	0.80	SA
3. are made interesting with the use of additional selected image displays	4.50	0.59	VSA	3.80	0.83	SA
4. are appropriate in the lessons discussed.	4.55	0.59	VSA	3.70	0.83	SA
5. compare method and techniques to meet the horticulture skills requirements.	4.55	0.59	VSA	3.80	0.85	SA
6. provide learning task and videos that relates directly to the contents.	4.60	0.58	VSA	3.70	0.85	SA
7. motivate learners to acquire skills in Horticulture.	4.65	0.57	VSA	3.60	1.04	SA
8. focusses on the main goal which is the development of skills in Horticulture.	4.65	0.57	VSA	3.60	1.04	SA
<b>Grand Mean/SD</b>	<b>4.58</b>	<b>0.60</b>	<b>VSA</b>	<b>3.69</b>	<b>0.89</b>	<b>SA</b>
<b>Interpretation</b>	<b>Very High</b>			<b>High</b>		

The result shows that in terms of contents, TLE teachers evaluated the level of appropriateness of the developed self-learning module in Horticultural production was *very high* shown by the grand ( $M=4.58$ ,  $SD=0.60$ ). This means that the contents of the self-learning module in Horticultural production were very highly developed as perceived by the respondents.

However, TLE master teachers perceived, that contents of self-learning module in Horticultural production was *high* shown by the grand ( $M=3.69$ ,  $SD=0.89$ ). This means that the contents of the self-learning module in Horticultural production were highly developed.



**Table 3. Level of appropriateness of the Developed Self-Learning Module in Horticultural Production in terms of Discussion**

STATEMENT	TLE Teachers			TLE Master Teachers		
	Mean	SD	Remarks	Mean	SD	Remarks
<i>The Module Discussion...</i>						
1. Are in sequence needed in development of skills.	4.55	0.59	VSA	3.70	0.80	SA
2. Uses appropriate words that are helpful to comprehend the topics.	4.55	0.59	VSA	3.80	0.83	SA
3. Motivates students to use the acquired knowledge and skill.	4.60	0.58	VSA	3.60	0.92	SA
4. Uses pictures and illustrations for better understanding of the lessons.	4.60	0.58	VSA	3.50	0.77	SA
5. Contains discussion that are allow students to think critically, thus encouraging original and independent thinking.	4.55	0.59	VSA	3.70	0.80	SA
<b>Grand Mean/SD</b>	<b>4.57</b>	<b>0.59</b>	<b>VSA</b>	<b>3.66</b>	<b>0.83</b>	<b>SA</b>
<b>Interpretation</b>	<b>Very High</b>			<b>High</b>		

The result shows that in terms of discussion, TLE teachers evaluated the level of appropriateness of the developed self-learning module in Horticultural production as *very high* as shown by the grand (M=4.57, SD=0.59). This means that the discussion of the self-learning module in Horticultural production was very highly developed as perceived by the respondents.

However, TLE master teachers perceived, that the discussion of the self-learning module in Horticultural production was *high*, shown by the grand (M=3.66, SD=0.83). This means that the discussion of the self-learning module in Horticultural production was highly developed.

**Table 4. Level of appropriateness of the Developed Self-Learning Module in Horticultural Production in terms of Activities**

STATEMENT	TLE Teachers			TLE Master Teachers		
	Mean	SD	Remarks	Mean	SD	Remarks
<i>The Activities of the module...</i>						
1. Has topics in the module are appealing.	4.65	0.48	VSA	3.90	0.77	SA
2. Are information provided is relevant and up to-date.	4.70	0.46	VSA	3.70	0.93	SA
3. Is adequate in acquiring the knowledge in each module.	4.75	0.43	VSA	3.90	0.78	SA
4. Are relevant to the concepts being developed in each module.	4.70	0.46	VSA	3.80	0.83	SA
5. Contain application of knowledge and skills	4.70	0.46	VSA	3.80	0.83	SA
6. Uses appropriate guide and practice and monitoring activities that are adequate for learner interest.	4.70	0.46	VSA	4.00	0.79	SA
7. Contains challenging activities that used creativity, intelligence, and ability.	4.65	0.48	VSA	3.80	0.83	SA
<b>Grand Mean/SD</b>	<b>4.70</b>	<b>0.46</b>	<b>VSA</b>	<b>3.84</b>	<b>0.82</b>	<b>SA</b>
<b>Interpretation</b>	<b>Very High</b>			<b>High</b>		



The result shows that in terms of activities, TLE teachers evaluated the level of appropriateness of the developed self-learning module in Horticultural production as *very high* shown by the grand (M=4.70, SD=0.46). This means that the activities of the self-learning module in Horticultural production were very highly developed as perceived by the respondents.

However, TLE master teachers perceived, that activities of self-learning module in Horticultural production was *high*, shown by the grand (M=3.84, SD=0.82). This means that the activities of the self-learning module in Horticultural production were highly developed.

**Table 5. Level of appropriateness of the Developed Self-Learning Module in Horticultural Production in terms of Assessment**

STATEMENT	TLE Teachers			TLE Master Teachers		
	Mean	SD	Remarks	Mean	SD	Remarks
<i>The Module Assessment...</i>						
1. provide pre-test and post-test and self-check for learner evaluation.	4.70	0.46	VSA	3.90	0.79	SA
2. contained evaluation suited to the learners.	4.80	0.40	VSA	3.80	0.84	SA
3. provide evaluation that uses critical thinking skill.	4.85	0.36	VSA	3.80	0.84	SA
4. assess learning task that develop directly to target competency.	4.80	0.40	VSA	3.80	0.84	SA
5. provide answer key to facilitate assessment evaluation.	4.75	0.43	VSA	3.70	0.81	SA
<b>Grand Mean/SD</b>	<b>4.78</b>	<b>0.41</b>	<b>VSA</b>	<b>3.80</b>	<b>0.83</b>	<b>SA</b>
<b>Interpretation</b>	<b>Very High</b>			<b>High</b>		

The result shows that in terms of assessment, TLE teachers evaluated the level of appropriateness of the developed self-learning module in Horticultural production as *very high* as shown by the grand (M=4.78, SD=0.41). This means that the assessment of the self-learning module in Horticultural production were very highly developed as perceived by the respondents.

However, TLE master teachers perceived, that assessment of self-learning module in Horticultural production were *high as* shown by the grand (M=3.80, SD=0.83). This means that the assessment of the self-learning module in Horticultural production were highly developed.

#### Level of Validity of Developed Self-Learning Module in Horticultural Production

The level of validity of self-learning module in Horticultural production was determined by the weighted mean and standard deviation was described in terms of suitability, relevance, and aesthetic value.

**Table 6. Level of Validity of the Developed Self-Learning Module in Horticultural Production in terms of Suitability**

STATEMENT	TLE Teachers			TLE Master Teachers		
	Mean	SD	Remarks	Mean	SD	Remarks
<i>The Module Suitability...</i>						
1. are text versatile and can be used across curriculum.	4.80	0.40	VSA	3.70	0.81	SA
2. provide learning activities that are suited to the various learning style.	4.70	0.46	VSA	3.60	0.77	SA
3. can be revised to fit for some other purposes.	4.70	0.46	VSA	3.90	0.70	SA
4. content and discussion are suited to learner adequacy.	4.75	0.43	VSA	3.80	0.83	SA
5. contain discussion that allow students to think critically.	4.65	0.48	VSA	3.80	0.83	SA
<b>Grand Mean/SD</b>	<b>4.72</b>	<b>0.45</b>	<b>VSA</b>	<b>3.76</b>	<b>0.79</b>	<b>SA</b>
<b>Interpretation</b>	<b>Very High</b>			<b>High</b>		

The result shows that in terms of suitability, TLE teachers evaluated the level of validity of self-learning module in Horticultural Production was found to be very high as show by the grand (M=4.72, Sd=0.45). This means that the suitability of the self-learning module in Horticultural production were very highly validated as perceived by the respondents.

However, TLE Master teachers perceived, that suitability of self-learning module in Horticultural production were *high as* shown by the grand (M=3.76, SD=0.79). This means that the level of validity of self-learning module in Horticultural production in terms of suitability were highly validated.

**Table 7. Level of Validity of the Developed Self-Learning Module in Horticultural Production in terms of Relevance**

STATEMENT	TLE Teachers			TLE Master Teachers		
	Mean	SD	Remarks	Mean	SD	Remarks
<i>The Module Relevance...</i>						
1. provide learning task that relates directly to the objectives of the lessons.	4.85	0.36	VSA	3.60	1.01	SA
2. activities and performance tasks are relevant to the objectives of the modules.	4.75	0.43	VSA	3.90	0.78	SA
3. focuses on important lessons that develop skills in Horticulture.	4.65	0.57	VSA	3.80	0.81	SA
4. are suited and fitted to the field of specialization.	4.60	0.66	VSA	4.00	0.79	SA
5. interesting and self-motivating to the learners.	4.75	0.43	VSA	3.90	0.78	SA
<b>Grand Mean/SD</b>	<b>4.72</b>	<b>0.51</b>	<b>VSA</b>	<b>3.84</b>	<b>0.84</b>	<b>SA</b>
<b>Interpretation</b>	<b>Very High</b>			<b>High</b>		



The result shows that in terms of relevance, TLE teachers evaluated the level of validity of self-learning module in Horticultural production is *very high* as shown by the grand (M=4.72, SD=0.51). This means that the relevance of the self-learning module in Horticultural production were very highly validated as perceived by the respondents.

However, TLE master teachers perceived, that the relevance of self-learning module in Horticultural production was *high* as shown by the grand (M=3.84, SD=0.84). This means that the level of validity of self-learning module in Horticultural production in terms of relevance were highly validated.

**Table 8. Level of Validity of Self-Learning Module in Horticultural Production in terms of Aesthetic Value**

STATEMENT	TLE Teachers			TLE Master Teachers		
	Mean	SD	Remarks	Mean	SD	Remarks
<i>The Module Aesthetic Value...</i>						
1. contents are type legible and free from alteration.	4.55	0.67	VSA	3.50	0.99	SA
2. use appropriate text font, size, and type.	4.80	0.40	VSA	3.80	0.83	SA
3. contains visuals that fit the level of interest, knowledge, and skills of the target learners.	4.75	0.43	VSA	3.80	0.77	SA
4. uses well define language which are easy to understand.	4.70	0.46	VSA	3.70	0.79	SA
5. illustrations contribute to the acquisitions of concepts, understanding and skills in Horticulture.	4.75	0.43	VSA	3.60	0.91	SA
<b>Grand Mean/SD</b>	<b>4.71</b>	<b>0.50</b>	<b>VSA</b>	<b>3.68</b>	<b>0.86</b>	<b>SA</b>
<b>Interpretation</b>	<b>Very High</b>			<b>High</b>		

The result shows that in terms of aesthetic value, TLE teachers evaluated the level of validity of self-learning module in Horticultural production is *very high* as shown by the grand (M=4.71, SD=0.50). This means that the aesthetic value of the self-learning module in Horticultural production were very highly validated as perceived by the respondents.

However, TLE master teachers perceived, that the aesthetic value of self-learning module in Horticultural production were *high* as shown by the grand (M=3.68, SD=0.86). This means that the level of validity of self-learning module in Horticultural production in terms of aesthetic value were highly validated.

**Significant difference on the level of appropriateness of the develop Self-Learning Module in Horticultural Production.**

Minitab 14 was used in computing the data gathered and treated them statistically using Paired t-test. The computed p-values were compared to the level of significance at 0.05 to determine the significant difference among the ratings given by the group of respondents on the level of appropriateness of the developed self-learning module in Horticultural production.

**Table 9. Significant difference on the level of appropriateness of the Developed Self-Learning Module in Horticultural Production made by the TLE Master Teachers and TLE Teachers**

Variables	t-value	p-value	Decision on H <sub>0</sub>	Interpretation
Objectives	3.57	0.005		Significant
Content	2.97	0.011	Reject	Significant
Discussion	2.99	0.010	Reject	Significant
Activities	2.85	0.016	Reject	Significant
Assessment	3.39	0.007	Reject	Significant

*\*Significant at .05 level of significance*

Table 9 reveals the significant difference on the level of appropriate of the developed self-learning module made by the TLE master teachers and TLE teachers in terms of objectives, content, discussion, activities, and assessment.

**Table 10. Significant difference on the level of validity of Self-Learning Module in Horticultural Production made by the TLE Master Teachers and TLE Teachers**

Variables	t-value	p-value	Decision on H <sub>0</sub>	Interpretation
Suitability	3.63	0.004	Reject	Significant
Relevance	2.84	0.016	Reject	Significant
Aesthetic Value	3.46	0.005	Reject	Significant

*\*Significant at .05 level of significance*

Table 10 reveals the significant difference on the level of validity self-learning module made by the TLE master teachers and TLE teachers in terms of suitability, relevance, and aesthetic value.

## V. CONCLUSION

The level of appropriateness of developed self-learning module in Horticultural production in terms of its components such as objectives, content, discussion, activities, and assessment as rated by TLE teachers and TLE master teachers were very high. While the level of validity in terms of suitability, relevance, and aesthetic value, as rated by TLE teachers were very highly validated and only highly validated as rated by TLE master teachers.

There is a significant difference in the level of appropriateness and validity of the developed self-learning module as rate by the TLE master teachers and TLE teachers. This means that the groups of respondents have a different evaluation on the development of the self-learning module in Horticultural production, therefore the hypothesis stating that there is no significant difference on the level of appropriateness and validity of developed self-learning module in Horticultural production was not sustained.

## RECOMMENDATION

In the view of the findings and conclusions of the study, the following recommendations may be done.

It is highly recommended that the developed and validated self-learning module be used as instructional materials in teaching grade 9 students as well as used for the improvement of learning strategies as in modular modality.

The module is ready for use as evaluated by the respondents though minimal modifications were suggested.



To test the effectiveness of the module, it should be used by an experimental group and then compare the result of the post-test to the control group who will not use it.

## REFERENCES

1. **Beige** (2011). *Learning Typology and Modular Assessment Strategy: "Inputs to Enhancement of Students' Performance in Grade 10 Science"* Unpublished Master Thesis.
2. **Christova A.** (2011) *Future Development of E Modules; The Roles of Interactive Tools and Multimedia in Teaching Studies Online.* Belgium...
3. **Combs** (2011) in the article *Objectives and Purposes of the Lesson Corpus* B. B. et.al (2013) *Principles of Teaching 2* Lorinmar Publishing pp. 64-76.
4. **Craft, D.L.** (2010) *Selecting and Using Pre-test/Post-test Assessment* <http://lccsenet.org/ass>.
5. **Dahar, M. and Faize** (2011) *Effect of the Availability and the used of Instructional Materials on Academic Performance of Students, two journals*, 3-6
6. **Espinar et.al.** (2016), *Content validity and Acceptability Worktext in Mathematics 2*
7. **Fisher,** (2017), *Forms and Purposes of Assessment*
8. **Ilene,** (2018), *What Makes a Good Typeface?* <https://creativepro.com>.
9. **Jeff Fox,** (2011), *"Why Are We Doing This" Establishing relevance to Enhance Students Learning*
10. **Jesse Hines** (2013), a magazine article, or a letter to a friend.
11. **Kelly** (2011), in article entitled; *The importance of Learning Objectives stated that learning objectives are of key importance when creating lesson plan.*
12. **Lee** (2017) *Input, Process-Output Model*
13. **Lee.et.al** (2011) *School Resources and academic Performance in Subharan African Comparative Education Review*, 369-390.
14. **Lim** (2019), *Development and Validation of Modules in Basic Mathematics to Enhance Students' Mathematics Performance. International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075, Volume-8 Issue-12, October 2019*
15. **Martin.et.al** (2012) *Timss International Results in Science. Retrieved TIMSS&PIRLS:*
16. **Moreno, Jenny Mary.** (2017) *"Learning and Modular Assessment Strategy: "Inputs to the Enhancement of Students' Performance in Grade 10 Science", Unpublished Master's Thesis, Laguna State Polytechnic University, San Pablo Campus, San Pablo Laguna*
17. **Morrison, B.R.** (2019). *Self-directed learning modules for independent learning:IELTS exam preparation. Studies in Self-Access Learning Journal*, 2(2).
18. **Olawale, 2013,** *Relevance: care must be taken to ensure that only instructional-materials that relate to the topic are used while teaching.*
19. **Ryan Manuel D. Guido,** *"Evaluation of a Modular Teaching Approach in Materials Science, and Engineering."* *American Journal of Educational Research*, vol. 2, no. 11 (2014):. 1126-1130. doi: 10.12691/education-2-11-20.
20. **Rick Pendawarden** (2014) *Descriptive Research*
21. **Sadaghiani, H. R.** (2011). *Using Multimedia learning modules in a hybrid online course in electricity and magnetism. Physical Review Special Topics-Physics Education Research.*
22. **Sadko,** (2017), *Guide to 10 font characteristics and their use in design* <https://eugenasadko.medium.com/guide-to-10-font-characteristics-and-their-use-in-design- b0a07cc66f7>
23. **Sadiq and Zamir** (2014), *Effectiveness of Modular Approach in Teaching At University Level*
24. **Salavaria, F. A. C.** (2014). *Development and Validation of Worktext in Statistics (Doctoral dissertation, Bataan Peninsula State University).*
25. **Samuel and Omosewo,** (2011), *Effect of Improvised and Standard Instructional Materials on Secondary School Students' Academic Performance in Physics in Ilorin, Nigeria. Singapore Journal of Scientific Research* 1 (1):68-76.
26. **Seel,** (2012), *Instructional Design for Learning: Theoretical Foundation* <https://scholar.google.com.ph/scholar>
27. **Shirley Mullen,** (2014), *Higher Education: When Relevance is Not Enough* <https://spaces4learning.com/articles/2014/09/01/when-relevance-is-not-enough.aspx>
28. **Solomon, P., Baptiste, S., Hall, Luke, R., Orchard, C., Rukholm, E., & Damiani-Taraba, G.** (2010). *Students' perceptions of Interprofessional Learning through facilitated online learning modules. Medical teacher,*
29. **Stelzer, T., Brookes, D. T., Gladding, G., & Mestre, J. P.** (2010). *Impact of Multimedia Learning Modules on an introductory course on electricity and magnetism. American Journal of Physics,*
30. **T. Hall & N. Strangman.** Retrieved: 10 December 2012. *Graphic organizers.* Wakefield, MA: National Center on Accessing the General Curriculum. <http://www.aim.cast.org/learn/historyarchive/backgroundpapers/graphicorganizer>.
31. **Tan-Espinar, M. J. F., & Ballado, R. S.** (2017) *Content Validity and Acceptability of a Development Worktext in Basic Mathematics 2. Asia Pacific Journal of Multidisciplinary Research*, 5(1).



## SUPERCAPACITOR TECHNOLOGY

**Vishal V. Mehtre<sup>1</sup>, Kunwar Pratoon Singh<sup>2</sup>**

<sup>1</sup>Assistant Professor, Department of Electrical Engineering, Bharati Vidyapeeth (Deemed to be University) College of Engineering, Pune, Maharashtra, India

<sup>2</sup>Student, Department of Electrical Engineering, Bharati Vidyapeeth (Deemed to be University) College of Engineering, Pune, Maharashtra, India

### ABSTRACT

Battery technology is well-established and widely used technology, but they offer several disadvantages such as weight, volume, high internal resistance, power density, short-term negative feedback. A new technology is rising in this area i.e., the supercapacitor, it has a very effective capability to come up in major advances in energy storage. Supercapacitors are controlled by the same basic as conventional capacitors but use a greater number of electrodes and smaller dielectrics to obtain greater power. They offer short-term response, power, low weight, low volume, and low internal resistance that make them suitable for most applications. This paper summarizes the different types of supercapacitors, the relevant quantitative modeling areas, and the future of supercapacitor research and development.

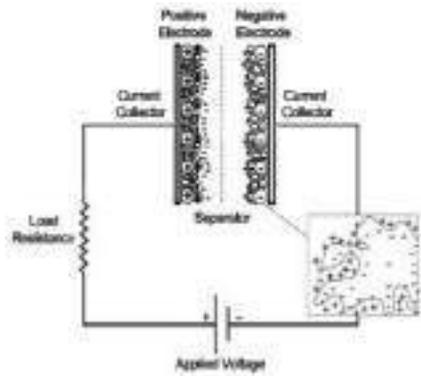
**KEYWORDS:** Supercapacitor, Batteries, capacitor, constant current, constant voltage, Equivalent Charge Resistance, Electrostatic Double Layer Capacitance.

### 1. INTRODUCTION

In response to the current change in global landscape, energy has become a focus for the major world powers and scientific community. The world has a interest in developing and refining more efficient energy storage devices. One such device is the supercapacitor it has matured significantly over the last few years and emerged with the future in the energy storage area. Batteries are well established and widely used in toys to medical implants. There are few downsides with batteries i.e., lower lifecycle, less power density, higher charging time, heating problem and they are not environmentally safe. The supercapacitors are special type of capacitors with a huge capacitance, they have the properties of batteries and capacitors into a single device, as compared to other type of batteries and capacitors they charge frequently but discharges like a normal battery the most important thing is they are eco-friendly.

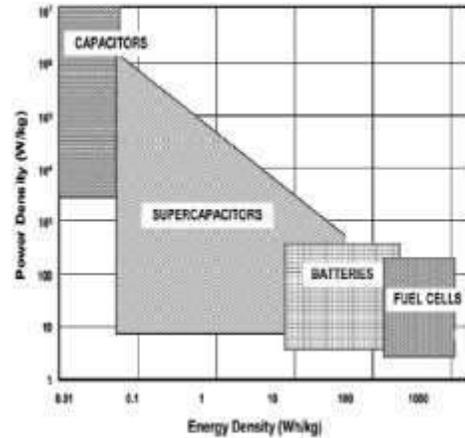
### 2. SUPERCAPACITOR WORKING AND CONSTRUCTION

Normally capacitor have two conducting electrodes separated by an insulating dielectric material. When a specific voltage is given to a capacitor, opposite charges are gathered on the surfaces of each electrode, these charges are kept separate by the dielectric material which,



**Figure 1. Schematic of a Capacitor**

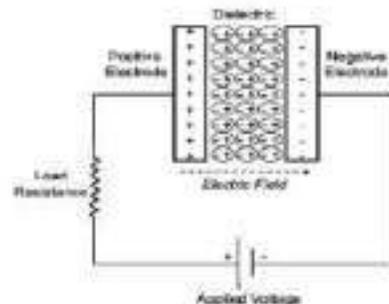
helps in producing electric field which allows the capacitor to store energy. On the other hand Supercapacitors are governed by the same basic principle as of a conventional capacitor, but supercapacitor based on carbon materials has a higher surface area, where phenomena known as electric double layer store charges. Super capacitors involving metal oxide or polymeric materials, pseudo-capacitance is the dominant charge storage mechanism. Though supercapacitors and electrolytic capacitors are governed by the same capacitance equations, supercapacitors can achieve higher capacitance because of thinner dielectric and higher surface area of electrodes due to this power density is greater than battery and energy density will be greater than capacitors, as shown in Graph 1 shows a —Ragone plot, it shows the performance of various energy storage devices. supercapacitors occupy space between batteries and capacitors, this presents a unique advantage that makes them efficient and reliable for applications which require high power delivered in a short time. Supercapacitors uses a dielectric material to split up two carbon-based electrodes, which not only acts an insulator but also has electrical properties that affect the functioning of supercapacitors



**Graph 1. Ragone plot for different energy storage device**

In supercapacitors there is no transfer of charges, instead, charges are stored electrostatically. When a voltage is applied across the terminals, an electrical field is made within the electrolyte and since of this electrolyte is polarized. This causes ions to disperse through the dielectric to the porous electrodes of opposite charges. Thus, electric double layer is made at each electrode, as a result, distance between electrodes decreases and area of electrode increases. The energy storage capacity depends on the active material utilized in the electrolyte, the area of electrode and utilization rate of micro-holes within the porous electrode.

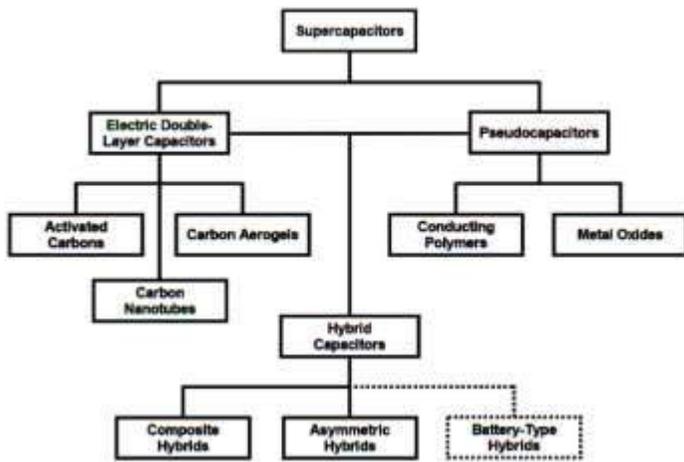
### 3. CLASSIFICATION OF SUPER CAPACITORS



**Figure 2. Schematic of a conventional electrochemical double-layer capacitor**

Based upon research and development trends supercapacitors are mainly divided into three types:-

- 1.) Electrochemical double-layer capacitors (EDLC)
- 2.) Pseudo-capacitors
- 3.) Hybrid capacitors



Based upon storage technique they can be classified as:

- 1.) Faradaic Supercapacitors.
- 2.) Non-Faradaic Supercapacitors
- 3.) Faradic and Non-Faradic combination.

**Figure 3. Block Diagram of types of Supercapacitors**

#### 4. SUPERCAPACITORS VS OTHER STORAGE DEVICES

With the upcoming advancement in technology the supercapacitor must prove its value in the market with the present competitor i.e., Battery or electrolytic capacitors. Supercapacitors has a higher energy density; higher power density and it has small in size and weight distribution is also good as compared to other devices. Supercapacitors have a long life and when compared to batteries it is around 500000 times. Supercapacitors can support various power level than batteries but has lower energy to weight ratio. In the upcoming time there is requirement of high-power rating, which has led to the manufacturing of batteries with high power and affecting the energy density and life cycle. Similar thing is happening with the capacitors, as they are suffering from low energy density and a huge self-discharge. Comparing with individual supercapacitors and battery, hybrid energy storage

system will achieve better energy and power performance. There are various hybrid models which shows superiority over battery only systems. Battery-supercapacitor, fuel cell - hybrid models are some examples.

Storage Device Characteristics	Super Capacitor	Capacitor	Battery
Charging Time	1-30 s	$10^{-1} < t < 10^{-5} S$	$J < t < 5 h$
Discharging Time	1-30 s	$10^{-3} < t < 10^{-6}s$	$T > 0.3 h$
Energy Density (Wh/kg)	1-10	< 0.1	10-100
Lifetime (Cycle no.)	$10^6$	$10^6$	1000
Power Density (W/kg)	10,000	> 1,000,000	< 1000
Charge /Discharge Efficiency	0.85-0.98	> 0.95	0.7-0.85

**Table 1. Comparisons of supercapacitors, capacitor, and battery performance.**

#### 5. ADVANTAGES AND FUTURE SCOPES

Batteries are dangerous when not properly treated, overheating of the batteries may lead to explode. Supercapacitors do not overheat because of their low internal resistance property. The time span of batteries is low, when compared to supercapacitors which have a long life, which make super capacitors useful where it is subjected to frequent charging and discharging cycles.

Some of the features of supercapacitors are:

- i) Low ESR.
- ii) Low leakage current.
- iii) Higher life cycle.
- iv) A wide range of operating temperature.
- v) Higher useable capacity.

In the upcoming time we can use supercapacitors in these fields: -

1. In Transmission Lines.
2. Computer Application like Supercapacitor UPS, Hybrid Ups SC and battery can complement each other in their shortcoming which would reduce battery cycling, in turn, increasing battery life.



3. To get more stability and frequency in system.
4. They can be used as an energy storage device in a micro source system connected to microgrid.
5. Wind Turbine System.
6. Hybrid electric vehicle use battery alone system to drive the vehicle through motor and inverter. If along with battery which is rich in energy density, supercapacitor which is rich in power density is used together, the transient requirement i.e., a pulse of current during acceleration is supplied by SC and during deceleration or breaking the energy will be returned back to the SC. An appreciable amount of energy used during acceleration will be regained.

## 6. CONCLUSION

In this paper, some of the characteristics of the supercapacitors have been discussed which will be helpful to select supercapacitor and design energy storage system using it. With high power density, short charging time, large discharging time, long life and environmentally friendly properties supercapacitor may be chosen as an alternative for battery or other energy storage devices in the upcoming times.

## 7. REFERENCES

1. Chukwuka C, Folly K. A, "Batteries and Supercapacitors", *IEEE PES PowerAfrica*, pp. 1-6,2012
2. A. Armutlulu, J. K. Kim, M. Kim, S. A. Bidstrup Allen, M. G. Allen, " Nickel-oxide- based supercapacitors with high aspect ratio concentric cylindrical electrodes", *Transducers & Eurosensors* , pp. 1480 - 1483, 2013.
3. IonutCioc an, CristianFarca, AlinGrama, Adrian Tulbure, " An Improved Method for the Electrical Parameters Identification of a Simplified PspiceSupercapacitor Model", *IEEE SIITME*, pp. 171 - 174, 2016
4. S. D. G. Jayasinghe, D. M. Vilathgamuwa, U. K. Madawala, " A New Method of Interfacing Battery/ Supercapacitor Energy Storage Systems for Distributed Energy Sources", *Conference Proceedings IPEC*, pp. 1211 - 1216, 2010.
5. A. K. Saonerkar, A. Thakre, A. Poday, A. Chimote, P. Kadao , P. Kadu , R. Satpute, " S ingle Phase Residential Multilevel Inverter Using Supercapacitor", *International Conference on Inventive Computation Technologies*, Vol. 3, pp. 1 - 4, 2016.
6. Andrew F. Burke, "Batteries and Ultracapacitors for Electric, Hybrid, and Fuel Cell Vehicles",

*Proceedings of the IEEE*, Vol. 95, pp. 806 - 820, 2007

7. Jayathu Fernando, Nihal Kularatna, Howell Round, SadhanaTalele , "Implementation of the supercapacitor-assisted surge absorber (SCASA) technique in a practical surge protector", *Annual Conference of the IEEE Industrial Electronics Society*, pp. 5191 - 5195, 2014.
8. Lakshmikant M. Bopche, Ank-ush A. Deosant, Muneeb Ahmad, " Combination of Parallel Connected Supercapacitor& Battery for Enhancing Battery Life", *International Conference on Automatic Control and Dynamic Optimization Techniques* , pp. 77 - 82, 2016.
9. C. M. Krislma, "Managing Battery and Supercapacitor Resources For Real-Time Sporadic Workloads", *IEEE Embedded Systems Letters*, Vol. 3, pp. 32 - 36 2011.
10. Hamid Gualous , HichamChaoui , Roland Galloway, "Supercapacitor Calendar Aging for Telecommunication Applications ", *IEEE INTELEC* , pp. 1 - 5, 2016.

## 8. BIOGRAPHIES



**Mr. Vishal Mehre** has completed his Master in Electrical Engineering (Power Systems) from Bharati Vidyapeeth (Deemed to be University) College of Engineering, Pune. He is currently working as Assistant Professor in department of Electrical Engineering. He has an industrial experience of about 2 years in Suzlon Power Infrastructure Pvt. Ltd. as Engineer in Power Evacuation department and has an teaching experience of more than 5 years. His area of interest is Renewable sources of energy specially Wind and solar with its analysis, optimization and power quality.



**Mr. Kunwar Pratoon Singh** currently Pursuing Bachelor of Technology Degree in Electrical Engineering from Bharati vidyapeeth (Deemed to be University) College of Engineering, Pune.



## STRUCTURAL-FUNCTIONAL NATURE OF ECONOMIC CULTURE: BASIC APPROACHES

**Jurayev Luqmon Narzilloyevich**  
*Samarkand State University, Docent, Uzbekistan*

### ANNOTATION

*This article explains the structural-functional nature of economic culture. In particular, the structural and functional nature of the economic culture is achieved by improving the working conditions of workers to increase labor productivity.*

**KEY WORDS AND EXPRESSIONS:** *Economic culture, structural-functional, civilization, phenomenon.*

In the development of modern civilization, economic culture not only plays an important role in improving working conditions and productivity, but also has a strong positive impact on trade. Therefore, both theorists and practitioners diligently study the current problems of economic culture. , try to explore its contents. In particular, A.I.Kravchenko interprets this phenomenon as follows: "Economic culture includes the culture of production, the culture of distribution, the culture of exchange, the culture of consumption, the culture of management"<sup>1</sup>. Apparently, this problem is limited to an easy method, i.e. enumerating the important elements of economic culture. Methodologically, this approach is the easiest and at the same time the most ineffective, as it simply counts the quality or elements of the phenomenon and does not allow to reveal its essence. When we analyze the next line of thought of the above-mentioned author, based on his definition, he focuses on the culture of production, distribution, exchange, consumption and management and shows their important features, but does not adequately explain the content of the concept of economic culture.

K.N.Panferov also makes this minor mistake and lists the main elements of economic culture. According to him, "Economic culture includes economic activity, the process of production of material values, consumption and distribution, rules and principles of economic life and organization,

economic consciousness and worldview, the system of production relations, the balance of economic interests of society"<sup>2</sup>. This definition reflects almost all the features of economic culture, i.e. economic activity, economic consciousness, economic relations, the subject of economic activity, economic norms and principles. Apart from economic values, this classification can be said to be the most perfect. Unfortunately, the methodological flaw significantly reduces its value, as the essence of economic culture has also been overshadowed, as it has not been determined which of these features is substantive and which is functional.

For example, in the terminology of the economic literature it is stated that "Economic culture is the participation of members of society in economic life: a) mass creative participation; b) their economic knowledge; c) economic skills and qualifications; g) a set of indicators of economic thinking and thinking"<sup>3</sup>. Here, too, we see a general approach to the category of economic culture.

Since the second half of the twentieth century, the definition of culture as a set of material and spiritual values has been almost dominant in the philosophical literature. This concept still exists in the classification of economic culture as well. In particular, O.V.Evsenkov writes: "Thus, economic culture is a set of social values and norms that

<sup>1</sup> Кравченко А.И. Культурология. Учебное пособие для вузов.-3-й., - М.: Акад. Проект, 2001, -С.18.

<sup>2</sup> Панферов К.Н. Экономическая культура (социально-философский анализ)-М.:Юриспруденция, 2000. -с. 17.

<sup>3</sup> Маркетинг терминлари изоҳли луғати: асосий тушунчалар ва истилоҳлар. -Т.: "Sharq", 2012. -Б. 191.



regulate the economic activities of individuals and social groups"<sup>4</sup>.

Evaluating economic culture as a set of values leads to several methodological inconveniences. First, economic activity, economic consciousness, economic relations, which are the main elements of culture, fall from this definition, which does not lead to the expected result without impoverishing its content, that is, does not allow in-depth study of the essence of economic culture. Second, considering economic culture only as a set of economic values makes it difficult to study its development trends, mechanisms of development. Modern science concludes that a system is never equal to the "sum" of the elements because the system has integrative properties that do not belong to the elements. This means that it is closer to the truth to look at economic culture as a system rather than as a whole.

Some experts move away from this traditional approach, explaining culture as a method and technology of human activity<sup>5</sup>. Technology plays an important role in the structure of economic culture as a means and means of producing, distributing and consuming material and spiritual values, changing reality. In the past, especially today, technological culture is one of the main factors determining the quality and level of economic development. But it is not correct to limit economic culture to the scope of technology alone, because it is a complex system that encompasses economic consciousness, economic relations, and economic values, as outlined above.

We will focus on technological culture in the following places. One of the experts in this field, Z. Freud, believes that "Culture is a human achievement that protects us from the natural environment and regulates human relations"<sup>6</sup>. Hence, culture, especially economic culture, is the protective shell of society and the means of regulating relations between people. Freud's opinion in this regard is not objectionable, because indeed, housing, structures, clothing, etc., created by economic culture, protect people from the effects of climate and weather. Also, economic norms and principles regulate the economic activities and economic relations of people. But Z. Freud's view of culture as a means of stifling the unconscious instincts of the individual, as an obstacle to his absolute freedom, is incorrect. Moreover, the views of this scientist that

unconsciousness and subconscious processes are the driving force of the development of civilization are also far from the truth. It is a fact that unconsciousness and irrationality lead to extremely harmful consequences, especially in economic activity.

In our view, the description of culture as a specific integrative quality of society is closer to reality<sup>7</sup>. We believe that such an imagination of culture allows us to study it as a whole system. From this point of view, economic culture can be described as an integrative quality of economic activity, economic consciousness, economic relations, economic values, human economic potential. So, not the production itself, but its quality, not the exchange and consumption itself, but their quality, not the product itself, its quality characterizes the economic culture.

This approach to the problem allows us to define the concepts of "economy" and "economic culture". The category of economic culture reflects not the economy itself, but the quality of the economy, the level of perfection. The concept of "economic culture" reflects the quality and level of human development. If the economy is focused on maximizing profits rather than on this function, indifferent to the working conditions and material motives of the workers, then such an economy cannot have a cultural meaning.

Although the terms "cultural economy" and "economic culture" are interrelated, they differ in content. In the early stages of capitalism, there was a "wild economy" based on the brutal use of natural resources, fierce competition, the tyranny of colonial oppression, the pollution of the environment. In the post-industrial stage of the developed countries of the West, a cultural economy based on resource conservation, environmentally friendly technology, and scientific achievements has been formed. Hence, the term is used in the scientific literature in this sense. Economic culture, as a human quality of the economy, has existed since primitive times. It is true that in the past there were fewer aspects of human self-development in the traditional economy, but in the course of historical development they have grown more and more.

A sociological survey on economic culture was conducted among the general population and youth. Due to the pandemic situation, the official telegram of the Samarkand Regional Council of the Youth Union of Uzbekistan (<https://t.me/Samyoshlar24>) on November 18-23 this year, according to the survey program "Transformation of youth economic culture in

<sup>4</sup> Евсенков О.В. Экономическая культура как регулятор экономической жизни. Петрозаводск. -СПБ: 1998. - с. 50.

<sup>5</sup> Маркарян Э.С. Теория культуры и современная наука. -М.: Мысль, 1983. -с.35

<sup>6</sup> Фрейд З. Неудовлетворенность культурой. Мир философии. -М: Мысль. 1991- С.285.

<sup>7</sup> Мадиримов Р. Маданиятшунослик назарияси. - Самарканд: СамДУ нашри, 1994 -19-6.



modern Uzbekistan" What is the level of understanding? "42% of respondents (699) answered "Results of economic reforms", 44% "Adaptation to living conditions", 14% "Quantitative and qualitative changes".

"What do you mean by the process of transformation of economic culture of young people in society?" - 49% of respondents (683) answered "Growth of economic awareness", 27% - "Improvement of living conditions", 24% - "Rational use of resources".

In conclusion, most thinkers equate economic culture with material culture. But such an approach to the issue is not methodologically correct. Although economic culture is the core of material culture, it cannot cover all its areas. Material culture is a quality of values that satisfies the needs of the human body, and in addition to economic culture, it includes such areas as physical culture, medicine, sanitation and hygiene, and in this regard, the concept of material culture is broader than the category of "economic culture". However, the concept of "economic culture" has a broader meaning than material culture, because it reflects the ideal phenomena such as economic consciousness, thinking, worldview, in addition to material things.

## LITERATURE

1. Кравченко А.И. *Культурология. Учебное пособие для вузов.* -3-й., - М.: Акад. Проект, 2001, -С.18.
2. Панферов К.Н. *Экономическая культура (социально-философский анализ)*- М.:Юриспруденция, 2000. -с. 17.
3. *Маркетинг терминлари изоҳли лугати: асосий тушунчалар ва истилоҳлар.* -Т.: "Sharq", 2012. -Б. 191.
4. Евсенков О.В. *Экономическая культура как регулятор экономической жизни.* Петрозаводск. -СПБ: 1998. - с. 50.
5. Маркарян Э.С. *Теория культуры и современная наука.* -М.: Мысль, 1983. -с.35
6. Фрейд З. *Неудовлетворенность культурой.* Мир философии. -М: Мысль. 1991- С.285.
7. Мадиримов Р. *Маданияти муносилик назарияси.* - Самарканд: СамДУ нашри, 1994 -19-б.



## FLUORIDE CONTENT IN GROUNDWATER QUALITY OF SOME VILLAGES IN RAJASTHAN, INDIA

<sup>1</sup>Kishan Gopal Jhanwar, <sup>2</sup>Rajeev Mehta, <sup>3</sup>Preeti Mehta  
<sup>1,2,3</sup>Department of Chemistry, Sangam University, Bhilwara-311001, Rajasthan

### ABSTRACT

*A study of the water quality condition of many villages in Rajasthan carried out to assess risk to human health. It was found that ground water of many villages of Rajasthan is contaminated with fluoride by naturally fluoride rich rock salt system. Physicochemical analysis has main consideration to assess the quality of water for its best utilization like drinking, irrigation. The result of this study helps in enhancing awareness of health hazards of contaminated water. Drinking water with excessive concentration of fluoride causes fluorosis which progresses gradually and becomes a crippling malady in the long run. It affects young, old, poor, rich, rural, and urban population. It has attained a very alarming dimension. Rajasthan suffers both the problems of quantity and quality of water. In most part of the state groundwater is either saline or having high nitrates and fluoride content. Obviously, groundwater is the major source of drinking water and over 94% of the drinking water demand is met by groundwater. Excess fluoride concentration in drinking water has deleterious effects on human health. All the districts in Rajasthan are engulfed by the clutches of fluorosis, to a varying degree. There being no perennial surface source for drinking water, the state is dependent chiefly on groundwater and its level is deeper year-by-year due to over exploitation. As the water table is receding more and more water sources are becoming prone to higher fluoride concentration. The pattern and prevalence of fluorosis in human population are determined by a number of epidemiological factors like water chemistry, demographic and nutritional profile of the community and high mean annual temperature of the area. UNICEF has taken definite steps in collaboration with Government and NGOs, to deal with the problem of fluorosis in Rajasthan. Beside, changing dietary habits, harvesting rainwater and promoting defluoridation of drinking water at household level can yield spectacular results in this regard. Different defluoridation techniques are being tried to make drinking water free from fluoride contamination. Awareness camps are being organized all over the state to make the masses aware of ill effects of fluoride problems. The state government has also taken up various programmed action plans such as artificial recharge of groundwater, rejuvenation of traditional baoris-kunds, RWH and judicious use of underground water for drinking and other purposes. Keeping in view the underground realities, this hydrotoxicants in water supplies of different locations and the people suffering from fluorosis and other ailments were identified in specified zonal localities. [1,2]*

**KEY WORDS:** Fluorosis, ppm, Fluoride, Ion-Selective Electrode

### INTRODUCTION

Water is one of the five elements described in "shastra" to life. Water is most useful matter on the earth for all lives. Significance of water as a natural agent is not only determined by its availability on the surface of the earth but also determined by its physical & chemical properties. High fluoride in drinking water is a problem found on both the ground & surface of water. Water is a universal solvent so it has the capability

to dissolve nearly all natural compounds. The chemical composition of natural water is developed as the result of many diseases in men. Fluoride is a natural component of the earth's crust and is also found in many minerals, like fluorite, fluoroapatite, etc. due to its high electronegativity. Only fluoride forms are found in water. Fluoride forms sparingly soluble in natural water. It enhances the fluoride accumulation of high fluoride concentration in soil & water due to this accumulation of high fluoride



concentration lead health problem in live stock. It has been reported by health organization as an essential substance in water for building healthy teeth at level with in 1 mg/L concentration. The maximum permissible limit of fluoride in water is 1.5 mg/L by WHO & ICMR<sup>9</sup>. The effects of fluoride in drinking water have been studied. Consumers also exhibiting positive symptoms after taking such water.Effects of fluoride “fluorosis” were first introduced by schorrt and it is reported in both human & cattle.High fluoride concentration has been found where fluoride rich volcanic rocks are common. The distribution of fluoride content in the ground water of state is reported on the based analysis of ground water quality monitoring data. Fluorosis is a most widespread

geochemical disease affecting more than 66 million people including million children under the age of 14 year . The first presentation of water quality slandered was made in 1914 by USPHS. The fluoride concentration laid down by USPHS (1962)<sup>32</sup> WHO (1963)<sup>33</sup> and ICMR (1962) In India nearly 177 districts in 19 states have been confirmed to be fluoride affected. In Rajasthan out of 27 districts 16 districts have been confirmed fluoride affected area and have more than permissible limit concentration of fluoride but Tonk district is the most worst affected one. In Rajasthan 6000 villages out of 33000 have water with fluoride concentration exceeding the permissible limit and dental & skeletal fluorosis is wide spread in these villages . [3,4]



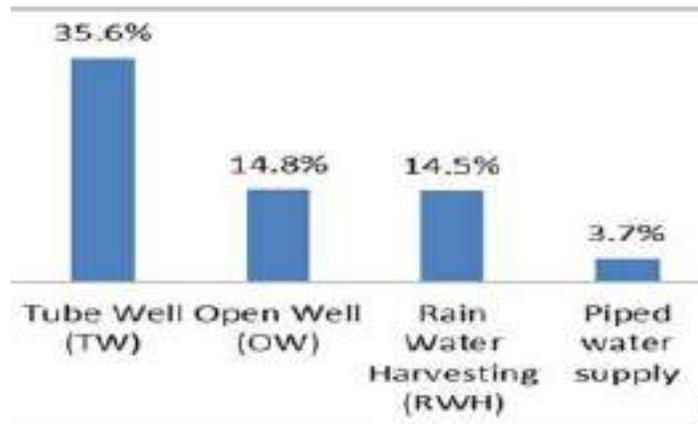
**Fig.1. Map showing fluoride variation in Rajasthan**

The presence of fluoride in ground water can be attributed to geological reasons . In recent years, great concern has been universally voiced regarding environmental pollution arising as a side effect of industrial and other human activities. In our own country, with the advent of industries, more and more toxic substances are either used as raw material or emitted during manufacturing processes in the form of dusts, fumes, vapours and gases. These pollutants ultimately dissipate in the working environment and pose occupational health hazards. Many of these chemicals are hazardous and impose chronic impact on organisms including human beings. By the very nature of their wide distribution, the halogen group of minerals, including fluorides, forms a natural part of our environment. In order to strike a balance between such an environment and general health of human population and live stock of any region, the level of fluoride concentration in potable water, food, soil and atmosphere needs to be an appropriate level. Fluorosis, though a common endemic problem of our country is more widespread and acute in Rajasthan. Defluoridation of contaminated water alone doesnt bring the fluoride content to safe limit It would be

necessary to overcome the toxicity of the remaining fluorides ingested other sources. This is achieved by effecting minor changes in the diet and dietary habits of the population compatible with their social system and available resources Since soil fluorides usually originate from micas are associated with clay-sized minerals, heavy soils tend to have substantially higher concentrations than sandy soils. Fluoride enters the soil through weathering of rocks, precipitation and impure water, mainly from waste run off and fertilizers.[5,6] Since much of our food is ultimately derived from plants often grown in contaminated areas, fluoride in soil is an important source of intake. Anti- oxidants possessing antagonistic effect play prophylactic role in preventing fluorosis. A malady- remedy analysis of the problem of fluorosis has to be holistic in character as the disease not only affects human beings but also plants and animals. Therefore , we need to have , as far as possible, an idea of the source of fluoride and its dispersion in the environment including land, water and air. Based on such study , an integrated approach has to be evolved to draw up a strategy for the control of this disease. In this manuscript clinical manifestations of various degrees of fluorosis and strategies concerning



to mitigation of fluoride content in water, have been delineated.[7]



**Fig.2. Fluoride in groundwater in Rajasthan**

## MATERIALS AND METHODS

Many methods have been suggested for the determination of fluoride ion in water given by official British and American compilation of Methods. The calorimetric & electrode method are the most satisfactory at the present time. Samples are collected in good quality polythene bottles of one liter capacity from different villages. Sampling has been carried out without adding any preservative in rinsed bottles directly for avoiding any contamination and brought to the laboratory. Fluoride concentration of sample was determined by ion electrode method.

### Fluoride Ion-Selective Electrode Method:

Apparatus: Ion-Selective Meter, Fluoride Electrode, Magnetic Stirrer Reagent: Fluoride Standards of various ranges (0.2-20ppm)

### Fluoride Buffer (TISAB-Total ionic strength adjustment buffer) Procedure:

Calibrate the instrument take 10ml sample in a beaker at 10ml buffer solution. Put stirring bar into the beaker immerse electrode & start the magnetic stirrer and wait until reading is constant withdrawal electrode rinse with distilled water. Fluoride contamination is a major Health hazard in many parts of the district. A few symptoms of Fluorosis types could be seen by naked eye and need not so many investigations. The 110 villages of Deoli Tehsil have high Fluoride concentration in water (i.e. >1.5 mg / lt). It has been observed people 58.19% villages of them have Fluoride concentration of water from 1.5 to 3.0 mg / Lt and 30% village have 3.0 to 6.0 mg / Lt of Fluoride, while 12% village have more than 6.0 mg/ l. of Fluoride. People of these villages are suffering from dental and skeletal Fluorosis. In Newai Tehsil almost 240 villages out of 269 villages

(considered 1.5 – 6.0 mg/lt) are affected by dental Fluorosis. While in Malpura Tehsil atleast 134 villages have Fluoride concentration 1.5 – 6.0 mg/lt and 42 villages have more than 6 mg/lt. concentration of Fluoride. The People of these villages are also affected by Dental Fluorosis. In Todaraisingh 79 (Fluoride concentration is more than 1.5 mg/lt) villages and habitants are affected by dental as well as minor skeletal Fluorosis out of 79 villages 70 have Fluoride concentration from 1.5 to 6.0 mg /lt. About 82 villages of Uniyara Tehsil are reported to have high concentration of Fluoride (>1.5 mg/lt.) in water and the many children and adults are affected by Dental and Skeletal Fluorosis. 330 Villages and habitants in Rajasthan state have Fluoride concentration in water more than 1.5 mg/lt. but of them 280 have 1.5 to 6.0 and 50 have more than 6 mg/lt Fluoride concentration. This high concentration reveals the dental as well as skeleton Fluorosis in the people.[8,9]

Many others symptoms of high take of Fluoride. Skeletal Fluorosis feeling of burning and tingling in the limbs, pain in the bones and joints, formation of gas in stomach, lack of appetite chronic fatigue and weakness of muscles are also reported by people. The people of this area have also compliant severe pain and stiffness in the neck, back bone and joints. So the more investigation and studies are needed.

## DISCUSSION

Fluoride present in water is in a simple form and ingested fluoride is rapidly absorbed through gastro-intestinal tract and lungs. The peaks are reached after 30 min in blood. The rapid excretion takes place through renal system over a period of 4 to 6 h. in children (3 yrs of age only) about 50% of total absorbed amount is excreted, but in adults and children



over 3 years about 90% is excreted. Approximately 90% of the fluoride retained in the body is deposited in skeleton and teeth. The biological half-life of bound fluoride is several years. Fluoride also passes through the placenta and also appears in low concentration in saliva, sweat and lacteal secretion (milk). Fluorides

present other than in water are relatively less harmful. Fluoride ions from soluble inorganic fluoride compounds are rapidly absorbed. Fluoride sufficient in amount to cause mottling of primary dentition may reach through placenta.



**Fig.3. Dental Fluorosis**

Fluoride is mainly excreted in the faeces. Ingestion of fluoride causes decrease in the ionized calcium. This hypocalcemia leads to changes in internal milieu of the body to maintain the calcium levels and leads to secondary hyperparathyroidism. [10]

The increased activity of osteoblasts in bones by activating membrane bound 35 cycle AMP. This increased osteoblastic activity causes increase in citric and lactic acids released from ruffled border of osteoblasts. This causes increase in H<sup>+</sup> ion concentration, and hence lysis of lysosomes takes place. Release of lysosomal enzymes viz acid protease, collagenase, hyaluronic acid in bones and other tissues of the body catalyses the reactions favouring the depolymerisation of the glycoprotein of bones and of

the cartilage. This causes breakdown of hydroxy proline, which is responsible for stabilisation of collagen triple helix. As the protein polymer deaggregates, and dissolves the mineral binding capacity (mbc), also get reduced and calcium is liberated, which helps in maintaining the serum calcium level. As a result the solubility of hydroxyapatite crystals also increases, causing its breakdown along with reduced laying down of collagen by reducing hydroxylation of proline and lysine. This event simultaneously led to the elevation of the serum mucoprotein or polysaccharide levels. The net result of degradation of ground substance in bones and other calcified tissues like teeth leads to symptoms of fluorosis like delayed eruption of teeth, dental fluorosis and premature ageing.[11]



**Fig.4. Skeletal fluorosis causing deformed legs**

## RESULTS

In 1947, Ajmer-Mewar, was first reported as endemic region by Shourie. Voluminous work on the subject was done by workers like Kesliwal and Solomon (1950); Bhargava (1974) and Mathur (1977) on various aspects of fluorosis. Later on, zonal labs of National Environmental Engineering Research Institute, NEERI in Jai Pur, reported high fluoride

content in groundwater from different parts of Rajasthan. Geologically, there is a belt underneath Aravali range, beginning from Panch Mahal, Gujrat to Gurgaon (Harayana) and passing through southeast Rajasthan that is rich in fluorospar, cryolite and fluoroapatite. In Jarna-Khurd village 20km away from the city of Jai Pur, there are no youth. All 1200 people irrespective of age look old and have cracked teeth.



Their shoulders, hips and ankles are swollen and ache all the time. It is painful to stand up, if they squat on the floor. In Jalore district of Rajasthan, the fluoride content in water has increased to 6.8 mg/l as against the permissible limit of 1.5 mg/l causing premature aging in the people. Nearly 120 out of 728 villages in the district are in the grip of fluorosis with some of the villages being the worst hit as identified by the European Commission (EC). Osteoporosis, bone deformation and yellowing of teeth are rampant. Even the unborn children are not safe. People are threateningly dependent on aquifers for their drinking needs. All over, in Rajasthan drills, borepipes, tubewells and handpumps are becoming the triphalistic instruments to extract water of varying fluoride concentration from the deep of the earth. The area 20 km away from famous marble city.

Makrana, having 60 villages has been known as Banka-Patti because most of the people of this fluorotic belt are facing skeletal deformities due to consumption of fluoride rich water. Most of the peoples of Tedhasar village of Churu district seem to be totally handicapped due to fluoride poisoning.

Mottling of teeth in children is one of the earliest and most easily recognizable feature of fluorosis. Beside a health problem, it is an aesthetic and social problem also. A yellow-white discoloration appears, which turns brown and presents itself in horizontal streaks, since new layers of matrix are added on horizontally during tooth development. In late stages, the teeth become black. They may be pitted or perforated and may even get chipped off. Lose of premature teeth (endentulous) is common in endemic areas.[12]

Severity of **dental fluorosis** in as group of children in fluorotic belt helps in determining the community fluorosis index (cfi), which depends on identifying the extent of dental fluorosis in an individual child. Deans classification is used in identifying the mild, moderate and severe fluorosis in the teeth and a numerical grading is given by very experienced eyes.

**The skeletal fluorosis** manifests initially at the beginning of adulthood and is progressive if persons continue to consume fluoride rich water. Maximum ill effects of fluoride are detected in the neck, spine, pelvic and shoulder joints. Early symptoms of skeletal fluorosis include pain and stiffness in the neck, back and major joints of the extremities. Restriction of movement commences. The stiffness steadily increases until the entire spine becomes one continuous column of bone, manifesting in a condition referred to as poker back. Finally, various ligaments of the spine become ossified. The stiffness that first appears in the spine

spreads to various joints of girdles and limbs. The involvement of the ribs gradually reduces the movement of the chest during breathing. The increasing immobilization of joints leads to deformities of hip, knee and other joints causing severe disability. Characteristic structural changes in a fluorosed bone as revealed in X-ray include increased bone mass density (BMD) and bony out growths. Skeletal fluorosis usually become crippling in people in the endemic regions. Symptoms developed due to pressure caused by osteophytes (bony outgrowth), narrowing of inter-vertebral space and increase in the size of vertebrae or narrowing of spinal canal lead to paralysis.

**Non-skeletal fluorosis**-The conventional belief that fluoride affects only bone and tooth has been negated in recent years as the evidences on the involvement of soft tissues/organs/system of the body are convincing. Involvement of skeletal muscles, red blood corpuscles, ligaments, blood vessels, spermatozoa and G-I mucosa has been documented so far. In animals involvement of kidney, liver adrenals and reproductive organs have also been reported. Direct involvement of skeletal muscles in fluorosis has now been scientifically proved. Fluorosed skeletal muscles show widespread destructive changes. The other symptoms include-

**Gastro-Intestinal problems**-G-I mucosa is involved in the early stage of fluorosis. The main complaints are nausea (flu like symptom), loss of appetite, acute stomach pain, bloated feeling, gas formation, constipation followed by intermittent diarrhoea and headache. These complaints are considered early warning signs of fluorosis.

**Neurological problems**-Nervousness, depression, tingling sensation in fingers and toes, excessive thirst and tendency to urinate frequently are some of the manifestations observed in fluorotic belt.

**Allergic problems**-It includes painful rashes on the skin prevalent in women and children, which clear up in 7 to 10 days.

**Urinary-Tract problems**-Urine may be much less in volume; yellow-red in colour, and itching in urinary region.

**Other Troubles**-Radiographical studies show that ligaments and blood vessels get calcified. Erythrocytes (RBCs) are also affected in fluorosis. Fluoride is accumulated on their membranes, which lose in turns their calcium content. Attached red blood corpuscles do live their full life span and are likely to be eliminated by the system. Thus patients suffer from anaemia. Sperm abnormality in fluorosis results in male infertility. Oligospermia (deficiency of sperms), azoospermia (absence of sperms) and low testosterone levels in blood is very common in persons residing in endemic area consuming high fluoride in drinking



water. Weakness, stiffness and pain are included in muscular manifestations.

Fluoride can damage a foetus if the mother consumes water and food with high fluoride concentration during pregnancy. It can adversely affect the IQ of children.

The above-mentioned symptoms can also be due to other reasons. Therefore, the challenge before the medical officers is to differentiate and distinguish the symptoms due to fluorosis from other reasons. Non-skeletal fluorosis can be reversed within a short span of time, if a person starts taking low/nil fluoride water.[13]

**CONCLUSION**

According to W.H.O. the safe limit of fluoride in drinking water is 1-1.5 ppm. Hence it is concluded that

44.93% area are effected by 1.5-3.0 ppm fluoride and 40.63% area have been effected by 3-6 ppm fluoride and 7.55% area effected from 6-8 ppm fluoride and 3.63% area effected by 8-10 ppm fluoride and 3.25% area of Rajasthan is effected by more than 10 ppm fluoride. Fluoride is mainly found in groundwater in which the solvent action of water on the rocks and soil of earths crust derive it from the adjacent soil. The porosity of the rocks or soil through which water passes and the speed with which water flows, the temperature of the interaction of the rock and water, the hydrogen and calcium ion concentration, determine the fluoride content of the drinking water. Hodge and Smith (1965) have related the concentration of fluoride to the following well-established biological effects.

**Table.1:- Fluoride Concentration And Related Effects**

Concentration	Source	Malady
2 ppb	Air	Injury to vegetation
2 ppm or more	Water	Mottled enamel
8 ppm	Water	10% Osteo- sclerosis
20-80 mg/day	Water / Air	Crippling fluorosis
50 ppm	Food / Air	Thyroid changes
10 ppm	Food / Air	Growth retardation
>125 ppm	Food / Air	Kidney changes
>5 gms	Acute dose	Death

In fluorotic zones males suffer more than females. In India, this is mainly attributed more to migration of females after marriage. Irrespective of to and fro migration, there is always a likelihood of women getting less victimized. There is also a hypothesis of higher consumption of drinking water by man doing strenuous physical work but women are more affected during pregnancy and breast-feeding, due to lack of sufficient calcium in the body

**Plan for an effective low cost defluoridation**

Defluoridation is the process of removal of excess fluoride ion from water. So in regarding this several methods have been suggested for removing excessive fluoride from water depending on their mode of action. The defluoridation techniques could be divided into three groups –

- Based on chemical reaction with fluoride
- Based on absorption process

• Based on ion exchange process In this the quick reverse osmosis and electro dialysis are costly and not suitable in rural area.

**The Nalgonda technique** is an economical way for defluoridation. The Nalgonda techniques using alum and lime is easily applicable at both domestic and community level and treated water contains permissible amounts of fluoride

**Approaches to be made are**

- Health Education
- Treatment of the Disease
- Preventive Measures
- Health Education

**Creating disease awareness:** Creating awareness about the disease should be in the form of graphic presentation of the final consequences of the disease to the extent possible. If required, live presentations of the patients who are suffering from the severe form of the



disease in areas where the gravity of the problem has not reached to that extent. It may be of use to demonstrate the most severe extent of the disease and to motivate them to use the preventive or therapeutic measures. Creating awareness about the sources of the fluoride: The creation of awareness will help in implementing the need based preventive measures in the affected community.[12]

### Treatment of the Disease

Vitamin C and D, salts of Ca, Mg or Al were prescribed in an attempt to reverse these effects. Published results were, however, inconclusive and largely negative. Recent studies conducted in Rajasthan under Raj DST sponsored studies indicated that fluorosis could be reversed, at least in children by a therapeutic regimen (Nutritional prophylaxis), which is cheap and easily available. The choice of the reported therapy was logical. The presence of calcium in gut directly affects the absorption of fluoride ions and also improve serum levels as observed by Teotia et. al (1995). Vitamin D3 in low doses enhances Ca absorption and retention without causing hypercalcemia and thus directly affects the absorption of fluoride ions. It also inhibits the excessive release of parathyroid hormone there by preventing excessive activation of osteoblasts thus preventing hyperosteoridosis and osteopenia. Ascorbic acid controls collagen formation, maintains the teeth structure and bone formation. The structures are adversely affected by higher fluoride intake.

### PREVENTIVE MEASURES

#### Providing Defluoridated Water for Drinking Purpose

Methods of defluoridation recommended so far are aimed at bringing the fluoride levels to the **WHO standards**. Desirable characteristics of defluoridation process, cost effectiveness, easy to handle, (operation by rural population) – the major sufferer – independent of input fluoride concentration, alkalinity, pH, temperature, no effect on taste of water, no addition of other undesirable substances (e.g. Al salts) to treat water, all these parameters must be considered for adopting any of the defluoridation process/technique.

#### Changing the Dietary Habits

Defluoridation of drinking water alone shall not bring the fluoride level to safe limit. It would be necessary to overcome the toxic effects of the remaining fluoride ingested through other sources. This can be done by effecting minor changes in the diet and dietary habits of the population compatible with their social system and available resources. The main aim must be to

- Restrict use of fluoride rich food
- Avoiding use of fluoride rich cosmetics
- Use of food rich in Calcium, Vitamin C and antioxidants
- Rain Water Harvesting: (Alternative water source)

Fluoride affects the people and the animals as well. Therefore it is desirable that the animals should also be provided with fluoride free water for maintaining their longevity. Defluoridation of drinking water for animals will be too costly and not feasible and therefore the only solution of this problem is water harvesting. The water harvesting technology should be aimed not only to provide fluoride free water to human beings but also to animals. Rainwater storage can be a major source of fluoride free drinking water for the animals. These three-pronged attacks can prove to be a blessing for the population especially for the younger generation living in fluoride rich areas having no choice except to drink the water contaminated with fluoride and suffer the inevitable consequences including permanent deformities.[13]

### REFERENCES

1. *Fluorine and fluorides (Environmental Health Criteria-36)*. WHO, Geneva 1984, pp 93.
2. R. Maheshwari, and N. Bansal, *Excess fluoride in groundwater: Its clinical manifestations, preventive measures and preventive processes*, Proceedings of National Conference on Environmental Conservation, pp. 113-1120, . pp.113-120, 1-3 September 2007.
3. R. Maheshwari and B Rani, B. N. Gupta, *Fluoride Toxicity, Everything About Water, No.7, pp.31-37. 2006.*
4. Maheshwari, R. (2007). *Fluoride Toxicity: An Alarming Threat, Proceedings of International Conference on Toxicology, Toxicogenomics and Occupational Health, Jiwaji University, Gwalior, MP.*
5. R. Maheshwari, *Fluoride Distribution: Recent advances in Mitigation Strategies for Sustainability of Modern Styled Era, Proceedings of International Conference on Recent Advances in Environmental Protection, St Jonhs College, Agra, pp. 45-38.2007.*
6. Mittal, N. Trivedi, S.K. Gupta, S. Kumar, and R. K. Gupta, *Radiological Spectrum of Endemic Fluorosis: Relationship with calcium intake, Skeletal Radiology, vol. 22. no. 4, 2pp.57-66, 1993.*
7. A.K.Susheela: *A treatise on fluorosis*. Edi. A.K. Susheela, F.R.R.D.F., New Delhi, India(2001).
8. J.D.Sharma, M.K.Sharma, P.Jain and D.Sohu, *Asian J. Exp. Sci., 19(2), 113-118(2005).*
9. Babulal Das, Jitu Talukdar et.al., *Current Science, 85(5), 659-661(2003).*



- 
10. Gita Seth, A.Kumar, M.K Samota, *Trade Science Inc.*, 2(6), 191-193(2005).
  11. *Standard Methods for the Examination of water and Waste Water*, Am. Pub. Health Assoc., New York, 15th Ed. (1981).
  12. W.G Nawlakhe., D.N.Kulkarni, B. N.Pathak , K.R.Bulusu, *Indian J. Environ. Health.*, 17, 26-65(1975)
  13. B.K.Shrivastava ,*Asian J. Exp. Sci.*, 23(1), 269-274(2009)



# A SURVEY ON LOWERING POWER CONSUMPTION IN CLOUD ENVIRONMENT WITH GREEN COMPUTING TECHNIQUES

<sup>1</sup>Suraj Chandran, <sup>2</sup>Abhijit Banubakode

<sup>1</sup>MET Institute of Computer Science, Bandra (W) Mumbai, India

<sup>2</sup>MET Institute of Computer Science, Bandra (W) Mumbai, India

## ABSTRACT

*The computational power is growing rapidly today hence the need for 'Cloud computing' concept is very vital. But, in Cloud computing high performance cloud servers are used for advance computational needs. A large amount of power is consumed to execute these computational units. At the same time, harmful gases are released in the environment. Green Computing is the concept which is trying to curb these ill effects by introducing new methods that would work efficiently while consuming less energy which is environment friendly. This paper focuses on Green computing techniques, in order to achieve low power consumptions in cloud environment.*

**GENERAL TERMS:** Virtual Machines (VM), Cloud, Servers

**KEYWORDS:** Green Computing, Data Center, Virtualization

## 1. INTRODUCTION

Cloud computing, which is considered as a giant of computing as a utility has a huge potential to bring revolution in a large part of IT industry, which complements software to make it more demanding as a service and changing the way IT hardware is thought of in terms of design and many other aspects.

Now a days developers do not require huge capital to implement their big ideas for internet services.

It happens that for a service overprovisioning is done unnecessarily which results in wasting the useful resources which ultimately leads to loss of revenue and customers too.

Moreover, big companies with huge requirements of task can get their results executed as soon as their request is received from the customer. Since using 100 servers for one hours is much cheaper overall as compared to one server for 100 hours.

This elasticity of pay per use for customer for a flexible requirement is getting hugely popular and never been done in the history of IT.

Cloud computing provides service offline and online. It means applications is accessed over the internet and through software in the datacenters.

The services is termed as Software as a Service (SaaS). The datacenter with hardware and software is refereed as a Cloud. When a Cloud is made available for all kinds of business people in a pay per use manner and to the general public, we call it a Public Cloud; the service being sold to the general public is known as Utility Computing. There are Private Cloud to service internal datacenters of a business or other organization, which is not available to general public. Hence, Cloud Computing is the summation of SaaS and Utility Computing, but not Private Clouds. People can be users or providers of SaaS, or users or providers of Utility Computing. We focus on Cloud Users and Cloud Providers.

Global warming is considered as a big concern, with high power consumption and various gas like CO<sub>2</sub> emission.

With the ever-increasing demand and usage of cloud computing, very high power is consumed at the data centers but with a toll on environment by releasing harmful gases by these data centers.

Big cloud providers have thousands of data centers to processes user request and to run these data centers huge amount of power is used for cooling and other processes.

The power consumption is increasing slowly every year and green computing plays a big and



helpful role to bring these issues down. Green Computing can be defined as an eco-friendly use of computers a various resources which has good effect environmentally, socially and politically with respect to effective and efficient use of energy to achieve competitive edge in terms of an energy-cost saving strategy, and reduction to carbon emission/footprints, recyclability, biodegradability, and minimal impact to the environment. Green computing represents environmentally responsible way to reduce power and environmental e-waste. Main goals of green computing are to reduce the use of toxic and hazardous materials and improve the energy efficiency, recycling of factory waste. It includes the efficient use of servers and various peripherals at the same time reducing the power consumption.

### 1.1 Cloud computing and virtualization

Cloud computing is a cost-effective model for provisioning services, and it makes IT management easier and more responsive for the changing needs of the business. It delivers a wide range of services like Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). These services are made available on a subscription basis using pay-as-you-use model to customers, regardless of their location.

Cloud computing is a formal model for convenient, scalable and flexible network access to a shared pool of resources as per the requirement which is readily available with minimum effort or interaction with the provider.

The data centers are the backbone of cloud computing environment. The cloud services are provided from cloud data centers. A data center can be either non-virtualized or fully virtualized and either consolidated or geographically distributed. In IaaS cloud platform, service consumers give hardware and software configuration of virtual machines (VM) to be created and used to cloud platform, and perform the assignments on their custom VM. If the submitted jobs are parallelizable, the VM may require multi-core for more efficient execution. In many cases, some customers may need to execute a clustered application service which involves interprocess communication with a low-latency demand. Such services and applications will also require multi-core architecture. It is suggested that once virtual

machines are configured, created and launched onto the appropriate host, they will begin executing the jobs. The speed at which a VM processes the assignment depends on the speed of the computing resources on which the VM is launched as well as the internal scheduling policy associated with

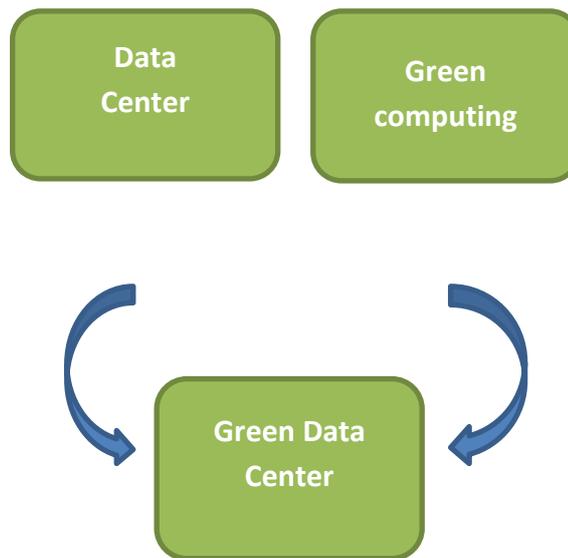
the host. Since the cloud customers and subscribers expect explicit SLA on computer resources, storage and networking infrastructure, a high-efficient scheduling and placement policy to map the incoming VM instances onto a right fit infrastructure is necessary.

### 1.2 Data center based on green cloud computing

Now, more and more power of data centers is consumed, thus it has impacted on environments seriously. Many researchers have been seeking to find effective approaches to reduce power consumption of data centers with keeping the desired quality of service or performance

Objectives. Virtual Machine technology has many seminal features, such as reliability, flexibility and the ease of management. So it is right fit to apply in data center environments. The nature of green cloud computing is reducing energy consumption of data centers while ensuring the performance level from users' requirements. The advent of cloud computing makes large scale data centers become common in the computing industry. Since these data centers are commonly equipped with high performance infrastructures, they will consume much energy and increase CO<sub>2</sub> emissions leading to global warming. For today's world, it has already become a serious environmental problem. In the recent data centers, the idle power wasted is one of the major causes for energy inefficiency with the servers running at a low utilization. Even at 10% of CPU utilization, the power consumed is over 50% of the peak power. During off-peak load it also leads to more energy consumption per workload. 22% of energy consumption of a single server is needed to cool it. The fact that power consumption of data centers doubled across the globe between 2000 and 2006 is shown by studying data center

Problems. Incremental US demand for data center energy between 2008 and 2010 is equal to 10 nuclear power plants. Since the existing data centers use too many computing and storage resources to execute more and more large-scale distributed applications, the power consumption Increases rapidly. In order to utilize the computing systems efficiently and to reduce their environmental and social impact, green computing is focused on by computer research organization and industry. Now, some hardware techniques can be used to solve the power problems. However, the software techniques and new architectures are more important to achieve the best results.



**Fig 1: Green Data Center Cycle**

## 2. GROWTH

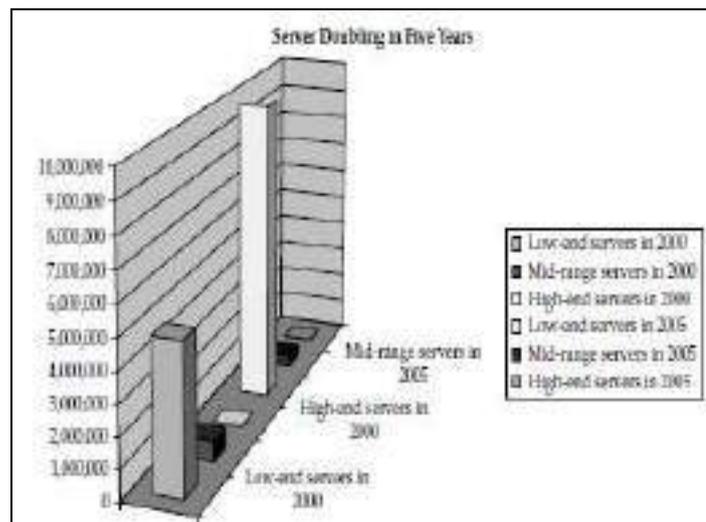
All material In U.S. datacenters in last 15 years about 5.6 million servers were installed. Of those, 4.9 million were low-end, 663,000 were midrange, and 23,000 were high-end servers, according to a survey by Lawrence Berkeley National Labs in 2007.

By 2005, U.S. datacenters had 10.3 million servers. Of those, 9.9 million were low-end, 387,000 were midrange, and 22,200 were high-end servers.

The same study showed that it's not just the U.S. that spiked in its server growth. Around the world server demand expanded. In 2000, as shown in

the following figure, there were 14.1 million servers. Of those, 12.2 million were low-end servers, 1.8 million were midrange, and 66,000 were high-end servers.

By 2005, that number had swelled to 27.3 million servers. Of those, 26 million were low-end servers, 1.2 million were mid-range servers, and 66,000 were high-end servers. To feed that growth, in the United States, the amount of power necessary was equivalent to about five 1000-megawatt power plants. Worldwide, it was the same as 14 power plants.



**Fig 2: Graph showing High and low end servers**



**Table 1: Data showing energy saving ratio**

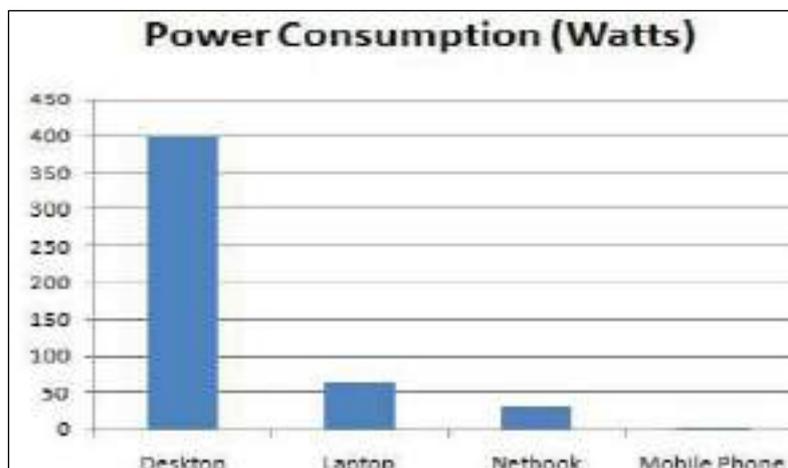
Energy-Saving Action	Savings (kW)	Savings (%)
Lower-power processors	111	10
High-efficiency power supplies	141	12
Power management features	125	11
Blade servers	8	1
Server virtualizations	156	14
Cooling best practices	24	2
Variable-speed fan drives	79	7
Supplemental cooling	200	18

White and bright colors can use up to 20 percent more power than black or dark colors.

Is the difference between a white background (74 W) and a black background (59 W) major? Well, 15 W equates to major increase in the bill.

**Table 2: Data showing color and the watts used**

Color	Watts used
White	74 W
Fuchsia	69 W
Yellow	69 W
Aqua	68 W
Silver	67 W
Blue	65 W
Red	65 W
Lime	63 W
Gray	62 W
Olive	61 W
Purple	61 W
Teal	61 W
Green	60 W
Maroon	60 W
Navy	60 W
Black	59 W



**Fig 3: Graph showing power consumptions of electronics items**

**2.1 Other Costs**

When we think and analyze about energy consumption then talking only about power meters won't be enough, instead we should have a realistic

data about the complete organization and should change one area at a time to bring a big change.

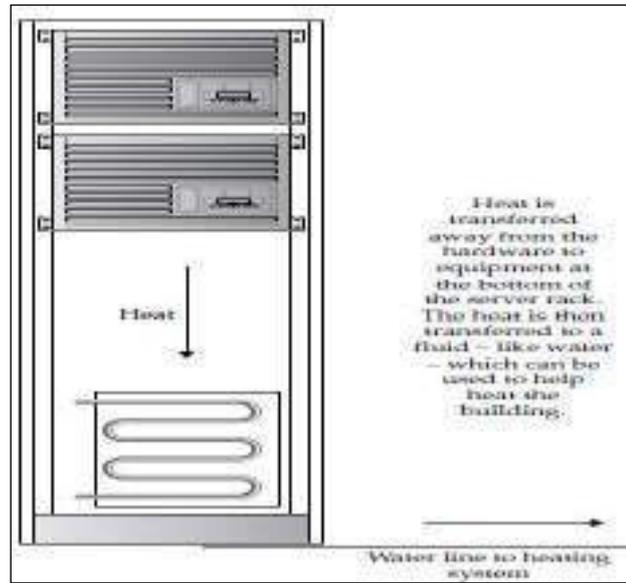


For example, Isothermal Systems Research (ISR) in Liberty Lake, Washington offers a technology called Spray Cool.

A nonconductive fluid known as Fluoinert is used by Spray Cool. The coolant is sprayed directly on a chip or processor (the procedure is called “chip-based” cooling), and then cools the chip as the coolant is converted into a gas.

Following figure shows, that gas is then taken down to a heat exchanger at the bottom of the unit, where the heat is transferred to another fluid, such as water. Because the water has been heated up, it can be used to regulate the building’s temperature.

In a system with 10 racks of equipment, there is a 150-kW load just for cooling. Using the spray coolant removes a quarter of that cooling load.



**Fig 4: Cooling unit for servers**

**2.2 LEED Considerations**

If you are concerned with LEED, good cabling practices can help propel you toward your certification goal. Buildings registered under the LEED system are awarded “credits” for reaching certain environmental goals, and are assigned a rating

within the LEED system based on the following scale:

- Platinum 52–69 credits
- Gold 39–51 credits
- Silver 33–38 credits
- Certified 26–32 credits

**Table 3: Leed standard for cables**

Design Consideration	LEED Credit	Explanation
Using intelligent infrastructure management software	Construction Waste Management (50 percent)	Reduction of unnecessary channels due to undocumented or poorly managed movement, addition, or change work.
	Construction Waste Management (75 percent)	
	Resource Reuse (5 percent)	Identification and utilization of unused cabling channels to limit installation of new channels. Maximization of active port usage to limit the installation of unnecessary active equipment. Identification and utilization or elimination of abandoned channels to maximize pathway space or increase air flow for energy-efficient cooling.
	Resource Reuse (10 percent)	
	Optimize Energy Performance	



CAT 7 cabling and cable sharing	Construction Waste Management (50 percent)	Cable sharing as a means to reduce the number of installed cabling channels.
	Construction Waste Management (75 percent)	Future-proof performance extends the life cycle of the cabling, decreasing the frequency of cable removal/disposal and installation of additional cabling.
	Optimize Energy Performance	Shielded construction may limit noise sufficiently to reduce active equipment power consumption through elimination of DSP.
Using trunking cable	Construction Waste Management (50 percent)	Factory termination eliminates onsite waste created by field terminations.
	Construction Waste Management (75 percent)	Efficient installation of trunk cables requires fewer contractor visits and smaller crews.
	Resource Reuse (5 percent)	Modular design of trunks allows for onsite reuse.
	Resource Reuse (10 percent)	
	Optimize Energy Performance	Well-organized channels eliminate air dams in pathways caused by poorly managed individual channels to maximize air flow for energy-efficient cooling.

### 3. STORAGE VIRTUALIZATION SOLUTIONS

Vendors understand the need for streamlined SAN (Storage Area Networks) solutions, and they're introducing new and ever-efficient technologies all the time. In this section, we'll take a closer look at some of the better SAN solutions out there and talk about how they can help you virtualize your storage.

#### 3.1 Compellent Storage Center

Storage vendors are seeing the benefits of going green and reacting to market pressures to churn out smart products that balance performance, power, and consumption. One such company is Compellent. Compellent offers a number of SAN enhancements with its Compellent Storage Center 4.0. In fact, Compellent is not only concerned with providing an effective, efficient SAN, but is also taking strides to address ecological considerations through its products.

The company uses such technologies as the following:

- Automated tiered storage
- Thin provisioning
- Advanced virtualization

Compellent notes that a fully featured Storage Center SAN can save companies up to 93 percent of the power consumption and power costs of storage when compared to conventional solutions.

For instance, the company observes that a typical 20TB storage system configured with RAID 10 and utilized at 50 percent might require 274 enterprise-class disk drives. Using 10,000 rpm 146GB drives could consume 6020 watts per year (52,740 kWh). If the company pays \$0.10 per kWh to power those drives, it would cost US\$26,370 over the drives' 5-year lifespan.

However, a Compellent SAN with its proprietary technologies—thin provisioning, advanced virtualization, and automated tiered storage—might require just 14 of the same enterprise-class disk drives configured at RAID 10, and seven 7200 rpm 750GB SATA storage disks, configured at RAID 5.



This configuration would consume just 429 watts—or 3758 kWh—for a total cost of just US\$1879 over the drives' 5-year lifespan [6].

### 3.2 Incipient

Another SAN management platform is offered by Incipient. Incipient's solution is two enterprise-class software products managed by a common administrative console called Incipient Storage Administrator (iSA). The two products are Incipient Automated Data Migration (iADM) software and Incipient Network Storage Platform (iNSP) software. Incipient Automated Data Migration (iADM) Software iADM is targeted at customers who need to move their data with very little planning. Data migration includes:

- Datacenter moves
- Storage array refreshes
- Application tiering
- Storage resource balancing

iADM boasts an intelligent automation of end-to-end migration processes, and it supports heterogeneous SAN environments as well as various storage vendors (including 3PAR, EMC, IBM, and Sun).

Further, the software can run on off-the-shelf servers and is designed to automate end-to-end workflow and provisioning tasks that occur with migration projects. iADM also allows you to perform datacenter moves with reduced downtime, as well as to perform all tasks from a single console.

Incipient Network Storage Platform (iNSP) Software

The iNSP platform is targeted at customers who have ongoing data mobility needs, but can't have any downtime. iNSP combines storage virtualization tools with powerful management tools, which allows customers to move data across the SAN with no downtime.

iNSP is located on a director-class SAN switch and provides a suite of network-based storage services that can be deployed SAN-wide or across heterogeneous storage arrays.

These services provide:

- Nondisruptive data migration
- Network volume management
- Storage provisioning
- Point-in-time copy

### 4. SAVINGS

So how much can you save by virtualizing your servers and storage? Let's consider the fictional software giant CompuGlobalMegaWare, which has decided to make the switch and is going to virtualize and consolidate its servers and storage. It will be reducing the amount of physical servers it has from 1000 down to 72—a 14:1 reduction.

The company is also going to reduce its 1000TB of storage spread across 13,700 hard drives down to 1050 drives, or a 13:1 reduction. Let's take a closer look.

#### Server Savings

In terms of storage, an average, run-of-the-mill server will cost US\$9052 per year in costs.

Those costs include:

- US\$4000 for purchase, support, and maintenance costs. This amount is amortized over 3 years.
- US\$1100 for storage and networking costs.
- US\$333 for server provisioning and life cycle replacement costs, which consume 20 hours per server. That also assumes a 10 percent server growth. If your environment is growing especially fast, expect this amount to be higher.
- US\$2720 in ongoing administration.
- US\$589 in power and cooling costs.
- US\$310 for datacenter space costs.

### 5. GREEN COMPUTING TECHNIQUES TO MANAGE POWER IN COMPUTING SYSTEM

These techniques can be classified at different levels:

- 1) Hardware and Firmware Level
- 2) Operating System Level
- 3) Virtualization Level
- 4) Data Center Level

Hardware and Firmware level techniques are applied at the manufacturing time of a machine. These techniques contain all the optimization methods that are applied at the time of designing at the logic, circuit, architectural and system levels.

In technique working at operating system level, it includes various methods which works at operator level.

Virtualization level techniques used the concept of Virtual Machines (VMs) to manage power. In this number of VMs are created on a physical server, so that reduce the amount of hardware in use and improve the utilization of resources.

The technique working at Data center level is applied at data centers which has various methods to manage workload across various nodes in the data centers [6].

### 6. CONCLUSION

After analyzing many techniques for managing power and energy in computing system, different approaches has been surveyed for data center to manage efficiency of energy using virtualization. The work presents in this paper indicate the ever increasing interest of researchers in the area of green computing. Many green computing methods for energy efficiency are proposed by researchers however, green computing



technology needs to be further researched because of high power consumption in data centers. This is the conclusion of power management techniques in a virtualized environment by analyzing the existing work [7], [8].

## 7. REFERENCES

1. *Survey on Green computing techniques - Sonu Choudhary / (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 5 (5) , 2014, 6248-6252*
2. *Green IT - Toby J. Velte, Anthony T. Velte, Robert Elsenpeter*
3. *A survey on Green Computing based on cloud environment - Liang Hu, Jia Zhao- China*
4. *Above the clouds: A Berkeley View of Cloud Computing.*
5. *Abhijit Banubakode "A Review paper on Multi keyword rank search on encrypted cloud data", International Organization of Scientific Research (IOSR) Journal of Computer Engineering, Pp 28-32, 2015, e-ISSN2278-0661, P-ISSN 2278-8727*
6. *Abhijit Banubakode "Scalable Distributed Processing of K nearest Neighbor Queries over Moving Objects",International Journal of Innovative Research in Science, Engineering and Technology , Vol. 5,Issue3, January 2016, ISSN: 2347-6710.*
7. *Abhijit Banubakode "Query Optimization on Compressed and Decompressed Object-oriented Database Using Operators", International Journal on Computer Science and Engineering, vol. 2 , no. 9, 2010, pp. 2883-2889.*
8. *Abhijit Banubakode "Hierarchical Clustering Algorithm for Improved Pattern Classification" International Journal of Innovative Research In Computer and Communication Engineering, Vol. 4, Issue2, May 2016,ISSN: 2320-9798.*
9. *Abhijit Banubakode "Query Optimization in the Objectoriented Database Using Equi-join", Advances in Computational Sciences and Technology, vol.4, no.1, 2011, pp. 83-94.*
10. *Abhijit Banubakode "Query Optimization in Object-oriented Database Management Systems: A short review", International Journal on Computer Science and Engineering Technology Subject Category: Computer Science and Engineering vol. 1, no.1, pp.1-6, 2011.*



## TECHNOLOGY OF PRODUCTS OF INTERACTION OF OLEIC ACID AND MALEIC ANHYDRIDE

<sup>1</sup>Feruz Boboqulova, <sup>2</sup>Oytura Maksumova

<sup>1</sup>Assistant, Shakhrisabz Branch of the Tashkent Chemical-Technological Institute.

<sup>2</sup>Doctor of Chemical Sciences, Professor, Tashkent Institute of Chemical Technology Republic of Uzbekistan, Tashkent

### ABSTRACT

Nowadays in the world the issue of adaptation of surfactant production technology at those enterprises where they are used as components of various products also remains topical. This can have a positive effect on the general economic situation of small enterprises. Thus, the work considers topical issues of chemistry and technology of surfactants based on oleic acid and maleic anhydride, and is of a recommendatory nature for use in industry.

**KEYWORDS:** Maleic anhydride, 1,4-butanediol, Oleic acid, Perchlorethylene, tetrahydrofuran, aspartame.

### INTRODUCTION

To be competitive in the world market, modern industries need to have several basic qualities: to produce environmentally friendly products and have perfect cutting-edge production technologies. The environmental friendliness of products is ensured, first of all, by the nature of the materials and raw materials that are used to obtain it. And the issue of improving technology remains relevant at any time.

Surfactants (surfactants) have found widespread use in our time, which accompany a person, both in his daily life and in the technical sphere. Surfactants based on plant and animal products are considered environmentally friendly and biodegradable. Moreover, such raw materials are renewable and easy to use. An interesting class of "organic" surfactants are derivatives of fats, oils and fatty acids. As a rule, these are products of malleination of vegetable oils or unsaturated fatty acids with non-conjugated multiple bonds. The branched structure of the molecule and the presence of carboxyl groups in combination with the hydrocarbon chain determine the sufficient nonionicity of the molecule, and, as a result, allows the use of such surfactants in non-polar media.

It is the technology of surfactant production based on maleic anhydride (MA) and oleic acid

(OA), as an unsaturated fatty acid, that has become the subject of our research.

Analysis of literature data and problem statement. Surfactants derived from products of maleic anhydride and oleic acid are obtained by malleination of the latter in the melt at 200-220 ° C for 3-5 hours [1-3], followed by their treatment with polyhydric alcohol [1]. Thus, the nonionicity of the molecule is achieved, which allows the use of substances such as, for example, emulsifiers of the second kind. The authors of [4] succeeded in reducing the malleination temperature of unsaturated fatty acids and oils to 150 ° C through the use of catalysts — boron compounds. The authors managed to obtain the product with a yield of 86-96%, which they determined by the amount of unreacted maleic anhydride. Boron compounds are used industrially as catalysts for the oxidation of hydrocarbons, which can affect the quality of the final product of malleination. Determination of the yield of MA products and unsaturated fatty acids from the degree of MA conversion is not quite a correct method, since it can also be used for the formation of by-products. Therefore, the high yield in this case can be considered invalid.

The issue of malleination of OK and vegetable oils was asked back in the middle of the twentieth century, however, with the beginning of the



two thousandth, this topic became relevant again. Thus, in [5, 6], it is reported about ten new oil demulsifiers based on the product of MA and OA, followed by esterification with various polyhydric alcohols at the anhydride group.

In addition to the unsaturated fatty acids themselves, cis-isomers of their esters can react with maleic anhydride, as shown in [4, 2, 7] in the first half of the 20th century, and also much later in 2008 [8]. At the same time, in the last of the listed works, the kinetics of malleinization of cis-forms of alkyl esters of highly oleinized sunflower oil was investigated. The authors also noted that in the reaction of malleination of OA, two different reaction mechanisms occur simultaneously: allylic addition and new interaction. This is confirmed by the simultaneous presence of isomers with and without a shift in the OC molecule among the products.

The relationship between the various pathways for malleination of unsaturated fatty acids is shown in [7]. Here, ethyl oleate was reacted with MA at 210 °C. The resulting product was oxidized with an alkaline solution of potassium permanganate and the ratio of the final products was evaluated. Thus, it has been proved that under the indicated conditions it is the new mechanism with the movement of the double bond that prevails, in the ratio 1: 2.

Modern science makes it possible to more accurately determine and identify the structural differences in the products of interaction between MA and OA [9]. For this, a mass spectroscopy technique has been developed.

As can be seen from the sources considered, between oleic acid and maleic anhydride at temperatures of the order of 150-300 °C, interaction is possible according to several mechanisms: allyl, new and radical. In this case, the reaction product is a mixture of isomers obtained by all three types of interaction.

There are no other references to a decrease in the temperature regime of the malleination process

of unsaturated carboxylic acids, primarily oleic acid, in the literature.

Therefore, we were faced with the task of considering the possibility of interaction between MA and OK in milder conditions, different from industrial ones.

## MATERIALS AND METHODS

Isolation of a pure crystalline reaction product requires a series of successive dissolutions and filtrations, which should also be provided for in the technology and in the technological production scheme.

The whole technology can be represented in the form of the following block diagram of stages and flows (Fig. 1).

So the synthesis proceeds at the first stage at the boiling point in the main apparatus (Fig. 1 block I), where perchlorethylene, oleic acid and maleic anhydride are loaded (Fig. 1, flows 1, 2, 3). Then the hot reaction mass (Fig. 1, stream 4) is fed to the purification filtration (Fig. 1, block II), from where the first brown precipitate formed during the synthesis is discharged for drying (Fig. 1, stream 6). The filtrate is overloaded (Fig. 1, flow 5) to the next filtration stage (Fig. 1, block III). There it is cooled to normal temperature, and the resulting mixed precipitate (Fig. 1, stream 7) is sent for secondary dissolution in perchlorethylene (Fig. 1, stream 8), followed by filtration of the purified precipitate (Fig. 1, block V). The filtrate after repeated washing of the precipitate (Fig. 4.1, stream 9), as well as the filtrate after the primary filtration (Fig. 1, stream 10) are collected and evaporated to constant weight (Fig. 1, block IV). The result is a brown oily liquid (Fig. 1, stream 11).

Thus, in the course of this technology, 2 target products are obtained: crystalline (Fig. 1, stream 8), as well as a liquid mixture of maleic anhydride and oleic acid products and starting reagents (Fig. 1, stream 11).

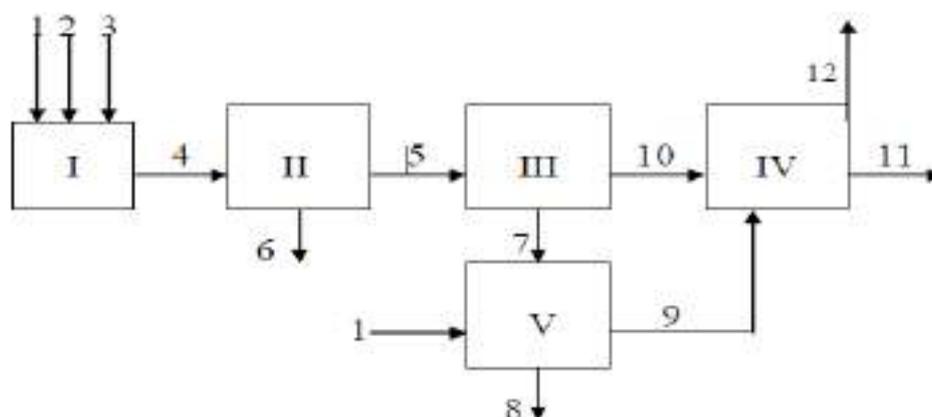




Fig. 1. Block diagram of the technology for obtaining the products of the interaction of oleic acid and maleic anhydride: I - block of the main stage of the process - synthesis of substances; II - block of primary filtration of hot reaction mass; III - primary filtration filtrate cooling unit and secondary filtration; IV - block for evaporation of the solvent from all filtrates; V - block for re-dissolving the precipitate with subsequent filtration; 1 - perchlorethylene, 2- oleic acid, 3 - maleic anhydride, 4 - hot reaction mass, 5 - filtrate after hot filtration, 6 - precipitate formed during synthesis, 7 - precipitate formed upon cooling, 8 - purified precipitate by redissolution, 9 - filtrate after repeated purification of the precipitate, 10 - filtrate after filtration of the cooled reaction mass, 11 - brown viscous product (a mixture of maleic anhydride and oleic acid products), 12 - evaporated perchlorethylene.

## RESULTS AND DISCUSSION

### *Calculations per ton of the first target product*

To confirm the economic feasibility of obtaining a new surfactant from maleic anhydride and oleic acid, it is necessary to carry out preliminary material and technological calculations of the synthesis.

In addition, it is worth noting the features of the technological process.

Oleic acid is a rather viscous liquid, which affects the time of its loading into the apparatus, and also leads to the deposition of its residues on the surface of the pipeline and on the bottom of the measuring vessel. It should be borne in mind that the melting point of oleic acid is 16 °C. Thus, when the temperature in the production room decreases, oleic acid will crystallize in the measuring vessel and the pipeline, which will affect its loading. Therefore, the line for supplying oleic acid to the reactor should provide for the possibility of heating it during the cold season.

Maleic anhydride is fed in portions within an hour from a heated measuring tank, through a heated feed line, into a reactor preheated to 60 °C. When melted, Maleic Anhydride is a viscous liquid that crystallizes rapidly at temperatures below 52.5 °C. Therefore, taking into account the viscosity and temperature conditions, the excess loading of Maleic Anhydride into the reactor should also be about 15% of the calculated one.

Since, in the course of the proposed technology, two target products are obtained, the total output of the technological process is determined by adding the total outputs for each product. Considering each product as a separate technology, we will compile a list of stages for them (Table 1) and indicate the outputs for each.

### Technology stages of target products

**Table 1.**

Stage	First product (crystal) Output, %	Second product (product mix) Output, %
1	2,2	3,1
Reaction between maleic anhydride and oleic acid in a reactor	57	45
Filtration in a different filter from the reaction sludge	54	44
Cooling the reaction mass in an intermediate tank	54,7	42,7
First filtration in a vacuum funnel	55	45
Dissolution of the crystalline precipitate in the second intermediate vessel	56	-
Formation of a crystalline precipitate in the crystallizer	55	-
Second filtration in a vacuum funnel	52,5	-
Evaporation of solvent	53,4	42,2
Drying	52	-
Total yield by product	49,18	37
Total production output	43,09	

Thus, the total technological yield is 43.09%, which makes it feasible.

To determine the consumption of raw materials and auxiliary substances for the production of one ton of the first target product, then for calculations we use the total yield of this product by technology - 49.18%.

The calculation results are presented in table. 2. In this case, the amount of perchlorethylene is indicated taking into account that this solvent is used in two stages: the interaction of the reagents and the re-dissolution of the crystalline product.



Consumption of raw materials and auxiliary substances per ton of the first target product

**Table 2.**

Substance	Quantity, kg
Oleic acid	2295,3
Maleic anhydride	797,4
Perchlorthylene	4500,0

The technology provides for the return of perchlorethylene to the system after evaporation. The return rate can be estimated at 80-85%. This allows you to significantly reduce the cost of the product by almost 3 times. The approximate cost of the product for raw materials is about 300 hryvnia per 1 kg. Taking into account the return of the solvent - about UAH 100. Since the target product is recommended to be used as a surfactant, its amount added to the formulation is, as a rule, 0.1-0.3%, which makes it an affordable raw material for various industries. The cost of the acid is also reduced due to the production of the second product by 25%.

## CONCLUSIONS

An important scientific and technical problem has been solved - the technological bases for the production and use of the products of interaction of maleic anhydride with oleic acid have been developed. So, maleinization of unsaturated fatty acids is recommended to be carried out at the boiling point of the reaction mixture (120-121 ° C) in an aprotic organic non-polar solvent - perchlorethylene, with a ratio of reagents oleic acid: maleic anhydride = 1: 1.2. This temperature regime is much lower than the known one (200-250 ° C). As a result, a mixture of maleation products is formed with a total yield of 98-99%. The use of a solvent helped to distribute the maleation products, so one crystalline product was isolated, which is a mixture of isomers of maleic anhydride and oleic acid products, and exhibits surfactant properties. The yield of the crystalline product reaches 54-56%.

## REFERENCES

1. Crecelius, Samuel B. Пат. 3141897 США МПК C 11 C 3/00, C 11 D 1/00, Reaction product of maleic anhydride unsaturated fatty acid adduct and polyethylene glycol [Text] / Crecelius Samuel B., Brunelle Thomas E., Rue Larry M. et al // *ECONOMICS LAB.* - № 143566; заявл. 09.10.1961; опублик. 21.07.1964. 2. Rheineck, A. E. Reaction of Maleic Anhydride with cis-Isolated Unsaturated Fatty Acid Esters [Text] / A. E. Rheineck, T. H. Khoe // *Fette, Seifen, Anstrichmittel.* - 1969. - Vol. 71, Issue 8. - P. 644-652. doi: 10.1002/lipi.19690710814
2. Peng, E. Succinic Anhydrides Functionalized Alkenoic Ligands: A Facile Route to Synthesize Water Dispersible Nanocrystals [Text] / E. Peng, J. Ding, J. Min Xue // *Journal of Materials Chemistry.* - 2012. - Vol. 22. - P. 13832-13840. doi: 10.1039/c2jm30942d
3. Пат. 2569420 США МПК C 10 M 342, Method of Preparing adducts / Milton Kosmin; заявитель и патентообладатель - Monsanto Chemical Company, St; Louis, Mo., a corporation of Delaware. - № 144 385; заявлено 15.02.50; опубликовано 25.09.51.
4. AlSabah, A. M. Breaking water-in-crude oil emulsions by novel demulsifiers based on maleic anhydride-oleic acid [Text] / A. M. Al-Sabah, A. M. Badawi, M. R. Noor El-Den // *Petroleum Science and Technology.* - 2002. - Vol. 20. Issue 9-10. - P. 887-914. doi: 10.1081/ft-120003685
5. Wysocki, L. The Hetero-Ene Reaction: Development and Synthetic Utility [Text] / L. Wysocki // *Burke Group*, 2005. - 61 p.
6. Holmberg, K. Addition of maleic anhydride to esters of mono-unsaturated fatty acids [Text] / Krister Holmberg, Jan-Allan Johansson, Å. Bergman, U. Brunk, G. Dallner, Jan-Eric Berg // *Acta chemical Scandinavica.* - 1982. - Vol. 36b. - P. 481-485. doi: 10.3891/acta.chem.scand.36b-0481
7. Stefanoiu, F. Kinetics and mechanism of the reaction between maleic anhydride and fatty acid esters and the structure of the products [Text] / F. Stefanoiu, L. Candy, C. Vaga-Garcia, E. Borredon // *European journal of lipid science and technology.* 2008. - Vol. 10. Issue 5. - P. 441-447. doi: 10.1002/ejlt.200700181
8. Loutelier-Bourhis, Corinne. LoutelierBourhis C. Mechanistic study of maleic anhydride grafting onto fatty double bonds using mass spectrometry [Text] / Corinne LoutelierBourhis, Ornella Zovi, Laurence Lecamp, Claude Bunel, Marie HubertRoux, Catherine M. Lange // *Rapid Commun Mass Spectrom.* - 2012. - Vol. 26(11). - P. 1265-1276. doi: 10.1002/rcm.6222



# EFFECTIVENESS OF STRUCTURED TEACHING PROGRAMME ON KNOWLEDGE REGARDING MANAGEMENT OF PREMENSTRUAL SYNDROME AMONG ADOLESCENT GIRLS

**M.V. Hyrune Zohara, M.Sc.(N),**

*Tutor at Psychiatric Nursing Dept., Ithayajothi College of Nursing, Tirunelveli.*

## ABSTRACT

*A study was conducted to reveal the effect of structured teaching program on the knowledge regarding the management of Premenstrual Syndrome among adolescent girls. Samples of 30 Adolescence Girls in Tirunelveli district were selected. In pretest mean value were 8.41 with standard deviation 4.86. In posttest the mean value was 17.81 with standard deviation 4.18. The mean difference score was 9.37. The paired' test score was 5.86 which is significant at  $p < 0.05$  level. From the results of the study. Hence, the structured teaching programme was effective on knowledge regarding management of premenstrual syndrome among adolescent girls.*

**KEY WORDS:** Adolescence girls, Premenstrual syndrome, structured teaching.

## INTRODUCTION

Adolescence is a transitional stage of physical and mental human development occurring between puberty and adulthood. It is characterized by beginning and ending teenage stage. Adolescence is a person between the age group of 13 and 19. Puberty is a period of rapid growth and psychological changes. Adolescent is a stage is very important in the life of the girl, because of physical, sexual, psychological changes takes place. The major landmark of puberty for females is Menarche, the onset of Menstruation which occurs the age of 12-13. There can be emotional and physical discomfort problems with puberty.

Premenstrual syndrome to physical and emotional symptoms occur about 5 to 11 days before a woman starts her monthly menstrual cycle. The symptoms usually stops when the menstruation begins. premenstrual syndrome is a set of physical, behavior and emotional symptoms. The common physical symptoms are, abdominal fullness, bloating of abdomen and headache. The common psychological symptoms are confusion difficulty in concentration, tension, anxiety, irritability, aggressive behavior and

mood swings. premenstrual symptoms can be relieved by leading a healthy lifestyle, reduction of caffeine, sugar, increase of fibre diet and adequate rest and sleep.

Premenstrual syndrome refers to physical and emotional symptoms that occur in the one to two weeks before a Women's period. Some symptoms may be worsened by a high salt diet, alcohol or caffeine. Premenstrual syndrome has a wide variety of signs and symptoms including mood swings, tender breasts, fatigue, irritability and depression. It is estimated that as many as 3 of every 4 menstruating women have experienced some form of premenstrual syndrome.

In India, the premenstrual syndrome is the second (60.5%) most prevalent syndrome among the adolescent girls. Psychiatric symptoms are predominant in adolescent girls suffering from premenstrual syndrome.

According to the **epidemiology of premenstrual syndrome**, globally women with premenstrual syndrome usually present with both physical and mood symptoms. According to International **Psychiatric article**, premenstrual syndrome can be defined as constellation of



psychological and physical symptoms. A cross sectional study was conducted to determine the prevalence of premenstrual syndrome among female students in Zahedan University. The results revealed that, out of 300 female students, 68.2% reported severe premenstrual syndrome, 20.4% reported moderated Premenstrual syndrome and 12.6% showed mild premenstrual syndrome.

According to Chinese University of Hong Kong, a structured education programme among adolescents regarding premenstrual syndrome was given. The results proved that structured education programme was an effective source of reduction in Premenstrual syndrome.

### STATEMENT OF THE PROBLEM

A Study To Assess The Effectiveness Of Structured Teaching Programme On Knowledge Regarding Management Of Premenstrual Syndrome Among Adolescent Girls Studying In Selected High School At Tirunelveli District.

### OBJECTIVES OF THE STUDY

- To assess the pre test level of knowledge regarding management of premenstrual syndrome among adolescent girls .
- To assess the post test level of knowledge regarding management of premenstrual syndrome among adolescent girls .
- To evaluate the effectiveness of structured teaching programme on knowledge regarding management of premenstrual syndrome among adolescent girls
- To find out the association between the pre test knowledge regarding management of pre menstrual syndrome among adolescent girls with this selected socio demographic variables.

### HYPOTHESIS

H<sub>1</sub> – There will be a significant difference in pretest and post test level of knowledge regarding management of premenstrual syndrome among adolescent girls.

H<sub>2</sub> – There will be a significant association between the pre test level of knowledge regarding management of premenstrual syndrome among adolescent girls with their selected socio demographic variables.

### OPERATIONAL DEFINITION

#### Assess

In this study it refers the measurement of knowledge among adolescent girls regarding premenstrual syndrome and its management.

#### Effectiveness

In this study, it refers to assess the effectiveness of structured teaching programme in manipulate the knowledge among premenstrual syndrome among adolescent girls.

#### Structured Teaching Programme

In this study it refers to organized teaching and learning process for the study samples among adolescent girls regarding premenstrual syndrome and its management

#### Knowledge

In this study it refers to awareness of premenstrual syndrome and its management among adolescent girl

#### Premenstrual syndrome

In this study premenstrual syndrome refers to physical and psychological symptoms before the onset of menstruation.

#### Management

In this study management refers to measures taken to manage the symptoms of premenstrual syndrome

#### Adolescent girls

In this study adolescent girls ( 14 & 15 years) refers to the students studying in High school at Tirunelveli District

### DELIMITATIONS

The study is delimited to

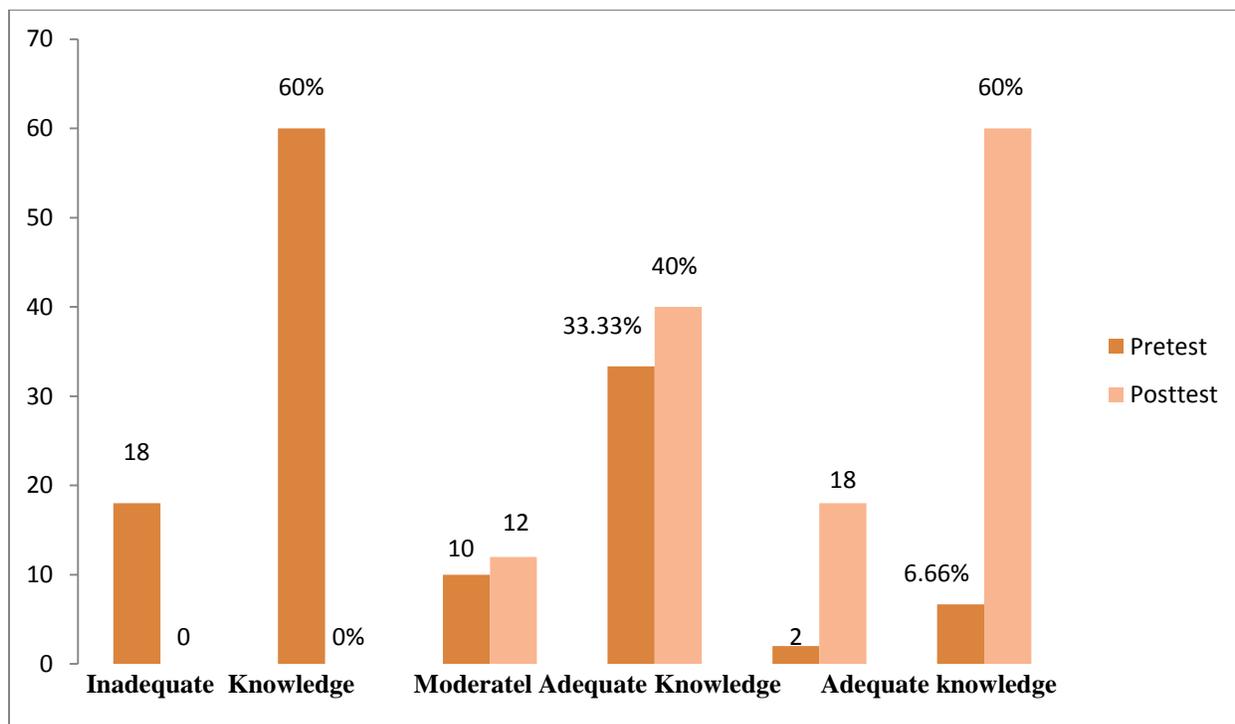
- Adolescent girls who are studying in High school
- Willing to participate
- Sample size 30



**ANALYSIS AND INTERPRETATION**

n=30

S.No.	Variable	Group	Mean	Standard Deviation	Mean Difference	Paired 't' test	Table Value
1.	Structured Teaching Programme	Pre test	8.41	4.86	9.37	5.86*	2.04
		Post test	17.81	4.18			



**FINDINGS OF THE STUDY**

- During pretest, the level of knowledge regarding management of premenstrual syndrome among adolescent girls 18(60%) were in inadequate knowledge,10(33.33%) were in moderately adequately knowledge and 2(6.66%) were in adequate knowledge.
- During posttest level of knowledge regarding management of premenstrual syndrome among adolescent girls, none of them were in inadequate knowledge,12(40%) were in moderately adequate knowledge and 18(60%) were in adequate knowledge.
- In pretest mean value were 8.41 with standard deviation 4.86.In post test the mean value were 17.81 with standard deviation 17.81.The mean difference score were 9.37.The paired' test score was 5.86 which was significant at p<

0.05 level. It shows that the structured teaching programme was effective regarding the knowledge of management of premenstrual syndrome among adolescent girls.

- There was no association between the pre test knowledge regarding management of pre menstrual syndrome among adolescent girls with this selected socio demographic variables.

**CONCLUSION**

The study was done to determine the effectiveness of structured teaching programme on knowledge regarding management of premenstrual syndrome among adolescent girls in selected high school. In pretest mean value were 8.41 with standard deviation 4.86. In posttest the mean value were 17.81 with standard deviation 4.18.



The mean difference score were 9.37. The paired test score was 5.86 which is significant at  $p < 0.05$  level. From the results of the study, it was concluded that structured teaching programme was effective on knowledge regarding management of premenstrual syndrome among adolescent girls. The structured teaching programme are easy to follow and cost effective. For overall High school adolescent girls, using PowerPoint presentation regarding premenstrual syndrome and its management was given and pamphlets were issued to adolescent girls.

### RECOMMENDATIONS

- ❖ A study can be conducted among Higher secondary girls
- ❖ A comparative study can be conducted for school girls and college girls
- ❖ A study can be conducted for longitudinal basis
- ❖ An experimental study can be conducted for the effectiveness of management of premenstrual syndrome.

### BIBLIOGRAPHY

1. Chandraratne NK, Gunawardena NS. *Premenstrual syndrome: the experience from a sample of Sri Lankan adolescents. Journal of paediatric and adolescent gynaecology.* 2011;24(5).
2. Derman O, Kanbur NO, Tokur TE, Kutluk T. *Premenstrual syndrome and associated symptoms in adolescent girls. European Journal of obstetrics and gynaecological reproductive biology.* 2004; 116(2).p.201-206.
3. Kumbhar S, Tondare D, Tejaswini G et al. *Study of Prevalence of Pre-Menstrual Syndrome among the 13 to 22 Years of Young Girls Residing in Kadapa Town of Andhra Pradesh. International Journal of Contemporary Medicine.* 2014;2(2).p.143-145.
4. Mandal J, Sarkar AP, Ghorai S. *A study on premenstrual syndrome among adolescent girl students in an urban area of west Bengal. International journal reproduction, Contraception, Obstetrics and Gynaecology.* 2015;4(4):1012-1015.
5. Cleckner CS, Doughty AS, Grossman JA. *Premenstrual symptoms. Prevalence and severity in an adolescent sample. Journal of Adolescence Health.* 1998 May;22(5).p.403-408.
6. Bianco V, Cestari AM, Casati S, et al. *Premenstrual syndrome and beyond: lifestyle, nutrition, and personal facts. Minerva Ginecologica.* 2014;66(4):365-375.
7. Olive Kujur *A Study to Evaluate the Effectiveness of a Structured Teaching Programme on Knowledge regarding Selected Non-Pharmacological Management of Pre-Menstrual Syndrome among Adolescent Girls in Selected Schools, Bangalore International Journal of Pediatric Nursing / Volume 4 Number 1 / January - April 2018 28 10.*
8. Amany ES, Eman SM, Eman MM. *Life Style Factors Associated with Premenstrual Syndrome among ElMinia University Students, Egypt. Journal of Public Health.* 2013.
9. Navdeep K, Ramesh T. *A descriptive study to assess the premenstrual syndrome among nursing students, NINE, PGIMER, Chandigarh. Nursing and Midwifery Research Journal.* 2009;5(1).
10. Shahhosseini Z, Abedian K, Danesh M. *Effect of starch dietary regimen on treatment of premenstrual syndrome. Journal of Obstetrics and Gynaecology.* Feb 2012.



## A REVIEW PAPER ON QUANTITATIVE ASSESSMENT OF SOLAR PV SYSTEM IN JAIPUR

**Mr. Kishan Khatri<sup>1</sup> Dr. Shweta Choudhary<sup>2</sup>**

<sup>1</sup>PG Student (Sustainable Design), Vivekananda Global University, Jaipur

<sup>2</sup>Associate Professor (Centre Head CODE), Vivekananda Global University, Jaipur

Article DOI: <https://doi.org/10.36713/epra7508>  
DOI No: 10.36713/epra7508

### ABSTRACT

*The aim of research is to identify a performance gap of solar PV through the quantitative assessment. In the recent studies it has been observed that the actual performance is considered based on the overall irradiation on the major portion of the area, as the irradiation for low distance grade is challenging to collect across the globe. The study and analysis of the actual solar PV system is the open ground to study and benchmark the generation for particular Jaipur City. On the basis of cost analysis, it has been observed, the rooftop solar plant is a feasible solution as it provides a helping hand to meet the growing energy demand. Although, some challenges such as inflation rate, the current discount rate and life of the plant will remain with installation and generating but, can be mitigated with its long-term benefits. The current market scenario with low cost of renewable technology the role of other financial parameters affects the financial viability of the project therefore it is necessary to analyse all the parameters carefully before installing a PV plant especially in areas where land cost is a considerable parameter.*

**KEYWORDS:** Solar PV Generation, Jaipur Radiation, Photovoltaic, Kilowatt peak, Rajasthan Solar

### INTRODUCTION

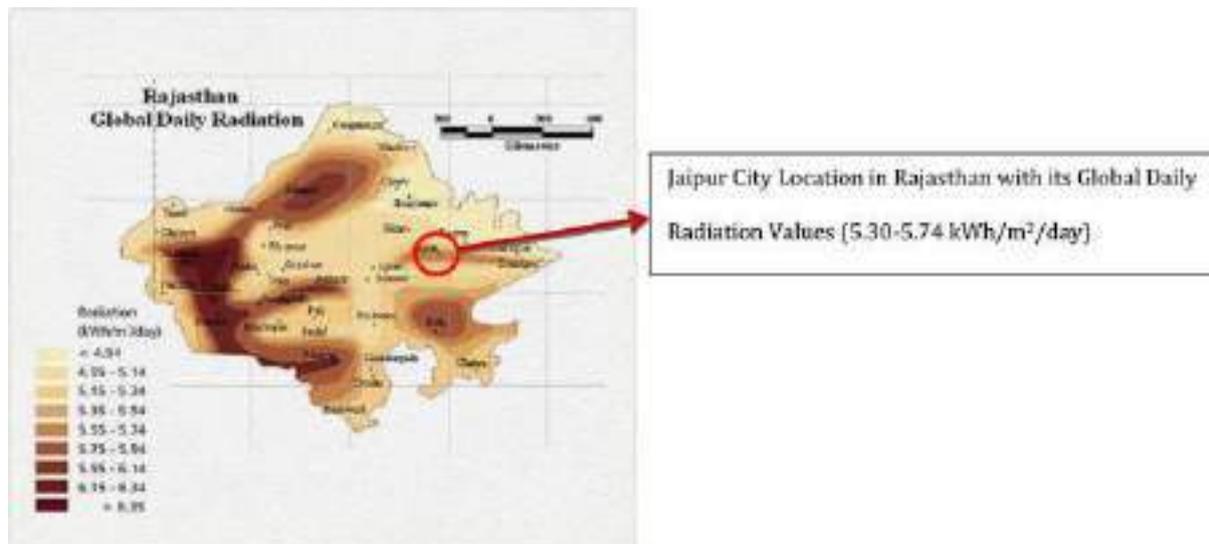
This document introduces with study the need of actual performance and energy generation by solar PV system in Jaipur City. The analysis shall include measurements of various sites in Jaipur city and the comparison with the theoretical values and calculative values of energy generation.

India as a tropical country has a huge potential of harnessing solar radiation. A 3000 h of yearly shine received by the country every year which contributes to 4–7 kW h of solar radiation per sqm. The following factors are responsible for variation in solar radiation:

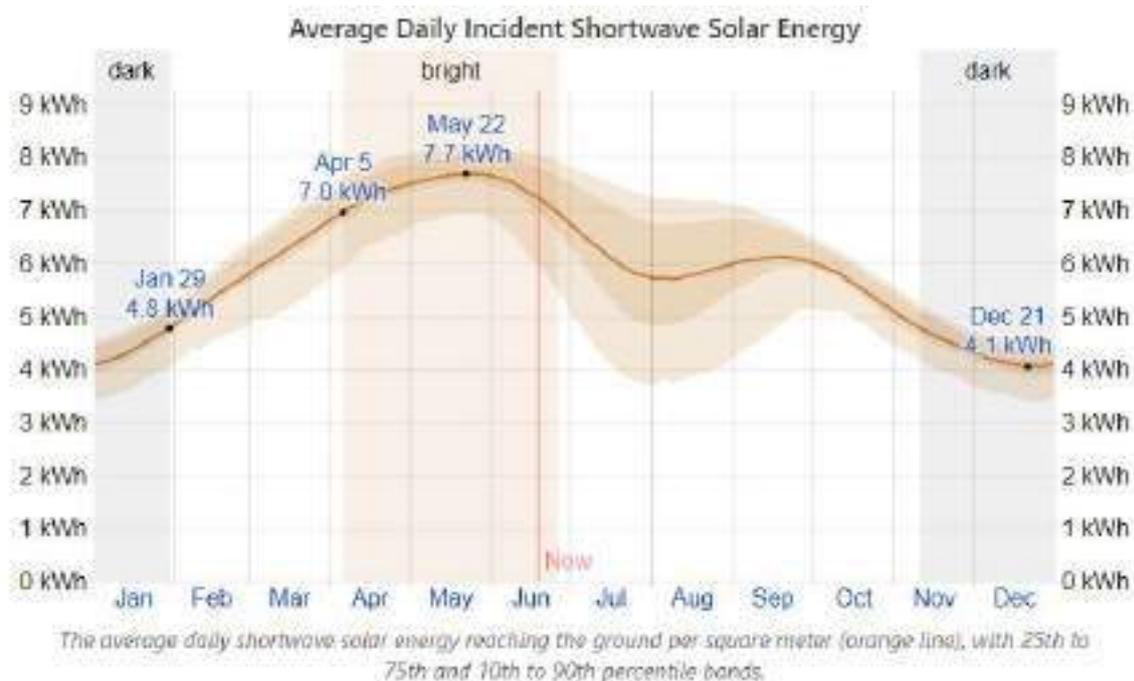
1. The intensity of solar radiation reaching the earth's surface depends on dust, moisture, orientation of the sun.
2. Lakes, Mountains and oceans different intensity of solar radiation as compared to the land areas adjacent to it.

3. Daily rotation yearly declination of the sun with respect to earth shows the variation in the intensity of radiation i.e. more solar radiation during morning and afternoon.
4. Some artificial acts like smokes from forest fires and urban air pollution, also reduce the amount of solar radiation reaching the surface of the earth. Also, some radiation's scattered towards the earth called diffuse solar radiation.

Rajasthan, a state of India receives highest intensity of solar radiation with minimum rainfall throughout the year. Rajasthan has around 208,110 Sq.km of desert land. Hence, Rajasthan has more than 325 sunny days in a year having solar radiation nearly about 6–7 kW h/sq-m/day. The average variation of direct normal insolation from 1800 kW h/m<sup>2</sup> to 2600 kW h/m<sup>2</sup>. Rajasthan also have less population density which amount to abundant land for solar PV Installation.

**Figure 1 Radiation in Rajasthan**

Source: Government, Rajasthan Solar Energy, Bureau of Investment Promotion in Rajasthan.



Source: <https://weatherspark.com/y/108316/Average-Weather-in-Jaipur-India-Year-Round>.

## LITERATURE REVIEW

Various type of studies are being conducted to analyse the demand and cost effectiveness of potential solar photovoltaic power plant. A research by Chandel M et.al. [1] was done on the techno-economic analysis of solar photovoltaic power plant for a garment zone of Jaipur city. In this study, the demand of factory was identified, the area requirement was estimated. The rate of return was further checked for onsite and offsite powerplant.

Another similar study was done by Khatri R [2] on design and assessment of solar PV plant for girls hostel (GARGI) of MNIT University, Jaipur city. The energy demand in one of the girl hostel was identified, financial assessment was also analysed. The inflation was introduced to check the actual payback period. After considering the inflation rate of 7.23%, the revised payback period was 13.4 years.

In order to check the design parameter, an optimum angle for getting the maximum solar radiation was studied by Kumar S, et.al. [3]. This



study was conducted on optimum tilt angle for solar PV panel in Jaipur. The study was carried out in the month of May & June and measurements were taken twice a week. This study revealed that optimum angle for may was  $5^{\circ}$ - $10^{\circ}$  and for June it was  $5^{\circ} \pm 2^{\circ}$ .

To further analyse in detail, a study was done by Jayswal V K et.al. [4], on Simulation and Optimisation of a Solar Panel. HOMER tool was introduced to conduct the analysis. The total Net Capital Cost (NCV) and the cost of energy was analysed and compared which revealed that there was a huge potential in making the campus independent to the grid connectivity.

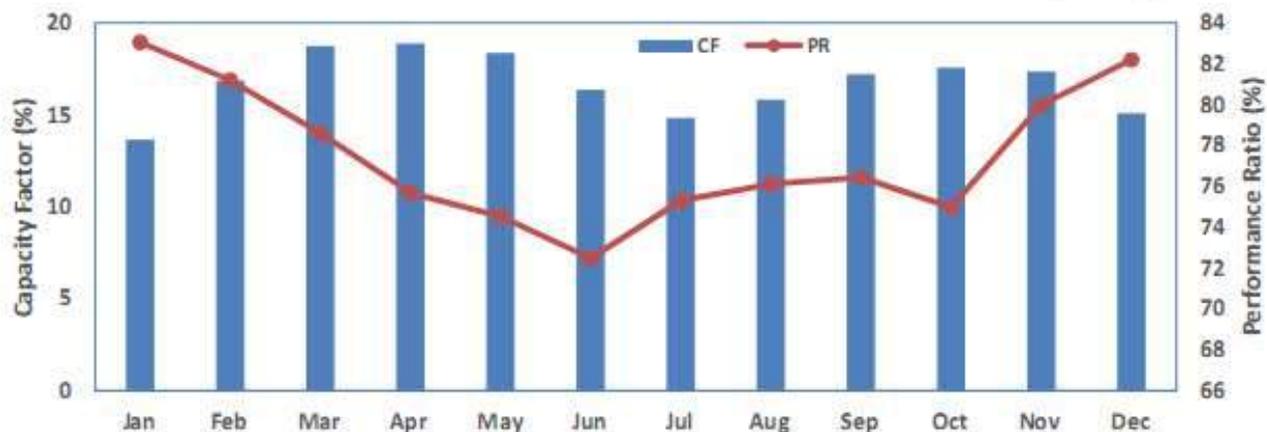
Mohanty S, et.al. [5], forecasted the solar energy in India with Survey and the implications. The forecasting is closely related to the weather forecast predictions. Accurate measurement of solar radiation for a particular location is always necessary for creating an ideal solar infrastructure.

Bhandari and Singh [6] present an analytical research of mean monthly efficiency of a flat plate collector with varying the solar Irradiation for Almora district of Uttarakhand. Monthly solar radiation data for a period of 2010–2011 used to find

the average efficiency of a flat plate solar collector. Winter season has the minimum efficiency of the solar collector due to less solar irradiation.

Bano T, et.al. [7] has evaluated a performance of 1 MW solar PV power plant which was located in Phagi, Jaipur. Performance parameters such as Performance ratio, reference yield, array yield, final yield of array are calculated using three different methods: namely Excel sheet, PV-syst, System Advisory Model (SAM). The plant performance was almost close to what calculated by SAM and PV syst method.

Nallapaneni e.t al. (2019) [8] studied and degradation, performance and energy loss a 22KW solar PV installed at Chandigarh in the Northern part of India. The PV syst simulation tool was used for identifying loss and yarly power generation for year-round conditions. A yearly power generation of 292954 kWh was estimated with a energy loss, PR and CF of 26.5, 77.27 and 16.72% respectively. The possible LID, and DR of the system obtained as 2.5%/year 5%. whereas CF is Capacity factor; PR is Performance factor; LID is light induced degradation & DR is degradation rate.



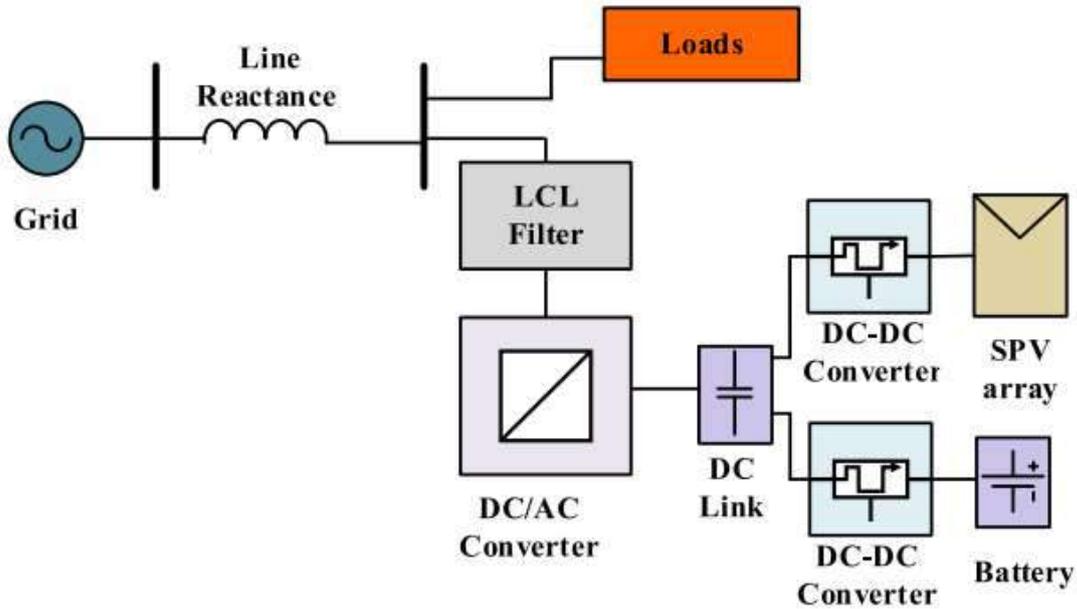
**Figure 2 : Capacity factor and performance ratio**

Source: <https://weatherspark.com/y/108316/Average-Weather-in-Jaipur-India-Year-Round>.

Vinod e.t al. (2018) [9], performed study on MATLAB software to analyse the performance of Solar PV system in a real time climate condition of India. They observed the simulated result is around 1.65% which is quite good result between the manufacturer value and simulated values. It has also presumed as a well-made tool to assess the performance of solar PV modules.

Naveen et. Al. [10], used Battery energy storage (BES) and real time implementation of SPV

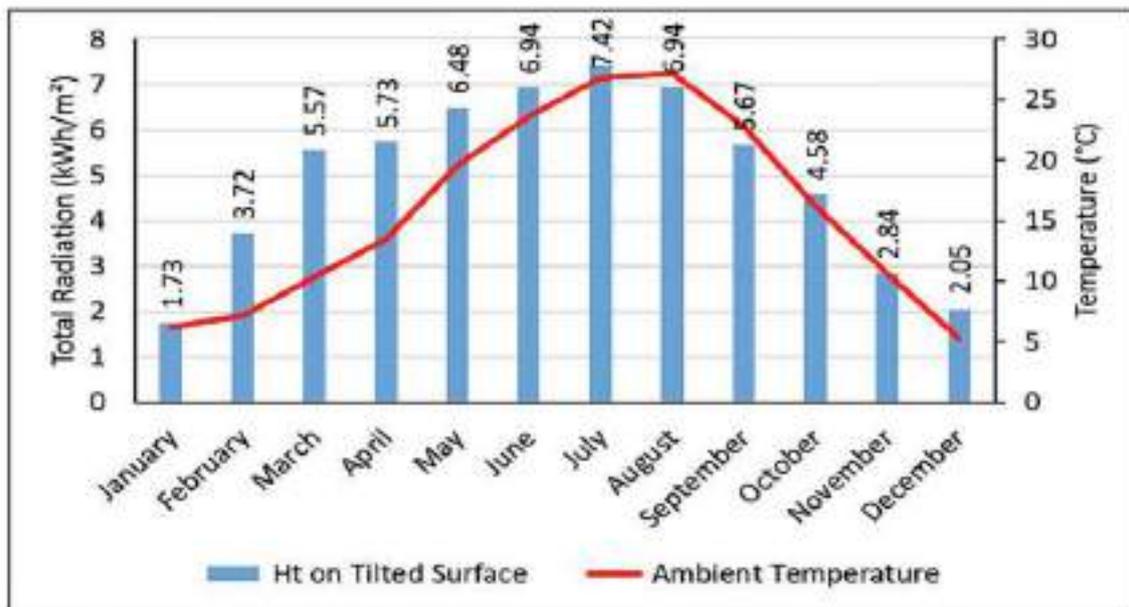
to compensate reactive power for supplying active power to the local grid system. The combined operation of SPV and BES is investigated to sure that voltage profile of the distribution system is improved. A real time (OPAL-RT) simulator was used to deliver active power capability of BES and SPV for improved voltage profile.



**Figure 3 : Block diagram of the complete test setup**

Ali et. Al.[11], studied a 30-kW rooftop solar PV system of 116 polycrystalline modules with 20-degree azimuth angle and a tilt of 12 degree. A comparative analysis was done to obtain the deviation of real time generation with respect to the simulation output. The capacity factor and

performance ratio were observed as 17.35% and 83.61% respectively. A displacement of 23.5 tons of CO<sub>2</sub> emissions from solar PV system as compared to the conventional powerplant was also the key observation on the analysis for the year 2018.



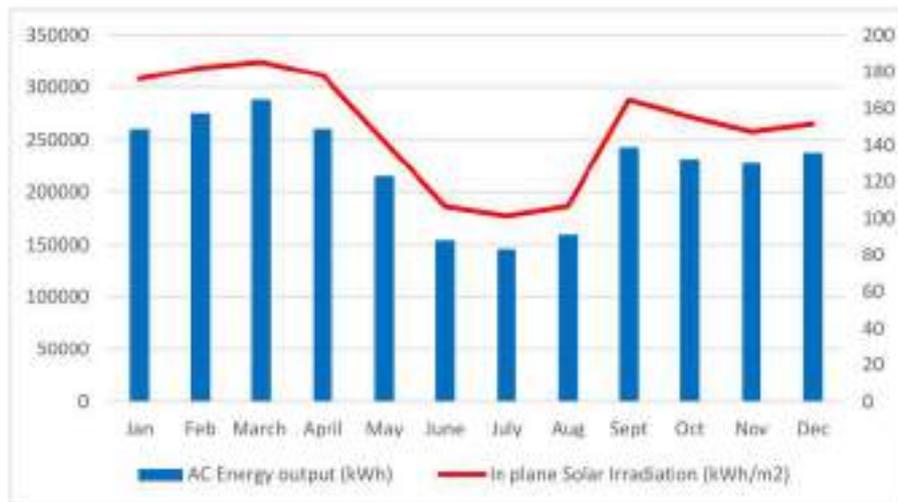
**Figure 4 Monthly average daily total radiation on tilted surface and monthly average ambient temperature measured.**

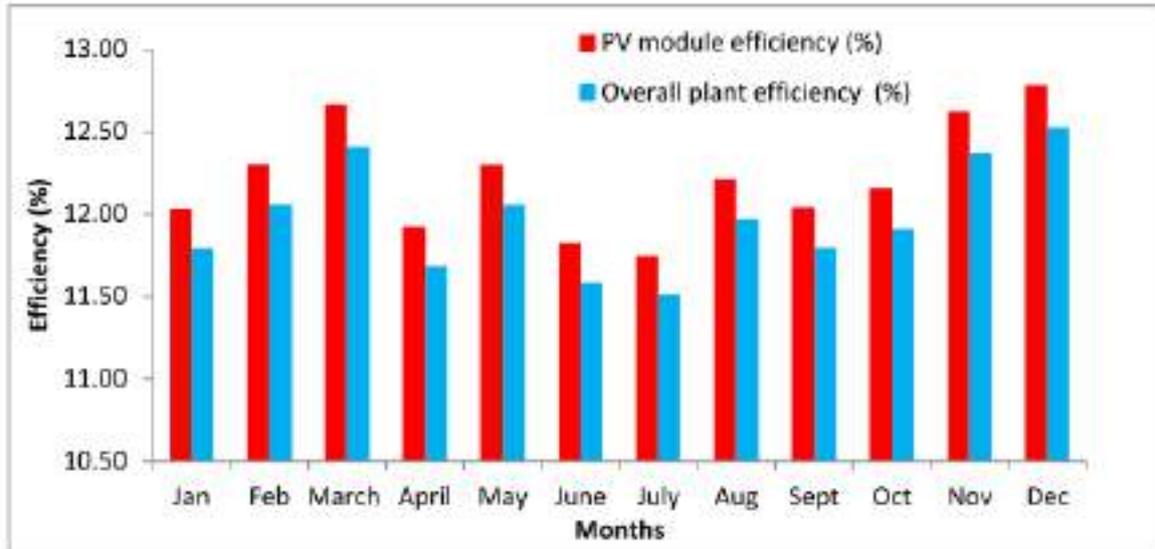
Source: <https://weatherspark.com/y/108316/Average-Weather-in-Jaipur-India-Year-Round>.



Ajith et. Al. [12], carried out the operational performance of 2 MWp solar PV plant in south India. The PV average utilization factor (CUF) and performance ratio (PR) is 73.4%. from June to august, which are part of the southwest monsoon

season was the most deficit generation for the PV plant due to rain-dominated monsoon tropical climates. The result amounted to 35% reduction in overall energy generation from the annual average generation.



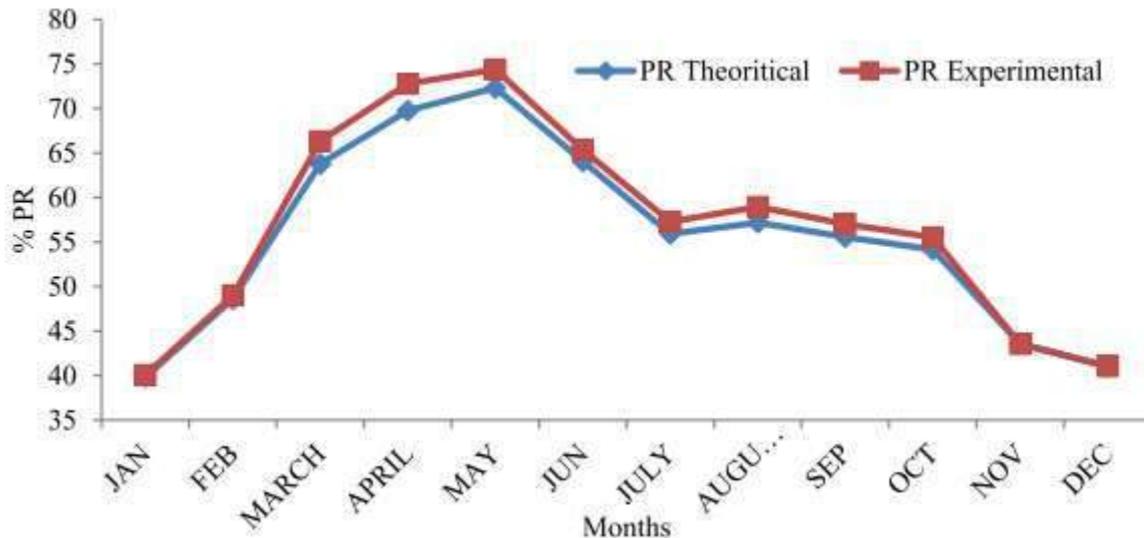


**Figure 5 Monthly variation of several factors during reference year**

Source: <https://weatherspark.com/y/108316/Average-Weather-in-Jaipur-India-Year-Round>.

Subhash et. Al. [13], evaluated the performance in local climates and it is observed that experimental performance is better by generating 703 more units than theoretical generation. From experimental method, 1.09% more modules and area, are required to compensate the losses while in

theoretical method 2.14% more modules and area, are required. Experimental annual PR is 56% while theoretical PR is 55%. Therefore, material and temperature dependent losses cannot be estimated by same approach also the type of module technology to be utilized is highly site dependent.



**Figure 6 Performance ratio variation in different methods.**

Source: <https://weatherspark.com/y/108316/Average-Weather-in-Jaipur-India-Year-Round>.

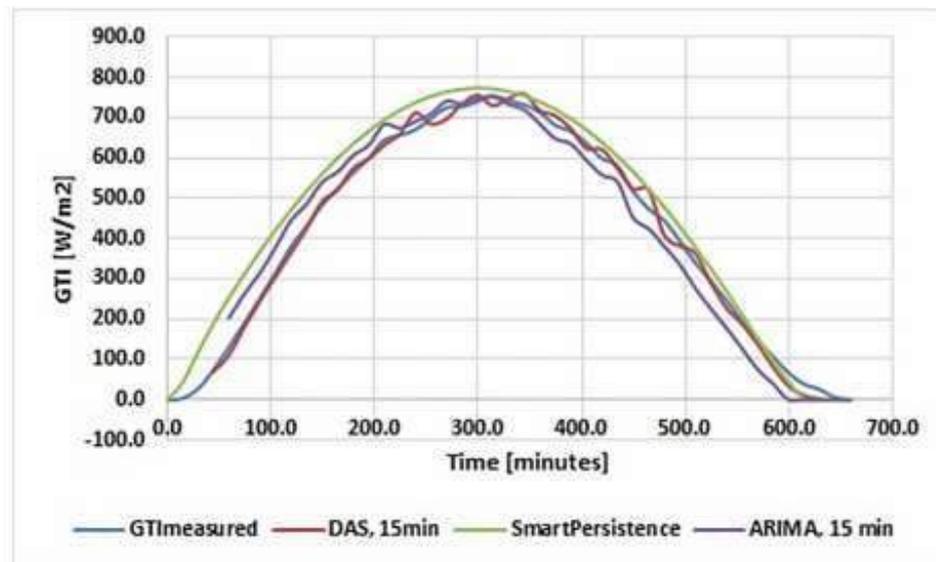
Subhra Das [14], conducted the short term forecasting of solar radiation and power output of 89.6 kWp solar PV plant. As we know solar forecasting is an essential tool in solar PV power

plant to improve quality of energy delivered to grid. Root mean square error (RMSE) and Forecast Score (FS) has been used to for accessing the quality of forecasting models. The proposed model for prediction of solar radiation on tilted surface is



simple and has very high accuracy. The proposed model is compared with smart persistence model & ARIMA model and it has been observed that it has

better RSME and forecast score than both smart persistence model and ARIMA model for both 15 & 30 minutes' time horizon.



**Figure 7 Comparison of measured versus predicted global solar radiation**

Source: <https://weatherspark.com/y/108316/Average-Weather-in-Jaipur-India-Year-Round>.

### RESEARCH GAP

Most of the prior studies on the performance of PV power plants are carried out for finding the main performance metrics of solar PV plants installed in different geographical locations. Even though some of the studies are conducted in different climates, no serious effort was made to study the impact of weather, especially the influence of the tilt angle, dust deposition and high temperature on utility-scale PV power plants. Despite the largest intensity of solar radiation during the summer months, a lot of PV power plants are being generating less power. In order to fulfil the research gap and to understand the performance loss due to above mentioned factors, a detailed study on the performance of utility-scale PV power plants in a composite climate, Jaipur (North West Part of State Rajasthan) is carried out.

### MATERIALS AND METHODS

The studies based on the analytical and measured outcomes of the solar PV plant at different climatic condition resulted to comparative analysis based on the following mathematical correlations:

#### Calculation of the efficiencies

The Instantaneous PV module efficiency ( $\eta_{PV}$ ) was calculated using equation (1),

$$\eta_{PV} = [P_m / I_t A_m] 100$$

$P_m$  is module output power,

$I_t$  ( $W/m^2$ ) is total inplane solar insolation and  $A_m$  is the area of module.

#### Monthly and annual electrical energy production

Hourly electric energy production of the PV system was calculated

$$E_h = G_t A_m \eta_m C_m$$

Here  $G_t$  is the total irradiance on module surface in an hour,

$A_m$  is the PV module area,

$\eta_m$  is the module efficiency and

$C_m$  is the number of modules

#### Performance ratio

This is the ratio of the energy that a PV plant can deliver to the grid to the energy that it can theoretically generate at STC conditions.

$E_{AC}$  = Produced AC energy during the considered time [kWh]

$\eta_{STC}$  = System efficiency at standard test conditions

$(STC)_{G_t}$  = Irradiation at the solar module area during the considered time [kWh]

$$PR = 100 [E_{AC} / \eta_{STC} * G_t]$$

$E_{AC,a}$  = Annual AC energy delivered to the grid (kWh)

PPV, rated = rated PV power (kW).



### Capacity factor

The capacity factor is an indicator that demonstrates the performance of a PV system according to the installation location and the type of installation. This value is calculated by dividing the annual AC energy produced by the system to the maximum energy that the system can produce as a result of its operation at rated power for one year

$$CF = 100 [E_{AC} / PPV_{rated} * 8760]$$

$E_{AC,a}$  = Annual AC energy delivered to the grid (kWh)

$PPV_{rated}$  = rated PV power (kW).

## RESULTS AND DISCUSSION

On the basis of cost analysis, it has been observed, the rooftop solar plant is a feasible solution as it provides a helping hand to meet the growing energy demand. Although, some challenges such as inflation rate, the current discount rate and life of the plant will remain with installation and generating but, can be mitigated with its long-term benefits. The current market scenario with low cost of renewable technology the role of other financial parameters affects the financial viability of the project therefore it is necessary to analyse all the parameters carefully before installing a PV plant especially in areas where land cost is a considerable parameter.

The studies showed that polycrystalline PV system for composite weather conditions like Jaipur seems to be a promising solution with minimum estimated performance of 77% with degradation rate of be 5%/year. The simulation tools such as MATLAB, Simulink, PV-syst are also generate very precise results which agrees with manufacturer values with the maximum relative error percentage is found 1.65%. A typical observation for the rainy season was obtained from a study for a 2MWp Utility-scale PV system for warm and humid climate zone of India in Kuzhalmannam, in the Palakkad District of Kerala, South India. The PV plant's average performance ratio (PR) is 75.02, with an average of 15.63% capacity utilization factor (CF) over the study period. The annual generation from the PV Plant is 2701467 kWh, with an average daily generation of 7420.780 kWh. The electricity generation during the summer months is highest because of the higher solar radiation during the season in this region. The electricity generation during winter months is also reasonably good because of the cleaner atmosphere and moderately lower temperature. System and capture losses are lower in rainy months, obviously due to lesser generation and solar radiation which is quite low as compared to dry climate of the country.

One of the comparative analysis of 2.5 MW solar PV power installation at Jaipur city with and without battery bank revealed that for off-site SPV

power plant is more promising as no battery required as all the power generated is supplied to the grid simultaneously and a centralized inverter is used with a step-up transformer also financial analysis shows that the off-site PV power generation option is better because of land scarcity near the city. The above analysis also concluded the to obtain maximum power density, single or double axis tracker should be preferred. However, due to financial or maintenance limitations If it is not possible than so one can fix the panel to optimal angle and get the maximum power. As this study also pointed out that for the optimum tilt angle month of May and June is  $5^\circ - 10^\circ$  and  $5^\circ - 2^\circ$ . Additionally, the annual average inverter, module and overall system efficiency values of the plant were found to be 97.88%, 13.59% and 13.29% respectively.

## CONCLUSION

The study and analysis of the actual solar PV system is the open ground to study and benchmark the generation for particular Jaipur City. In the recent studies it has been observed that the actual performance is considered based on the overall irradiation on the major portion of the area, as the irradiation for low distance grade is challenging to collect across the globe. Graphical representation of deviation in actual onsite solar energy generation depicts the substantial deviation of is consistent throughout the site in Jaipur. This deviation could be of multiple reasons which can be studied further for more accuracy. Although, some challenges such as inflation rate, the current discount rate and life of the plant will remain with installation and generating but, can be mitigated with its long-term benefits. The current market scenario with low cost of renewable technology the role of other financial parameters affects the financial viability of the project therefore it is necessary to analyse all the parameters carefully before installing a PV plant especially in areas where land cost is a considerable parameter.

## REFERENCES

1. Chandel M et al., *Techno-economic analysis of solar photovoltaic power plant for garment zone of Jaipur city*, 2014.
2. Khatri R, *Design and assessment of solar PV plant for girls hostel (GARGI) of MNIT University, Jaipur city*, 2016
3. Kumar S, Singh HK., *Experimental Study of Optimum Tilt Angle for Solar PV Panel in Jaipur (Rajasthan)*, 2015.
4. Jayswal V K., *simulation and optimisation of a solar panel: a case study for Suresh Gyan Vihar University Campus*, 2014.
5. Mohanty S, *Forecasting of solar energy with application for a growing economy like India: Survey and implication*, 2017.



6. Bhandari and Singh, *Performance analysis of flat plate solar air collectors with and without fins*, 2012.
7. Bano T., *Performance analysis of 1MW grid connected photovoltaic power plant in Jaipur, India*, 2017.
8. S. Nallapaneni Manoj Kumar, "Performance, energy loss, and degradation prediction of roof-integrated crystalline solar PV system installed in Northern India," *Case studies in thermal energy*, vol. 100409, 2019.
9. Vinod, "Solar photovoltaic modeling and simulation : As a renewable energy solution," *Energy Reports*, pp. 701-712, 2018.
10. Naveen. G. & A. k. Dahiya, "Solar PV-BES in distribution system with novel technique for DC voltage regulation," *Engineering Science and Technology, and International Journal*, 2020.
11. Ali Murat Ates, "Rooftop solar Photovoltaic (PV) plant – One year measured performance," *Journal of King Saud University–Science*, vol. 101361, p. 33, 2021.
12. Ajith Gopi, "Energy analysis of utility scale PV plant in the rain dominated tropical monsoon climates," *Case studies in Thermal Engineering*, vol. 101123, p. 26, 2021.
13. M. Subhash & B. Govinda Somani, "STRINGENCY ANALYSIS OF BUILDING ENVELOPE ENERGY CONSERVATION MEASURES IN 5 CLIMATIC ZONES OF INDIA," in *14th Conference of International Building Performance Simulation Association, Hyderabad, India.*, 2015.
14. S. Das, "Short term forecasting of solar radiation and power output of 89.6 kWp solar PV power plant," *Materials Today: Proceedings*, 2020.



## FLYWHEEL STORAGE SYSTEM

Vishal V. Mehtre<sup>1</sup>, Rupsi Sharma<sup>2</sup>

<sup>1</sup>Assistant Professor, Department of Electrical Engineering, Bharati Vidyapeeth  
(Deemed to be University) College of Engineering, Pune, Maharashtra, India

<sup>2</sup>Student, Department of Electrical Engineering, Bharati Vidyapeeth (Deemed to be University)  
College of Engineering, Pune, Maharashtra, India

### ABSTRACT

For the efficient use of available renewable energy in the form of solar, wind, geothermal, etc, reliable energy storage system is used so that variations in supply and demand can be smooth. The flywheel energy storage is a long lifetime uninterrupted power supply. Flywheel storage system is an alternative form of energy storage used in application like UPS, etc. This requires high power to energy ratio. For long run storage it's important that there is less amount of power loss or dissipation due to friction. In this way the flywheel storage system can store kinetic energy for very long time and durable.

**KEYWORDS:** Need for energy storage, Flywheel working principle, Kinetic energy, Flywheel components Power converter, Frequency regulation, Flywheel in uninterruptible power supply system, Flywheel versus battery

### 1. INTRODUCTION

FESS known as Flywheel energy storage systems stores electric energy in terms of the kinetic energy. FESS is variable technology for energy storage because it is environment safe, can sustain infinite charge/discharge cycles, and has higher power. Flywheel energy storage system is between high power. A high power electric machine is fitted with some extra weight to sustain the power for a long enough time. Energy storage system play an essential role in providing continuous and high-quality energy. Energy storage flywheel are usually supported by active magnetic bearing AMB systems to avoid friction loss. So it can store energy at high efficiency over a long duration. FESS are competitive for applications that need frequent charge/discharge at a large number of cycles. Flywheel also have the least environmental impact amongst the latest technologies, since it contained no chemicals. So it makes FESS a decent candidate for electrical grid regulation to improve distribution efficiency.

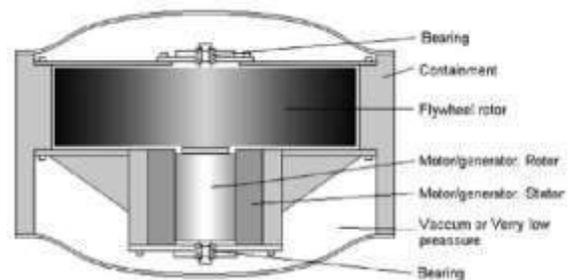


Figure 1. Basic scheme of the FES system

### 2. NEED OF ENERGY STORAGE

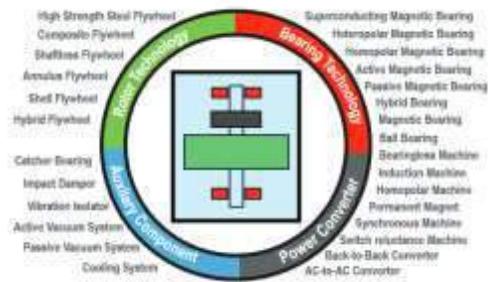
Energy storage system (EES) should provide three main functions, first, it plays a significant role in reducing the price of electricity by storing the electrical energy in off-peak hours to use it later in peak times. Second, it improves the power quality and prevent power fluctuation especially when it



is associated with renewable energy system such as solar energy and wind energy due to the changes in the climate. Third, energy storage system helps to achieve the balance between the proper amount of the generated electricity with the varying demand, this can be achieved by monitoring second-to-second fluctuations in demand. Consequently, the need for energy storage system can be summarized in the need of flexible and continuous supply to consumers even during the power network failures, such as voltage sag which happens due to overload and can last for milliseconds, A UPS system based on energy storage system keeps supplying the electricity to the load during the sag period. As a result, energy storage system helps to utilize more generated power from renewable energy with high reliability and flexibility.

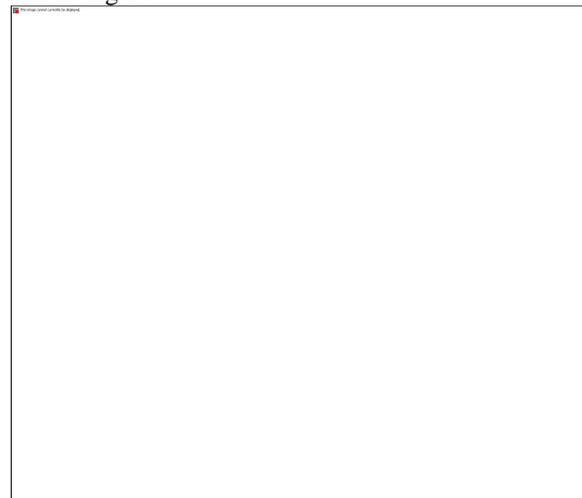
- 3. WORKING PRINCIPLE OF FESS :** Unlike the Electrochemical based battery systems, the FESS uses and electromechanical device that store rotational kinetic energy  $E$ , which is function of the rotational speed  $W$  and the rotor primary moment of Inertia.

A FESS consists of several key components such as rotor/flywheel, a bearing system to support the rotor/flywheel, a power converter system for charge and discharge, including an electric machine and power electronics. And other components, To achieve a higher energy capacity, FESS either inside a rotor with a moment of Inertia or operate at a fast spinning speed. Most of the flywheel rotors are made of either composite or metallic materials. When spinning the rotor is supported by operational bearings. The bearing can be either mechanical or magnetic. When spinning the rotor is supported by operational bearings are preferred for minimal standby loss and maintenance requirements. A mainstream choice is an electric machine like a motor/generator such as the device depicted. A motor/generator converts the kinetic energy to electricity and vice versa.



**Figure 2. A overview of system components for a flywheel energy storage system.**

- 4. CONSTRUCTION OF FLYWHEEL ENERGY STORAGE SYSTEM FESS :** Mostly modern high speed Flywheel storage systems consists of a massive rotating cylinder (a rim attached to a shaft) that is supported on a stator- the stationary part of an electric generator by magnetically levitate bearings. To maintain efficiency, the flywheel system is operated in a vacuum to reduce drag. the basic principle is using the electric motor to drive the flywheel to rotate at high speed, converting electric energy into mechanical energy to be stored, when necessary the flywheel decelerate and the motor runs as a generator, converting the kinetic energy of the flywheel into electricity, so the acceleration and deceleration of the flywheel realize the storage and release of electric energy. the basic structure of the flywheel is shown in the figure.



**Figure 3. Components of Flywheel System**



**Advantage of FESS**

- PMSM : higher power density,high efficiency small form factor
- IM less cost more rugged simple construction
- SRM more rugged simple construction
- BM high integration level
- MGR no power electronics more rugged simple construction

**Disadvantages Of FESS**

- Higher cost less robust
- Lower power density less efficiency
- Higher slip ratio
- Complex control less mature
- Higher cost and complexity
- Less mature

**5. COMPARISON BETWEEN FLYWHEEL AND BATTERIES**

The advancement in energy storage system have lead us to many energy storage devices but the ancient and still in use popular device is batteries, so let's see the comparison between these two rivals.

Category	Flywheel (4340 steel)	VRLA Battery
Life Span (Years)	20	5
Efficiency	95%	85%
Power Density (W/kg)	115	35
Hazardous Material	None	Yes
Maintenance	Limited	Extensive
Operating temperature	40 °	25 °
Embedded carbon emission (CO <sub>2</sub> /kg)	2.23	1.14
Total energy storageweight for 1MW (kg)	3,084	14,693
Total embedded carbon(CO <sub>2</sub> /kg)	6,785	16,750
15years replacement	0	3
Total life cycle embedded carbon	6.785	67,002
Cost (\$ / kWh)	~1000	~360

**Table 1: Comparison between flywheel and VRLA battery**

**6. CONCLUSION**

In this paper, some of the characteristics of the flywheel storage system have been discussed which will be helpful to select the flywheel storage system over batteries will be very efficient and it improve the power quality and enhancement of the network reliability and stability. We have also gone through the construction and the working principle behind the Flywheel Storage System. Flywheel Storage System are now used extensively in many applications related to power system such as telecommunications, utilities load leveling, and even in some additional applications in satellite engineering as well.

**7. REFERENCES**

1. K. Murakami, M. Komori, and H. Mitsuda, "Flywheel energy storage system using SMB and PMB," *IEEE Transactions on Applied Superconductivity*, vol. 17, no. 2, Jun. 2007.
2. M. Subkhan and M. Komori, "New concept for flywheel energy storage system using SMB and PMB," *IEEE Transactions on Applied Superconductivity*, vol. 21, no. 3, Jun. 2011.
3. I. Vajed, Z. Kohari, L. Benko, V. Meerovich, and W. Gawalek, "Investigation of joint operation of a superconducting kinetic energy storage (Flywheel) and solar cells," *IEEE Transactions on Applied Superconductivity*, vol. 13, no. 2, Jun. 2003.
4. T. Aanstoos, J. P. Kajs, W. Brinkman, H. P. Liu, A. Ouroua, and R. J. Hayes, "High voltage stator for a flywheel energy storage system," *IEEE Trans. Magazine*, vol. 37, no. 1, pp. 242-247, 2001
5. T. Zouaghi, F. Rezeg, and A. Bouazzi, "Design of an electromechanical flywheel for purpose of renewable energy storage," in *Proc. International Renewable Energy Congress, Sousse, Tunisia, Nov. 5-7, 2010*.
6. H. Mitsuda, M. Komori, A. Inoue, and B. Nakaya, "Improvement of energy storage flywheel system with SMB and PMB and its performances," *IEEE Transactions on Applied Superconductivity*, vol. 19, no. 3, Jun. 2009.
7. Rashid, M.H.; Kumar, N.; Kulkarni, A.R. *Power Electronics: Devices, Circuits, and Applications*, 4th ed.; Pearson: Essex, UK, 2014
8. Babuska, V.; Beatty, S.; DeBlonk, B.; Fausz, J. A review of technology developments in flywheel attitude control and energy transmission systems. In *Proceedings of the 2004 IEEE Aerospace Conference, Big Sky, MT, USA, 6-13 March 2004; Volume 4, pp. 2784-2800*
9. Shelke, P.R.S.; Dighole, D.G. A Review paper on Dual Mass Flywheel system. *Int. J. Sci. Eng. Technol. Res.* 2016, 5, 326-331



10. *Pena-Alzola, R.; Sebastián, R.; Quesada, J.; Colmenar, A. Review of Flywheel based Energy Storage Systems. In Proceedings of the 2011 International Conference on Power Engineering, Energy and Electrical Drives, Malaga, Spain, 11-13 May 2011.*



## IMPACT OF GREEN ROOF ON HEATING AND COOLING IN CONTEXT OF DIFFERENT CLIMATIC ZONES IN INDIA

**Ar. Ankur Bhardwaj<sup>1</sup>, Dr. Shweta Chaudhary<sup>2</sup>, Ar.Kirti Varandani<sup>3</sup>**  
*<sup>1,2&3</sup> CODE, Vivekananda Global University, Jaipur, Rajasthan, (India).*

Article DOI: <https://doi.org/10.36713/epra7466>  
DOI No: 10.36713/epra7466

### ABSTRACT

*The ecological, social and visual commitments that green roofs can make towards sustainable living in more intensified urban centres are generally recognized around the world. Green roof is one such sustainable methodology, utilization of which causes us in insulating the buildings and, subsequently contributing to better energy proficient execution of the same. Green roofs additionally give environment to various species, lessen the rainwater runoff and better deal with the carbon-dioxide cycle. In spite of these advantages, 'Green roofs' are not as basic an element in India as they are in other European and American urban areas. In this paper an attempt has been made to enhance the advantages of this innovation in India.*

*Green roofs systems looks simple in terms of setting up, but actually very complex in maintaining and achieving sustainability. In depth study of green roofs, historic background, climatic zones, impacts of green roofs on heating and cooling, benefits, problems and opportunities is done with the help of data taken from secondary sources like books, magazines and published literature (articles, journals, conference proceedings) form various e-libraries and other online platforms.*

**KEY WORDS:** *Heating, Cooling, Green Roofs, Sustainability)*

### INTRODUCTION

Green infrastructure uses vegetation, soils, and natural processes to manage water and create healthier urban environments, providing traditional roof services and alternative storm water management technologies. Currently, climate change and the scarcity of natural energy resources are topics of interest in many countries. Furthermore, cities continue to grow and expand their peripheries to accommodate increases in rural migration to urban area. (CasconeOrcID, 2019).

The percentage of population that lives in the urban areas at present, there is unavailability of greens in the country. This situation has led to the lack of greenery. In short, we can say that there has been blocking of the urban environment which has led to rise in the temperature and thus ecology has been disturbed. (Vijayaraghavan, 2016).

Thus there is need for climate responsive design techniques and use of local and sustainable materials to overcome the issue of urbanisation and climate change. Increase in the vegetation can help to combat the problem. Thus green roofs fit best for the Indian scenario where the development is taking place at a very high pace and thus effecting the climate as here Structures represent 35% of total energy utilization in the country now, thus structure's energy use is developing at 8% yearly. (Himanshu Poptani, 2014).



It is one such sustainable approach, use of which helps us in insulating the buildings and, thereby contributing to better energy efficient performance of the building. Green roofs can help to mitigate the heat island effect in cities and other constructed areas with minimal vegetation, especially during the day. (Agency, n.d.).

The benefits of green roofs in cities have been split into seven categories: thermal impacts, rainfall drainage, and aesthetics.

Others include design and building, plants (flora), noise reduction, and air pollution abatement.. (Wiecek, 2019)

Relationship of the building envelope with the encompassing climatic conditions is liable for the comfortable environment. The rooftop has been discovered to be the main underlying component of structures in a hot climate by displaying and recreation of energy streams in present day homes. (Reddy, 2004)

The growing number of buildings in metropolitan areas with green roofs adds to the expansion of biologically active areas while also lowering the average ambient temperature. The consequences of the urban heat island are reduced as a result, the use of green roofs in cities will also be conducive to the protection of biodiversity in urban areas. (Wiecek, 2019)

## **CO-RELATION OF GREEN ROOFS WITH CLIMATIC ZONES**

Taking the case of UK, the built structures are answerable for 45 percent of CO<sub>2</sub> discharges. A high extent of these emanations are from heating and cooling the internal climate. Lessening the energy utilization of the UK's built structures will decrease their commitment to environmental change. The IPCC (Intergovernmental Panel on Climate Change) had discovered that structures give probably the best, cost- effective and quickest freedoms to handle environmental change. Thus Green roofs can fundamentally diminish the cooling heaps of structures, bringing about decreased air cooling prerequisites and hence decreased energy utilization and the related yield of environmental carbon dioxide.(www.ukgbc.org ).The other example can be the colder environments of London, Moscow and Montreal advantage the least, arriving at daytime normal reductions from 1.7 to 2.1o C and maxima from 2.6 to 3.2o C for the green-walls case and from 3.0 to 3.8o C and from 3.6 to 4.5o C, separately. It may be said that, the more hotter and drier an environment is, the more significant the impact of living roofs on moderating cities temperatures is.(Alexandri and Jones, 2008)

Green roofs have a positive function in rooftop thermal conduct in various environments which the

pace of their productivity relies upon the environment that they are situated in. (Ahmadi et al., 2015). Our country is home to a phenomenal assortment of climatic zones, going from sub-tropical in the south to sub-mild mountains in the Himalayas. In view of the geological highlights, the nation is grouped into 15 Agro climatic zones with 20 Agro natural zones and 72 sub divisions. Unquestionably, Indian homesteads face an assortment of climate limits because of huge variety in climatic conditions. As indicated by NBC 2016, climatic zones in our nation are isolated into 5 zones . Each climatic zone doesn't have same environment for the entire year; it has a specific season for over a half year and may encounter different seasons for the leftover time frame. (NBC, 2017)

The significant job of a green rooftop like some other rooftop is to give cover from heat, cold, day off, and wind. A green rooftop is just a convective roof with soil and plant layers in addition to a waterproofing covering. Green rooftops as referenced before relies upon different boundaries like protection, vegetation type etc. All of these parameters fluctuate and are affected by the environment zone they are found. Contractors and Clients in spite of the fact that comprehend the significance of a living roof, they don't have truly necessary information in regards to the variety in green rooftop development concerning the environment to profit the most extreme investment on energy. Having accurate information about the various types of green rooftop development based on the climatic zones in which they are located can benefit in terms of energy savings and so make it more monetary. This would overall be able to expand the development of these living rooms across the globe. Since green rooftop relies upon soil creation, plant type, climatic condition, and so forth on location estimated information needs to be gathered before installing the living roofs on the structure or any building. The measure of warmth sent into or lost from a structure differs with the change from day to evening time temperatures and changes through fluctuating climate, for example heating by daylight and cooling by wind. The appropriate design and determination of a building envelope is a proficient way to decrease the space heating cooling loads (Kaynakli 2012).

The principle design factors that should be considered for plan of energy productive structures are dividers, rooftop, arrangement and size of openings, proportion of window/divider territory and arrangement of legitimate concealing gadgets. These components have been talked about finally in past section. Green roofs most ordinarily alludes to vegetative rooftop frameworks that contain live plants on the rooftop layer. Vegetative rooftops are

named either serious or broad, in light of planting medium profundity. Intensive vegetative rooftops are the more considerable rooftop regular and oblige the development of trees and bushes. They require a planting mechanism of at any rate 1 foot inside and out and can reach up to 3 feet top to bottom. Extensive vegetative green rooftops are more slender, lighter frameworks utilizing vegetation of grasses or sedums that have shallower root structures (Cavanaugh 2008).

The Green roofs have been examined from a very long time in numerous urban communities

around the planet as an instrument to take care of numerous issues in the cities climate. The green rooftops introduced a comparative picture with respect to their mid-year surface temperatures in warm and humid and hot and dry climates. Another investigation on life cycle evaluation of green rooftops proposed that they are as of now not cost effective on a private expense premise, however multifamily and business building green rooftops are serious when social advantages are incorporated (Blackhurst et al. 2010).

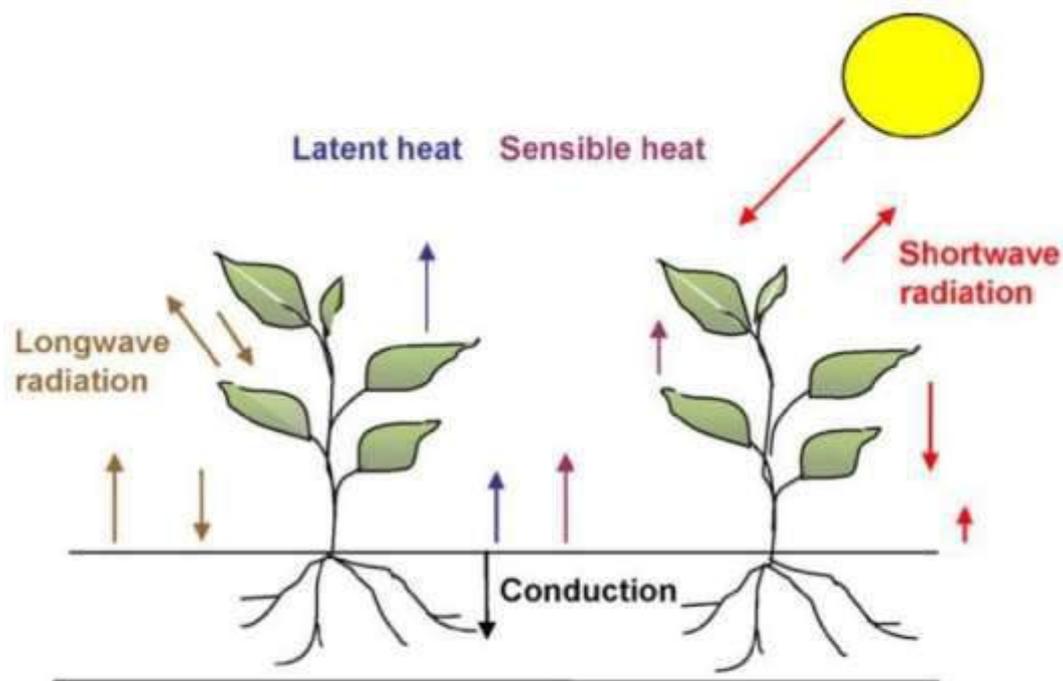


Figure 2 Surface energy Balance of green RoofsSource: Source: Stuart et al., 2009

Analyses directed by Stuart et al. (2009) showed that the warmth balance technique utilizes the guideline of energy preservation to ascertain heat moves and the convective warmth streams are controlled by heat move condition for surface and air temperatures in various climatic zones. The hydrologic water vanishing technique is supported for observing the impact of long haul energetics because of vegetation changes.

Different numerical examinations have been done on ventilated lightweight low inclined rooftop, ventilated rooftop without warm protection and air temperature variety with ventilated cavity. Numeric studies demonstrated that energy saving surpassing 30% can be accomplished by utilizing ventilated rooftops in summer, contrasted with a similar non ventilated design. Normally ventilated pit rooftop was discovered to be better than the single rooftop in

bringing down the usable temperature. (Susanti et al. 2008, 2010, 2011). A venturi formed rooftop can drive the normal ventilation of the structure zones. This rooftop idea into the system has been talked about by Bronsema (2010). Diverse plan setups of the venturi shaped rooftop were examined: without controlling vanes, with managing vanes at each 900 span and with directing vanes at each 100interval etc. The numerical studies indicated that expanding vent size brings about higher ventilation wind current rate however doesn't affects the attic heating load, and both adequate ventilation and protection are expected to guarantee the appropriate function and its energy effectiveness (Wang et al. 2012).

The vaulted rooftop and level rooftop in different climatic conditions demonstrated that vaulted rooftops are just appropriate for hot and dry environments, because of the presence of bigger



pillar part of the sun oriented radiation which is successfully reflected by the bended rooftop surface, and less for warm and sticky environments. In hot and dry climatic conditions vaulted and domed rooftops are very mainstream in the vernacular design. Vaulted rooftops assimilate more warmth during the daytime than level rooftops, they additionally disseminate more warmth through characteristic convection and re-radiation particularly during evenings in run of the mill desert environment that encounters colder encompassing temperatures. High warm separation happens inside vaulted rooftop structures, with practically 75% of the delineation occurring in the volume under the vault, keeping the lower a piece of the structure space cool. The hot air can be depleted close to the highest point of the peak dividers of vaults (Tang et al. 2006).

### IMPACTS OF GREEN ROOFTOPS ON HEATING AND COOLING UTILIZATION OF STRUCTURES

Generally, green rooftops were known for capacity of giving warm protection in cold environments and to shield from overheating because of the high sun oriented openness of rooftops in warm environments. These properties were greatly valued in times when thermal insulation materials and 'cool' materials were not accessible. In current period, these properties are as yet viewed as the principle benefits that a green rooftop can give to a structure, however as of not long ago this information had just a subjective character since there could have been no additional data to report this position. (Theodosiou, 2009)

The requirement for more proficient and harmless to the ecosystem urban structure needs to achieve the goal of sustainability, researchers have been examining green rooftop innovation to convert data from a subjective to a quantitative structure in order to abuse and enhance the commitment of green rooftops to the energy execution of buildings. (Issa et al., 2012)

India has all the climates of the world, however the climate in a large portion of the nation is really tropical and influenced by the rainstorm system, with a dry and a rainy season. The rains are exceptional and enduring relying upon zone, and wettest period is from July to September, besides in the southeast, where the withdrawing rainstorm proceeds until the year's end. The hottest period by and large runs from April to mid-June, for example prior to the appearance of the rainstorm, so the schedule's spring is in a way the genuine summer. Winter period is from December to February. (NCERT, 2020)

### CONCLUSION AND FUTURE CONSIDERATIONS

Sustainability is a very broader area and open ended, likewise one cannot achieve it in a single day or by focusing on a particular thing but it can be achieved with a holistic approach by practicing various elements and factors of the same. Green roof is also a milestone in the path to reach sustainable future. There is a gap in the green roof technology i.e. climate responsive green roof or we can say adaptability of green roof technology according to different climatic zones. With the above study it is clear that we can achieve more sustainable green roof which will be beneficial in every term such as environmental benefits, reduction of pollution, cost effectiveness, low maintenance and also better energy performance which will lead to a better building envelope and if practiced in every building, we can also achieve a sustainable urban envelope. To further study and analyze the relation of green roofs with respect to climatic zones, a detailed research can be done by taking a specific case of a climatic zone to analyze and frame the strategies for efficient climatic responsive green roof technologies in the field of architecture for a sustainable and healthy future.

### REFERENCES

1. Al-Kodmany, M. M. (2012). *Tall Buildings and Urban Habitat of the 21st Century: A Global Perspective*. Buildings, 384-423.
2. Areas—Review, T. I. (2009). Dariusz Suszanowicz and Alicja Kolasa Wiecek. *Atmosphere*, 1-17.
3. Burn, T. E. (2003). *Permafrost*. Elsevier Science, 1717-1730.
4. CABA. (2021, February 1). *Climate Association Business Association*. Retrieved from [cabaus.org](http://cabaus.org): [cabaus.org](http://cabaus.org)
5. Cascone, S. (2019). *Green Roof Design: State of the Art on Technology and Materials*. Sustainability, 1-27.
6. Environmental Protection Agency, United States. (2021, January 21). *United States Environmental Protection Agency*. Retrieved from [epa.gov](http://epa.gov): <https://www.epa.gov/heatislands/using-green-roofs-reduce-heat-islands>
7. Himanshu Poptani, A. B. (2014). *Extensive Green Roofs: Potential for Thermal and Energy benefits in buildings in central India*. 30th INTERNATIONAL PLEA CONFERENCE 16-18 December 2014, CEPT University, Ahmedabad (pp. 1-8). Ahmedabad: CEPT University.
8. *Livingroofs.org*. (2021, February 16). <https://livingroofs.org>. Retrieved from [Livingroofs.org: https://livingroofs.org/energy-conservation/](https://livingroofs.org/energy-conservation/)
9. Musa Akther, J. H. (2018). *A Review of Green*



---

*Roof Applications for Managing Urban Stormwater in Different Climatic Zones. sustainability, 1-28.*

10. NBC. (2017). NATIONAL BUILDING CODE OF INDIA 2016. CHENNAI: BIS for LARSEN AND TOUBRO CONSTRUCTION - MANAPAKKAM.NCERT.(2020,December29).Climate-NCERT. Retrieved from [ncert.nic.in: https://ncert.nic.in/ncerts/viess104.pdf](https://ncert.nic.in/ncerts/viess104.pdf)
11. Rufai Mohammed Ahmed, A. P. (2016). An Evaluation of Green roofing in Buildings. *International Journal of Scientific and Research Publications*, Volume 6, Issue 1, 366-373.
12. Theodosiou, T. (2009). Green Roofs in Buildings: Thermal and Environmental Behaviour. *Advances in Building Energy Research*, 271-288.
13. United Nation Human Settlement Programme. (2008). *Best Practices on Social Sustainability*. Illus: UNESDOC.
14. Vijayaraghavan, K. (2016). Greenroofs: A critical review on the role of components, benefits, limitations and trends. *Renewable and Sustainable Energy Reviews*, 740-752.



## ASSESSMENT OF THE PROBLEMS IN THE MANAGEMENT OF URBAN HOUSING (A CASE STUDY OF OWERRI MUNICIPALITY, IMO STATE)

Nwabueze, O.p.O<sup>1</sup>, Onwuka, E.O.<sup>2</sup>, Uzomba, N.I<sup>3</sup>, Ekeh, C.U.N<sup>4</sup>,  
Akuesi, C.U<sup>5</sup>.

<sup>1</sup>Department of Urban and Regional Planning

<sup>2</sup>Department Building Technology

<sup>3</sup>Department of Microbiology/Biochemistry

<sup>4</sup>Department of Estate Management

<sup>5</sup>Department of Environmental Microbiology

Federal Polytechnic Nekede, Owerri, Imo State

Corresponding Authors: Uzomba, N.I

Article DOI: <https://doi.org/10.36713/epra7310>

DOI No: 10.36713/epra7310

### ABSTRACT

*The high rate of migration, coupled with population increase triggered rapid urbanization. However, a great proportion of the population still lives in substandard and low quality houses in a deplorable unsanitary residential environment particularly in developing countries. Urban and Economic growth have brought about all typical problems associated with rapid urban development resulting in housing shortage both quantitative and qualitative, slums, illegal settlement and squatting as experienced in owerri municipality. These have resulted into many urban and housing problems within the state capital owerri. This study examined the nature of urban growth and housing problems in owerri municipality. Also it tries to examine residential housing stock, identity the nature of housing problems, government policies and programmes in other to address the problems. The pattern of growth was determined using spatial analysis, and the housing problems were identified through questionnaire and field surveys. Findings revealed that the growth of urban housing in owerri municipality increases by 1034.0 hectare which is equivalent to 38.5% which is in line with Maurice (2004). It was also discovered that over a period of time, new settlements have evolved. Also, the construction and expansion of road networks are evidences of urban growth in owerri municipality.*

**KEYWORDS:** Development, Urban growth, Housing problems, population, owerri municipality.

### INTRODUCTION

This is a study of an assessment of management of housing problem in urban areas of Nigeria using Owerri municipality council as a case study. Housing generally has not been ranked high on the scale of priorities for social expenditure and state governments have been relying upon local council authorities to meet up with the challenges faced by urban dwellers. Efforts aimed at developing low-cost urban housing have been minimal despite the creation of the federal mortgage Bank of Nigeria in 1977 to alleviate the problems of housing in urban areas. Overcrowding



has been a problem in these areas and it has been estimated that about 85% of the urban population live in single rooms, often with six to eight persons per room. In 1996, only about 27% of urban dwellers had access to portable water supply and less than 10% of urban dwellers have an indoor toilet. As of 1979, about 3720 of all housing units were cement or brick roofed with asbestos or corrugated iron, 34% were mud plastered with cement and roofed with corrugated iron. In the same vein, 44% of urban dwellers were rented, 37% were owner occupied, 17% were rent free and 2% were “quasirented” at below-average rates and the total number of housing units in 1992 was 25, 661, 000 (National housing policy, 2011).

The revised draft for the national housing policy, (2011), defines housing as the process of simultaneous production (building to target prices of large number of decent, safe sanitary and affordable residential building with secure tenure on a continuous and prevalent basis with adequate physical infrastructure, amenities and social services in a planning healthy and livable environment to meet the basic and special needs of the population and reflecting their social economic cultural aspirations and references. In Nigeria, problems in the management of urban housing are enormous and complex, showing apparent and marked regional differences in most urban centres is not only restricted to the quality of housing stock but also to the quantity of available housing units infrastructure and the environment. The result is manifested in growing overcrowding in houses, neighborhoods, communities and increasing pressure on infrastructural facilities such as roads drainages, power supply and rapidly deteriorating environment. The provision of housing in a given area may be linked with specific policies which include the free market approach where people are expected to participate in the building of houses for themselves as well as the government embarking on construction of housing estates at subsidized rate. The study area Owerri municipality has a mixed population, predominantly civil servants, with increasing administrative, commercial and industrial activities. People from all walks of life are attracted to the area resulting to high population density. The establishment of federal tertiary institutions in Owerri such as Federal University of Technology Owerri (FUTO), Alvan Ikoku Federal College of Education Owerri, Federal College of Lands Resources and Technology Oforola, Owerri, and State Owned tertiary Institutions close to the center of the town have added to the population as well as increase in the demand for residential accommodation, offices and shops.

## AIM

The paper is an attempt at accessing the problems of the management of urban housing in Owerri municipality in order to solve the urban housing problems of the inhabitants of the city, mostly Civil servants whose income are not enough to build their own houses.

## OBJECTIVES

1. To examine the nature of housing problems in Owerri municipality.
2. To identify the causes of the problems associated with residential housing in Owerri.
3. To examine possible solution at solving these problems.
4. To examine the existing policies in Nigeria towards solving the housing problems.

## RESEARCH QUESTIONS

1. Characteristics of housing problems in Owerri Municipality.
2. Income levels of the respondents.
3. Occupational status of the respondents.
4. Respondents refuse dump site.
5. Age status of the respondents.

## HYPOTHESES

1. There is no significant relationship between characteristics of the houses and problems of the urban housing.
2. There is no significant relationship between refuse dump site and problems of urban housing.

## LITERATURE

Housing is one of the three basic needs of mankind and it is the most important for the physical survival of man after the provision of food. Adequate housing contribute to the attainment of physical and mental health of a



nation and stimulates the social stability, work efficiency and development of the individuals. The Nigeria housing policies and programmes are in crises situation, manifesting and expressing itself in quantitative and qualitative forms there is lack of comfort and rudimentary infrastructure, congestion, unhygienic environment, high density population in or surrounding occurs in our urban centers. The spatial product of these problems is not only in the emergence and deployment of slums and squatters of various forms but in the proliferation of suburbs (Abiodun, 1998)

### **A. ECONOMIC GROWTH AND URBANIZATION IN NIGERIA**

Economic growth is one of the important determinants of urbanization in any country of the world. It emphasizes equitable distribution of goods and services, provision of employment opportunity and other services needed by human (Oberai, 1992).

The level of Urbanization of any country refers to percentage of the total population of the country that lives in the towns and cities therefore urbanization expresses the growth of towns at the expense of the rural areas. It is a measure of the shift of population from one end to another side (Maurice, 2004). The four major determinants of urbanization includes,

- (i) Economic growth and development
- (ii) Rural-urban Migration
- (iii) Technology change
- (iv) Rapid growth in population in developing nations like Nigeria.

Urbanization parameters progresses at a phenomenal rate without any articulated policies to stem its tide. The dynamics of this processes reviews that less than 15% of the population lived in cities of 20, 000 or more population by 1950, and in 1975, this proportion increase to 23.4% and by the year 2025, the proportion has risen to 13.3%. It is said that in 2025, more than half of the country's population will live in urban centers (Mabogunje, 2003).

### **B. NIGERIAN'S HOUSING PROBLEM**

Many renowned scholars as well as distinguished regional and international organization concerned with urbanization and housing at global levels have long expressed immense anxieties over the alarming nature and dimensions of the housing problems in the nations of the developing world like Nigeria, Brazil, and Egypt. This crises situation in urban housing in this integrated forms has surpassed the terrenes of the social; sphere, reproducing itself in the economic political and environmental processes of these nations of the third world countries (I.A.H.S., 2005).

In Nigeria most people live in poor quality housing and in unsanitary environments. The problems of inequality housing have been compounded by the rapid rates of urbanization and economic growth. Housing difficulties is more serious for the low income groups where problems have been complicated by rapid growth, inflated real estate values, speculative activities and influx of poor immigrants and lack of planning. Some of the factor responsible for shortage of housing in Nigeria includes

#### **1. National Economy**

The economic situation of the country which is the bases of any country has passed through many stages. The rapid increase in prices of petroleum products in 1980's that follows the period of boom result in a near collapse of the economy today due to total dependent on the petroleum oil (Anugwom, 1995). Devaluation of Nigerians currency has made importation of building materials a difficult one.

The cost of acquisition of land and building a residential accommodation have gone up that some investors feel that it is risky investing in the housing sector and this means that new houses are not forthcoming to augment the already existing stock of houses (Austin, 1991). Also increase in population of our cities as a result of rural-urban migration for greener pastures by our youths, school leavers graduates, business men without a corresponding increase in the provision of housing is a major factor urban housing problems. (Okeke, 1983).

#### **2. Land tenure**

One of the important problems of housing is land. The fragmentation of the land and heterogeneous nature of our communities which has various ethnic groups that has land tenure arrangement distinguished from those of others, even the land decree of 1928 could not resolve the problem completely. The land tenure system leads to enormous problems in acquiring land for housing (Igbozuruike 1981)



### 3. Cost of land acquisition

The acquisition of land in our urban areas is very expensive and has made affordable by only the rich in the society. The middle class and others are forced to move to the outskirts of the cities. The high cost of land brings about stockings of land thereby reaching the number of housing units (Maurice, 2004)

### 4. High cost of building materials

The cost of building materials in our markets are high and this has contributed in a great measure in reducing the housing units in our urban areas. Mabogunje, (2003) observed that with the rate in increase in building materials, construction of new buildings would be a herculean task. People's intention of erecting new structures for residential purposes are discouraged by the cost of building materials thereby making the plans unrealizable and the problem of housing estate lingers.

### 5. Increase in rent

The construction of building involves huge capital. A high risk interest rates and inflationary trend in the economy have affected activities in the housing sector adversely. An investor in the housing stock finds it difficult to secure credit from financial institution. This is because high interest means high cost of fund which implies that the supply end of the housing sector will be stagnant. Households, therefore are made to pay high rent which encroaches very much into their income (Adeniyi, 1981).

## PROBLEMS OF PROPERTY DEVELOPMENT

Development is defined under section 22 of town and country planning Act 1991(British) as the carrying out of building engineering, mining or other operations in, on, over or under land, or making of any materials change in the use of any building or land. Property development in Nigeria faced with a lot of problems which has affected it seriously includes,

### 1. Lack of fund

Igbozuruike (1981), observed that fund is the backbone of any forum of development. To end this, projects requiring huge sum of money cannot effectively be financed by private bodies which most of the time are not completed due to lack of funds and as a result, property development suffers. This implies that only public authorities embark on big property development projects.

### 2. Acquisition of land

Developers are faced with the problems of acquiring land for developmental purposes. According to Jude (2012), the land use Act of 1978 caused more problems than it can solve. Individuals holding of land in small portions has continued to pose a very big problems. Even if the land is acquired, provision of alternative accommodation, rehousing or disposed occupiers and payment of compensation is not an easy task.

### 3. Unavailability of credit facilities

Okeke,(1983), observed that financial institutions are the bedrock of anti-capital intensive development. Based on facts above, unavailability of credit facilities like loan, overdraft and high interest rates on the borrowed money has discouraged a lot of developers, thereby making property development suffer.

### 4. Political instability

Changes in political leadership over time has contributed a lot in the problem of housing development. Each administration comes up with its developmental plans, leaving behind the already existing plan lain down by its predecessors and embarking on a new project. This action always results in uncompleted projects, waste of resources and time (sada, 1990)

### 5. Technology and labour

According to Abiodun, (1998), the level of development in any country is greatly determined by its available technology and workforce. The type of technology required for certain development and re-development are lacking in our country. New innovations and changes in design are not yet obtainable in the country. The required manpower for specific jobs is lacking and one do not have enough skilled and semi-skilled labour that has the needed skill to supervise some developmental projects.

## ECONOMIC AND SOCIAL BACKGROUND OF OWERRI

Owerri was an administrative centre of government in early 1960's. Presently, it is the administrative capital of Imo state of Nigeria. It houses the seat of government and other ministries in the state. There are presence of



serious commercial activities going on in the area. Stores are located in the area mainly used by traders for the sales of some of their goods like electrical appliances, pharmaceuticals, food items. In the 1960's people embarked on the building of bungalow, tenace houses and tenement buildings but since the creation of Imo state in 1976 and Owerri was named the state capital, there has evolutions of flats, duplexes, estates etc. This has resulted to the increase in house rents and demand for houses as a result of over population of the city center. Owerri have mixtures of great number of low income earners, medium income group and few privileged high income group. The flats and duplexes cannot be affordable by the low and medium income earners resulting in a high rush for tenement building most of which are deteriorated and obsolete, thereby causing over usage of existing facilities present in these building.

## **SOCIAL BACKGROUND**

Owerri is composed of some societal infrastructure which includes road networks that lures it with other major cities in the country. There is the provision of medical services owned by the government and private ones. The cities houses almost all the federal and state institutions of higher learning. Other social amenities like pipe borne water supply from the water board, star hotels located in every nook and crannies of the city, recreational facilities and business centres found in the city. With the position Owerri, commercial activities, private companies and government ministries has contributed to the increase in the population of the area and resulting to the social ills and violence experienced in the city center. Irrespective of the presence of the military and police with their stations situated within the urban center, the crime rate and violence continues to increase

## **RESEARCH METHODOLOGY**

### **METHOD**

#### **Description of Study Area**

Owerri is the capital city of Imo State and from National Population Commission (2013), Owerri municipality and its environs has a total population of 220,660 residence. This population comprises of civil servants, businessmen and the other professionals who occupied over 10,000 residential buildings

### **STUDY POPULATION**

Eligible occupants of the municipality of 120 people used for this study were drawn from different locations of the municipality. The questionnaires contains 25 questions which centres mainly on the problem of urban housing encountered by the residents of the municipality

### **RESEARCH DESIGN**

Data used for this study were collected from primary and secondary sources. This operation was useful to determine the event of the growth of Owerri municipality area over the period of study. Questionnaire and field survey were employed to identify the housing problems in the municipality. Secondary data were sourced from published works and owerri municipal council. Other sources of information includes; personal observations, interviews with private developers and traders of building materials as well as government officials. A record of the existing public and private housing stock was used to determine the extent of residential development in the municipality. A reconnaissance and the land use survey of the area carried out to update the existing structures in the area of study

### **DATA ANALYSIS METHOD AND STATISTICAL TOOLS USED**

1. The research was presented and analysis of the data was done using frequency distribution and sample percentages; while Chi-square ( $x^2$ ) was used to test hypothesis.



## FINDINGS AND DISCUSSION

**Table 1: Age status of the respondents**

Age (years)	Frequency	Percentage (%)
0-15	0	0.0
16-30	44	36.7
31-45	64	53.3
46-60	12	10.0
61 and above	0	0.0
Total	120	100

About 53.3% and 36.7% of the respondents respectively of the belongs to 31 – 45 and 16 – 30 age groups which indicates that the respondents can provide important information on the subject of study. The finding showed that 62% of the respondent's males and 38% female in which 45% are married and expected to bear children which are an indication that there is the tendency of population growth in this area in the nearest future.

**Table 2 occupational status of respondents**

Occupation	Frequency	Percentage (%)
Civil servants	47	39.2
Farmers	7	5.8
Traders	14	11.7
Self employed	16	13.3
unemployed	36	30.0

Occupation is an important socio economic variable as it is used to determine the standard of living of the respondents. The table 2 above shows that the majority of the respondent with 39.2% are civil servants while about 13.3% are self-employed, 11.7% are traders and about 5.8% are farmers. It is a very big problem that 30.0% of the population are unemployed and cannot cater for their housing needs and other necessary demands as most of them who are unemployed engages themselves in miscellaneous and odd jobs in the area which have no steady income.

**Table 3: Income level of Respondents**

Income in Naira per Month	Frequency	Percentage (%)
0-10, 000	66	55
11, 000-20,000	18	15
21, 000-30, 000	21	17.5
30, 000 and above	15	12.5
	120	100

The above table 3 shows a large percentage of the respondents comprises of 55% earn 0-~~₦~~10, 000 monthly or per month. The monthly income of 17.5% of the respondents ranges from 21, 000-30, 000 while that of ~~₦~~11, 000-~~₦~~20, 000 and ~~₦~~30, 000 and above are 15% and 12.5% respectively. The level of income is a determining factor of the type of house one occupies and once income always determine what he can afford for the rent. High income earners in most cases would prefer to live in more descent houses unlike low income earners who cannot afford such package. They would rather go for a less quality and cheaper houses which their income can afford.

**Table 4: Respondents refuse dump sites**

Site	frequency	Percentage (%)
Unauthorized place	35	29.2
Private ownership	49	40.8
Government Allocated place	36	30.0
Total	120	100

Waste management is one of the most important urban growth issues which must be handled appropriately to avoid some other environmental problems. If waste is not properly disposed, it blocks water channels which could lead to flooding and environmental pollution. It can be seen from table 4 above that 40.8% of the respondent dispose their refuse privately, while about 30% dispose theirs in government dump sites and 29.2% of the respondent dump their refuse indiscriminately in unauthorized places is a matter of serious concern. This can be connected with the fact that the condition of urban infrastructure in most of Nigeria cities is unsatisfactory because most urban environments are characterized by poor drainage and sewage system, uncollected garbage from industrial, commercial and domestic establishments.

**Table 5: Characteristics Housing problem in Owerri Municipality**

Housing Problem	Frequency	Percentage (%)
Over population	17	14.
Poor ventilation	13	10.8
High cost of rent	23	19.2
Over population and high cost of rent	18	15
Over population , high cost of rent and poor ventilation	28	23.3
Poor ventilation and high cost of rent	21	17.7
Total	120	100

From the survey conducted it was observed that some of the respondents are living in rented houses that are usually overcrowded with poor sanitation which leads to ill-health, because environment has great and obvious effects on human health, comfort and wellbeing. As a result of high cost of rent in the area, many more people occupy a single rooms to share the rent in some cases. Consequently, the exact high pressure on the available housing facilities in the area. This is in agreement with the finding of Mabogunje et al (1978), who observed that lack of adequate housing in Nigeria is one of the factors responsible for large proportion of the urban population living in high density housing unit, in spite of the environmental conditions which contribute serious threat to human health and their productivity. More so, the influx of people into Owerri, the high cost of urban land and building materials are the reasons for more people living in rented house in the area.

### TEST FOR HYPOTHESIS

In testing the hypothesis, Chi square ( $\chi^2$ ) was used at 5% or 0.05 level of significance.

$$\chi^2 = \frac{\sum (O-E)^2}{E} \text{ at } df_{0.05} (m-1) (n-1)$$

Where O = Observed frequency

E = expected frequency

DF= Degree of freedom

m = Number of rows



n = Number of columns

Ho = Null Hypothesis

Ha = Alternative Hypothesis

Accept Ho if  $X^2_{cal} \leq X^2_{tab}$ , at a level of significance, otherwise reject Ho.

**Hypothesis One**

**Ho:** There is no significant relationship between characteristics of the houses and problems of urban housing.

**HA:** There is significant relationship between characteristics of the houses and problems of urban housing.

$$\text{Test Statistics } X^2 = \frac{\sum (O-E)^2}{E}$$

This relationship was tested based on table 5.

**Table 6: Table of Observed and Expected frequency for Hypothesis one (A)**

Housing Problem	YES	NO	Frequency	Percentage (%)
Over population	14	3	17	14.
Poor ventilation	11	2	13	10.8
High cost of rent	18	5	23	19.2
Over population and high cost of rent	10	8	18	15
Over population , high cost of rent and poor ventilation	21	7	28	23.3
Poor ventilation and high cost of rent	14	7	21	17.7
Total	88	32	120	100

**Table 6: Table of Observed and Expected frequency for Hypothesis one (B)**

O <sub>ij</sub>	E <sub>ij</sub>	O <sub>ij</sub> -E <sub>ij</sub>	$\frac{\sum(O_{ij}-E_{ij})^2}{E_{ij}}$
14	10.3	3.7	1.33
3	0.8	2.2	6.05
11	8.1	2.9	1.05
2	0.5	1.5	4.50
18	13.2	4.8	1.75
5	1.3	3.7	10.53
10	7.3	2.7	1.00
8	2.1	5.9	16.58
21	15.4	5.6	2.04
7	1.9	5.1	13.69
14	10.3	3.7	1.33
7	2.2	4.8	10.47
		<b>Total</b>	<b>70.31</b>

$$X^2_{cal} = 70.31, X^2_{tab} (0.05)_5 = 11.07 \quad X^2_{tab} = (M-1) (N-1) \quad X^2_{tab} = (6-1)(2-1) \quad X^2_{tab} = (0.05)_5$$

Decision: since  $X^2_{cal} = X^2_{tab}$  that is  $70.31 \geq 11.07$

We reject the Ho (Null hypothesis) and accept H<sub>A</sub> (Alternative hypothesis) and conclude that there is a significant relationship between characteristics of housing and problems of urban housing.

**HYPOTHESIS TWO**

Ho There is no significant relationship between refuse dump sites and problems of urban housing.



H<sub>A</sub> there is significant relationship between refuse dump site and problems of urban housing

$$\text{Test Statistics } X^2 = \frac{\sum (O-E)^2}{E}$$

This relationship was tested based on table 4.

**Table 7: Table of Observed and Expected frequency for Hypothesis two (A)**

Site	Yes	No	frequency	Percentage (%)
Unauthorized place	20	15	35	29.2
Private ownership	30	19	49	40.8
Government Allocated place	20	16	36	30.0
Total	70	50	120	100

**Table of Observed and Expected frequency for Hypothesis two (B)**

O <sub>ij</sub>	E <sub>ij</sub>	O <sub>ij</sub> -E <sub>ij</sub>	Σ(O <sub>ij</sub> -E <sub>ij</sub> ) <sup>2</sup> /E <sub>ij</sub>
20	11.7	8.3	5.89
15	6.3	8.7	12.01
30	17.5	12.5	8.93
19	7.9	11.1	15.60
20	17.5	2.5	0.36
16	6.7	9.3	12.91

$$X^2_{cal} = 55.7, X^2_{tab} (0.05)_2 = 5.99 \quad X^2_{tab} = (M-1) (N-1) \quad X^2_{tab} = (3-1) (2-1) \quad X^2_{tab} = (0.05)_2$$

Decision: since  $X^2_{cal} = X^2_{tab}$  that is  $55.7 \geq 5.99$

We reject the H<sub>0</sub> (Null hypothesis) and accept H<sub>A</sub> (Alternative hypothesis) and conclude that there is a significant relationship between refuse dumpsite and problems of urban housing.

## CONCLUSION AND RECOMMENDATION

### Conclusion

The high rate of migration, coupled with population increase triggered rapid urbanization in Owerri municipality in Imo State. This has resulted into many urban and housing problems with in the municipality. This study examined the nature of urban growth and housing problems in Owerri municipality. The pattern of growth was determined using spatial analysis, and the housing problems were identified by the use of questionnaires and field surveys. Findings revealed that the area of Owerri municipality increases by 1034.0 hectare which is equivalent to 38.5% which is in line with Maurice, (2004), and will increase more as the years goes on. It was discovered that new settlement have evolved over the period. The Owerri city has spread towards Okigwe road, MCC/Uratta road down to Toronto Avenue and Egbu axis. Also, there was increasing spread of development towards Avu, Obinze, Oforola, World Bank, Umuguma axis all along Owerri-portharcourt express road. The increasing population witnessed along Nekede, Ihiagwa, Agbala, Ulakwu and its environ are evidence of urban growth in the Owerri city. The emergency of new settlement at Amakohia/Akwakuma, Ubomiri, Ohi, Irete, Orogwe and Ogbaku with the Capital city are another evidence of urban growth. It was also observed that the current expansion has changed the settlement pattern of Owerri municipality in these areas from radial to irregular pattern. Although, there are mixed feelings among the respondents that overpopulation, high cost of rent and poor ventilation are some of the major urban growth and housing problems in the municipality area. These can be attributed to the fact that housing demand exceeds the housing supply in the area as established by government officials, developers and other stakeholders in the area. Other problems include overcrowding, dirty toilet, poor sanitation, inadequate water supply, irregular electricity supply, and ill-health. It should be noted that housing problems cannot be separated from urban growth but the nature of the problems depends on the pattern of growth which varies from one geographical location to another.



## Recommendations

Based on the finding of this study, the following recommendations are made:

1. Government should build low-cost housing estates in the municipality in order to provide good and adequate housing units spread in these new settlement areas. This can be achieved through public private partnership. Low-cost houses can be giving to civil servants in the municipality through housing loan scheme in order to help them own their houses.
2. Commercial and mortgage banks should help in provision of loans for housing to the general public as it will help in increasing the number of people who own houses.
3. The ministry of Housing and Urban Development should address the high cost of rent in the area through appropriate legislations.
4. Government should control all developments within Owerri municipality to avoid current irregular growth pattern, overcrowding and poor ventilation as experienced in the area. There is also the need to review the master plan of the Owerri municipality by Owerri Capital Development Authority (O.C.D.A.) to cater for the current and future changes in the area.

**FUNDING:** This research work was funded by Nigeria Tertiary Education Trust (TETFund) through Institution Base Research (IBR) Project Grant 2020. (TETFund/DR&D/CE/POLY/NEKEDE/2020/RP/VOL. 1)

## ACKNOWLEDGEMENTS

The authors would like to acknowledge TETFund for their financial support and management of The Federal Polytechnic Nekede, Owerri for providing research facilities.

## REFERENCES

1. Abiodun, J.O. (1998). *Environmental poverty and sustainable development in Nigeria cities; Nigeria social scientist Vol. 1 (1) No 4 pp 10*
2. Abiodun, Y. (1998). *Urban development lessons from Brazil. The punch newspaper, Nov. 5.*
3. Abiodun, J.O. (1998). *Environmental poverty and sustainable development in Nigeria cities; Nigeria social scientist Vol. 1 No. 1.*
4. Adeniyi, E.O. (1981). *Housing the urban masses in Nigeria. Nigeria Journal of development Studies, vol. 1, No. 2 pp 5.*
5. Austin, C.O. (1991). *"Housing situation in a developing and distressed economy Nigeria".*
6. Bada, P.O. (1990). *Political policies and the development of transportation in metropolitan Lagos, Nigeria geographical Journal, Vol. 13, No. 6.*
7. *Federal Ministry of Lands, Housing and Rural Development: National Housing and Rural Development policies (2011).*
8. *Federal Ministry of National Planning: Nigeria vision 2000-2021. First National implementation plan volume 1 and 2 (2011-2013).*
9. Igbozuruike, U.M. (1981). *Land use and conservation in Nigeria, University of Nigeria press.*
10. Jude Ojokwu (2012). *An overview of public housing delivery strategies in Nigeria. Journal of environmental biology and valuation volume 1 No. 1 2012.*
11. Mabogunje, A.L. (2002.) *Towards an urban policy in Nigeria. Nigerian Journal of economic and social studies, 16(1): 85-87.*
12. Mabogunje, A.L. (2003). *Welcome address at the stakeholder's forum on strategies for enhancing domestic production of building materials for mass housing development in Nigeria.*
13. Mabogunje, A.L. and Harday, J.E. (1988). *Shelter provision in developing countries. The Gresham press.*
14. Maurice Umeakuka (2004). *Principles and techniques of town and country planning. Springfield Publishers Ltd Owerri.National Housing Policy and program[Nigeria (2011).[www.socialhousingnigeria.com/documentation](http://www.socialhousingnigeria.com/documentation). NEEDS 2: Housing sector vision transformation agenda: (2011-2015).*
15. Oberai, A.S. (1992). *Population growth employment and Poverty in third world mega cities dossiers, No 131. Megasoftware Publishers Owerri.*
16. Okeke, M.I. (1983). *Issues in Urbanization and urban administration in Nigeria. Pages 76-67. Supreme Publishers Owerri.*



# THE ROLE OF SCHOOLS IN YOUTH DEVELOPMENT

**Ishita Kapur**

*Masters in Social Work, Jamia Millia Islamia, New Delhi*

Article DOI: <https://doi.org/10.36713/epra7526>

DOI No: 10.36713/epra7526

## ABSTRACT

*Great schools have the power to change lives. They transform the process of guiding students towards benchmark success into a transformative learning experience that helps young people chart a course for a bright future. This type of education is purposefully designed to foster creativity and critical thinking. It's a place where students are introduced to ideas that inspire them and encouraged to investigate possible career paths in which those ideas could take flight. A great school is one where students understand that true learning, learning that matters to them and helps them connect to their goals, occurs. Three essential priorities are critical in assisting educators in designing innovative schools that strive to be great for all students: young people must be at the centre of any school design process; great practice must be deployed with the needs of students in mind; and schools must grow alongside students, practising iteration to meet emerging challenges. Given the demands on school staff and government regulations that place a premium on academic accomplishment, focusing on holistic adolescent outcomes and school outcomes that improve both adolescent psychosocial well-being and societal well-being remains a priority. The key to making youth development in schools a success is to take a system-wide approach to efforts and outcomes, as well as to form strategic relationships with key community stakeholders who share a same goal of fostering positive youth development. Great schools make learning easier by making these developmental milestones fundamental to their mission and smoothly incorporating them into academic goals.*

**KEY WORDS:** *youth development, psychosocial well being, societal well being, community stakeholders*

## INTRODUCTION

We usually conceive of schools as places where students go to learn and grow. Schools, on the other hand, are first and primarily institutions where young people build their identities and begin to see themselves as self-sufficient adults. Young children, like adults, thrive in circumstances that provide a healthy mix of autonomy, support, and high expectations. They thrive in circumstances where they may pursue new interests, have substantial choice over how they spend their time, and feel valued for their contributions and viewpoints. Youth Development in school systems focuses on helping adolescents in developing multiple areas of expertise, self worth, personal contacts, individual personality, and the ability to care for and contribute to society, with the assumption that achieving such developmental tasks will result in increased adolescent psychosocial well-being.

Schools have potential as centrepieces in promoting youth development as (a) schools are places adolescents spend much of their waking hours; (b) school environments, both academic and non-academic, influence multiple areas of adolescent functioning including identity formation, cognitive and social development, peer relations, and vocational development; (c) positive school experiences and opportunities contribute to adolescent resilience and positive development (Olsson, 2003) and (d) most schools have resources and infrastructure suitable for systems-change intervention focused on positive youth development. As a result, school involvement and investment in positive youth development is a realistic goal, and our focus here is on characteristics of a school's environment that support positive youth development.

Some believe that promoting youth development could distract schools from their



fundamental duty of academic instruction, given federal regulations emphasising assessments and standards. Schools that want to focus on both youth development and academic success are likely to stretch resources, especially if they have limited funds and manpower. However, positive youth development efforts are capable of nurturing learning environments that promote engagement and commitment to academic learning, thus meeting expectations of educationists (Roger P. Weissberg, 2004). Furthermore, improving connection between adolescents and school helps avoid behavioural problems in school and promote good development by providing crucial supports for healthy growth. Schools have the ability to provide positive places, and positive opportunities that promote development (Karen Johnson Pittman, 2003).

### **THE SIGNIFICANT ROLE OF SCHOOL**

The importance of schools to youth development was emphasized by John Dewey and is well-specified in life course/social field theory (Kellam, Branch, Agrawal, & Ensminger, 1975). In this perspective, one or more main social fields are critically important in each stage of life, and in each social field there are defined social task demands. Success or failure in regard to social roles is marked by the adequacy of behavioural responses of each individual to the specific social task demands faced within each main social field at each stage of life.

The social task demands are defined by and the adequacy of responses are rated by, natural raters, such as parents in the family, teachers in the classroom, or significant peers in the peer group. Not only the individual's performance, but also chance and the fit of the individual in the social context play roles in success or failure. Aggression, academic problems, and other early antecedents to problem outcomes must be viewed, therefore, as residing not merely in the child, but also as the social fields of family, school, and community (David Osher, 2014). Teachers provide a positive adult presence in the classroom by recognising students for positive behaviour, providing concrete feedback, and praising students for significant achievements. Teachers also support when they hear without judging, encourage students to think about values, tell students their efforts are appreciated, encourage students, or provide help (J M Richman, 1998). However, efforts to build support in schools are only effective if students recognise and use the resources that are available to them. Thus, in order to effectively create change in the classroom, it is necessary to check in with students to determine their perception of support.

### **SCHOOL ENVIRONMENTS AND CHILDREN'S WELL-BEING**

The school environment is an important factor when evaluating student well-being. Previous findings have shown that variables such as physical, academic, and social dimensions influence school environments (Cesar Tapia-Fonllem, 2020). Some research studies have found that peer settings and classroom environment play critical roles in children's behaviour development. Classroom environment covers a range of learning aspects that include the relationship that exists between learners themselves and their teacher. The classroom environment attempts to spell out the teacher's expectations on the children's motivation for effective learning, the strategies that should be employed for effective teaching, the kind of materials that would motivate children to have greater interest in learning, and the social behaviour that should be exhibited in a classroom (Obaki, 2017).

It is also important that the interests, developmental levels, and cultural and geographic backgrounds of the children in the classroom be considered in establishing environments (Bullard, 2010). In addition to helping support developmentally appropriate practices, a well-designed environment reduces behavioural issues, allowing the teachers to spend more time scaffolding learning. The environment can help prevent behavioural issues in three ways. One, children who are actively engaged in developmentally appropriate, interesting activities that they choose usually displays fewer behavioural issues. Because the well-designed environment provides children with many choices at different developmental levels, children's unique skill levels, preferred learning styles, and interests can be addressed. Second, the well-planned environment provides private retreats and activities that assist children to manage emotions. Thirdly, the teacher intentionally designs the layout of the environment to prevent common behavioural issues (Bullard, 2010).

### **BUILDING PARENT-SCHOOL PARTNERSHIPS**

Parental involvement is clearly linked to children's academic, social, and emotional development, and building parent-school partnerships is one strategy for improving student success worldwide. Parental involvement literature is combined with research from the fields of complexity theory, systems theory, and organizational science to explore the challenges and opportunities that parents and schools face as they seek to improve achievement for all children. On the surface, parental involvement in children's schools seems



uncontroversial. Most agree that parents play an important role in their children's education and are indeed the first educators of children. Parental involvement is clearly linked to children's academic, social, and emotional development, and building parent-school partnerships is one strategy for improving student success worldwide. Yet despite extensive research, family involvement experts also agree that parent-school partnerships have not received the research attention they deserve and suggest the need for a more comprehensive theoretical framework to guide partnership development (Price-Mitchell, 2009).

Systems thinking focus on parent-school partnerships through perceived boundaries to explore where and how learning occurs at the edges of interaction between people in different systems. These boundary dynamics (MacGillivray, 2006, 2008) are crucial to school reform and understanding the relationships of those committed to educating future generations. Not only do parents and educators influence a child's learning, they also hold the keys to understanding and potentially solving many of today's social issues that hinder learning and motivation (Price-Mitchell, 2009).

### **ROLE OF TEACHERS IN SHAPING CHILDREN'S LEARNING BEHAVIOUR**

Teaching effectively through the environment requires the teacher to be concurrently aware of the children in her classroom (their developmental levels, cultural backgrounds, interests, learning styles, dispositions, and behavioural nuances) and the early learning guidelines, curriculum standards, and program outcomes appropriate for her age group (Bullard, 2010). Effective learning occurs when children are actively engaged in the learning process or are paying special attention to what they are learning. The classroom teacher does not only observe but engages children in learning activities and posing questions to promote their reasoning abilities and widening their knowledge in the subject matter (Rheta DeVries, 2002).

Keeping children engaged help them to be more constructive than would be destructive if left unengaged. A teacher who engages his or her children in a meaningful learning situation is a resourceful and a facilitator. The teacher facilitates learning by giving his or her children examples on how he or she would like them to do the given work, provide the needed resources, and give guidelines on classroom behaviour. Changing children's behaviour is a process that takes a period of time. It may involve a teacher explaining clearly on the benefits of good behaviour and providing an opportunity for

positive interaction in the classroom. Understanding children's needs, interests, and the skills to be developed would help the teacher to identify the type of learning areas to be developed in the classroom (Obaki, 2017).

### **SAFE ENVIRONMENT OF SCHOOLS**

A school's climate is created partly through relationships and interactions among all members of a school community (National School Climate Council, 2016), including students, teachers, parents and guidance officers (Jenny Povey, 2016). Structure improvements, innovative student support services, and social changes in the school environment are all strategies for boosting youth development. Improving architectural elements or places to ensure physical safety; regulating school and classroom size to provide a sense of inclusion and community are examples of structural alterations; improve schedules to increase students engaged in meaningful tasks; monitor places within school where adolescents spend time so these places are supervised and have a climate of support and belonging (Denise C Gottfredson, 2003). Encourage peer and adult involvement, such as cooperative learning and a cross-age buddy system, as demonstrated in the Child Development Project, and peer leadership.

### **GROWTH OPPORTUNITIES IN SCHOOL**

Social and emotional learning interventions build the internal competencies that are critical for positive child and youth development, and although often viewed as an "add-on" to academic instruction, are in fact an essential part of education. Over the past two decades, researchers have produced increasingly compelling evidence that interventions promoting SEL improve academic performance. Zins, Weissberg, Wang, and Walberg (2004) reported that students who become more self-aware and confident about their learning abilities try harder in school. Students who set high academic goals, have self-discipline, motivate themselves, manage their stress, and organize their approach to work, learn more and get better grades (David Osher, 2014).

Important social emotional competencies schools can focus on are described in Table below. School-based efforts that promote youth development and reduce adolescent difficulties have the potential to increase emotional well-being and school performance. School wide social emotional learning efforts involves teaching adolescents interpersonal problem-solving skills such as recognizing social influences to engage in behaviour and generating alternatives, in addition to teacher training management, interactive teaching, and cooperative learning (J D Hawkins, 1999). Practices when put



into action across the school community, are opportunities that nurture positive environments for youth development (Mark T Greenberg, 2003).

**IMPLEMENTATION AND SUSTAINABILITY CONSIDERATIONS**

**School Leadership:** School leadership plays an important role in fostering relationships at the environmental boundaries that lead to generative learning and positive outcomes for children. School principals, teachers, administrators, and others who work with parents must embrace the role of boundary spanner, learning how to build relationships that hover at the peripheries between home, school, and community (Price-Mitchell, 2009). Reviews of international evidence point to the presence in effective and improving schools of both transformational and pedagogical/instructional leadership at all levels, but especially that of the head teacher, as being a critical determinant in the quality of the psychological, physical and social environments and conditions in which teaching and learning take place. This in turn influences the motivations, expectations, attitudes and conduct of students in classrooms and student outcomes (Christopher Day, 2016).

**School self-evaluation for School improvement:** School self-evaluation can be a fundamental force in achieving school improvement. This review establishes what the key debates are in relation to

school self-evaluation, what principles and processes are associated with it, and what the implications are for school self-evaluation as a means of leading school improvement. The review also incorporates a framework for conducting self evaluation and case study examples from systems and schools that have previously undergone the process (Christopher Day, 2016).

**Sustainable development of Youth:** To ensure youth could play the positive role and make a difference in economic and social structures and achieve the desired developmental outcomes, authorities should focus on the education quality, the characteristics of their teachers and the skills they acquire during the teaching learning process. Therefore, the relationship between intellectual and social variables for this group should be strengthened to achieve a positive change we seek (UNDP, 2014). According to UNESCO, Education for Sustainable Development aims to help people to develop the attitudes, skills, perspectives and knowledge. So, they can make informed decisions and act upon them for the benefit of themselves and others in the present time and in the future (UNESCO, 2006). Furthermore, the main goal of education should focus on making positive changes in their behaviours, skills and potentials. Therefore, the goals of sustainable development and the desired change will be successfully achieved (Albraizat, 2016).

**Table: Areas to concentrate on when it comes to establishing and maintaining school-wide change**

1. Preparing a method for positive youth development <ul style="list-style-type: none"> <li>• Identifying the needs for certain programmes and how the programming chosen will address these needs</li> <li>• Getting support from the system's stake holders</li> <li>• Staff and students should be more informed</li> <li>• Action-oriented strategy planning</li> </ul>
2. Implementing youth development methods <ul style="list-style-type: none"> <li>• Ensuring programme implementation compatibility</li> <li>• Stakeholders' collective involvement</li> <li>• Creating opportunities for skill development and building skills</li> <li>• Ensure that programming is task and schedule based</li> <li>• Preparing for long-term efforts</li> </ul>
3. Ensuring positive youth development <ul style="list-style-type: none"> <li>• Ensuring that what has been accomplished is maintained</li> <li>• All stakeholders must maintain their commitment</li> <li>• Enhancing and putting acquired skills into practise</li> <li>• Using evaluations to plan future directions and efforts</li> </ul>

**CONCLUSION**

Because the purpose of development is to improve human abilities and capacities, it becomes

evident that education and development have a beneficial relationship. Evidence shows that positive youth development guided schools provide learning



environments that support adolescents' academic, social, and personal competency. Education's objective is to instil positive qualities in youth and equip them with knowledge, skills, values, and traditions, as well as to enable them to be productive members of society. Educational outcomes are capable of meeting the world's current challenges and requirements, as well as keeping up with new scientific breakthroughs and technology. This can be accomplished through advancement-oriented education. Education is a critical component of all development strategies and programmes. It is also a crucial pillar in the process of long-term growth. This paper has shown that children and youth are more likely to concentrate in supportive learning environments with positive people, pleasant environments, and favourable opportunities. Youth should obtain appropriate education on all levels in order for the educational system to be successful. We must promote awareness of the significance of change in order to achieve sustainable development, and we must prioritise education. If we want to achieve sustainable development, we need to increase education and make it more accessible to the youth, who are the driving force behind developing societies. Finally, encouraging and sustaining youth development activities in schools results in positive schools with strong academic programmes that support all students' effective adolescent developmental outcomes.

## REFERENCES

1. al-braizat, H. (2016). *Youth Education and its Role in Achieving Sustainable Development Introduction*. ResearchGate.
2. Bullard, J. (2010). *Creating Environments for Learning: Birth to Age Eight*. Pearson Education.
3. Cesar Tapia-Fonllem, B. F.-S.-V.-T.-B. (2020, March). *School Environments and Elementary School Children's Well-Being in Northwestern Mexico*. Retrieved from <https://www.frontiersin.org:https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00510/full>
4. Christopher Day, P. S. (2016). *Successful school leadership*. Retrieved from <https://www.educationdevelopmenttrust.com:https://www.educationdevelopmenttrust.com/EducationDevelopmentTrust/files/a3/a359e571-7033-41c7-8fe7-9ba60730082e.pdf>
5. David Osher, K. K. (2014). *School Influences on Child and Youth Development*. SpringerLink.
6. Denise C Gottfredson, D. B. (2003). *Characteristics of effective school-based substance abuse prevention*. PubMed.gov.
7. J D Hawkins, R. F. (1999). *Preventing adolescent health-risk behaviors by strengthening protection during childhood*. PubMed.gov.
8. J M Richman, L. B. (1998). *Social support for adolescents at risk of school failure*. National Library of Medicine.
9. Jenny Povey, A. K.-D. (2016). *Engaging parents in schools and building parent-school partnerships: The role of school and parent organization leadership*. ScienceDirect.
10. Karen Johnson Pittman, M. I. (2003). *Preventing Problems, Promoting Development, Encouraging Engagement Competing Priorities or Inseparable Goals?* Retrieved from <https://citeseerx.ist.psu.edu:https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.471.1224&rep=rep1&type=pdf>
11. Mark T Greenberg, R. P. (2003). *Enhancing school-based prevention and youth development through coordinated social, emotional, and academic learning*. PubMed.gov.
12. Obaki, S. O. (2017). *Impact of Classroom Environment on children's Social Behavior*. International Journal of Education and Practice.
13. Olsson, C. A.-B. (2003). *Adolescent resilience: A concept analysis*. Retrieved from [psycnet.apa.org:https://psycnet.apa.org/record/2003-01667-003](https://psycnet.apa.org:https://psycnet.apa.org/record/2003-01667-003)
14. Price-Mitchell, M. (2009). *Boundary Dynamics: Implications for Building Parent-School Partnerships*. The School Community Journal.
15. Rheta DeVries, B. Z. (2002). *Developing Constructivist Early Childhood Curriculum: Practical Principles and Activities*. Early Childhood Education Series. ResearchGate.
16. Roger P. Weissberg, M. C. (2004). *Building Academic Success on Social and Emotional Learning: What Does the Research Say?* Routledge Taylor & Francis Group, 197-202.
17. UNDP. (2014). *UNDP Gender Equality Strategy*. Retrieved from <https://www.undp.org:file:///C:/Users/HP/Downloads/GenderEqualityStrategy2014-17.pdf>
18. UNESCO. (2006). *Education for Sustainable Development*. Retrieved from <https://en.unesco.org:https://en.unesco.org/themes/education-sustainable-development>



## PROFESSIONAL MENTORSHIP IN NURSING

<sup>1</sup>Ms. Beulah Jasmine Rao, <sup>2</sup>Dr. Ashok Dhanwal

<sup>1</sup>Assistant Professor, Pursuing PhD In Nursing, Mangalayatan University Extended NCR 33rd Milestone, Aligarh-Mathura, Highway, Beswan, Uttar Pradesh 202145

<sup>2</sup>PhD in Nursing, Assistant Professor, Mangalayatan University Extended NCR 33rd Milestone, Aligarh-Mathura, Highway, Beswan, Uttar Pradesh 202145

### ABSTRACT

Mentoring is an essential component in educating nurses and sustaining leadership. Mentoring relationships, benefits, and examples of mentor-mentee roles in nursing setting will be addressed. An overview of the mentoring cycle in nursing will be explained.

Mentoring is a vital process in nursing; it is a means for experienced nurses to orient and to facilitate acclimation of novice nurses to their new role. This process involves the art and science of guiding another through the purposeful actions of inspiring, coaching, teaching, directing, and leading an individual to a new place of cognition (Barker, 2006; Metcalfe, 2010).<sup>1</sup>

**KEY WORDS-** Mentee - Mentor, Bi - Directional Communication,

### INTRODUCTION

One of the earliest concepts of mentoring was documented in Greek history when Athena, the goddess of wisdom, disguised herself as Mentor, a trusted family friend, and assumed responsibility for Odysseus' household for the ten years he was away during his odyssey. During the time Odysseus was away, Mentor tutored Telemachus, his son, to become a successful ruler (Allen, 2006; Holmes, Hodgson, Simari, & Nishimura, 2010). Nurses teach and help other nurses by mentoring, which is crucial to maintain competency, encourage professional expertise, and promote leadership.

Both the mentor and mentee are engaged and committed to nurturing the relationship. This nurturing relationship may be described as a covenant between the mentor, one who shares his experience and expertise, and the mentee, who looks to the expert for knowledge to contribute to personal growth, consultation, and career advancement (Blauvaelt & Spath, 2008; McCaughey, O'Brien & Jackson, 2009; Mijares, Baxley & Bond, 2013). This bidirectional

relationship is complex and composed of trust and respect.

### WHO IS A MENTOR ?

Faculty mentors play a crucial role in mentoring graduates. Students and their mentors share responsibility for ensuring productive and rewarding mentoring relationships. Both parties have a role to play in the success of mentoring. For graduate students, a mentor is someone who serves as a guide throughout their institutional training. They provide both professional and personal advice in transitioning into, and out of, graduate school. They give constructive feedback on writing, teaching and other elements of career design. They can serve to help students balance professional goals with their personal lives or give emotional encouragement during challenging times.

### OBJECTIVES

- Enabling constructive interaction, guidance and mentorship of students by faculty



- ✍ Providing a reliable and comprehensive support system to motivate students to excel in both academic and non-academic fields and to make the most of their life at the Institute.
- ✍ To help fresh students understand the challenges and opportunities present in the Institute and develop a smooth transition to campus life.
- ✍ To counsel academically weak students and to play an important role in helping troubled students cope with academic, extra-academic and personal problems.
- ✍ To provide positive role models students in the institute.
- ✍ To proactively try to identify problems of the general student populace and to bring them to the notice of the concerned authorities.
- ✍ Ensuring regularity and punctuality of students through counseling sessions.<sup>2</sup>

### **THE BENEFITS OF A MENTOR-MENTEE RELATIONSHIP FOR THE WORKPLACE ARE**

- ✍ Improved nursing staff retention, reduced isolation, increased opportunity for promotion within the workplace, less transition time for learning, and improved teaching effectiveness (Billings & Kowalski, 2008).
- ✍ It is essential for the mentor to be available to the struggling or overwhelmed mentee. During a busy day, there is little time for the mentee to process the events or disengage from the stress of providing care.
- ✍ The mentee may become emotional; realistically, it may be difficult for any nurse to The mentor may be astute and tailor the teaching accordingly to the mentee's needs in order to assist the mentee in progressing through the cycle.
- ✍ The mentor must be both academically and clinically proficient, to provide proper support to the mentee.
- ✍ Anderson describes a mentor as an experienced nurse who has completed an approved mentorship program and is qualified to support and assess students in the practice setting (2011).
- ✍ An approved mentoring program prepares the mentor with communication resources, assessment tools, and teaching skills, in order

to provide a positive learning experience for the mentee.

- ✍ The mentor must be willing and able to accept responsibility for directing and overseeing the mentee. The mentor must not only direct, but also correct and coach the mentee forward, striving for excellence.
- ✍ The fit mentor should exude enthusiasm, support adult learning, portray professionalism, and possess a working knowledge of workplace operations, nursing policies, procedures, and corporate mission and vision (Blauvelt & Spath, 2008; Anderson, 2011).
- ✍ 2009).
- ✍ The mentor must become familiar with a mentee's learning history. This process assists the mentor to better understand challenges or recognize upcoming pitfalls and remediate any deficiencies. The mentor must be able to analyze the mentee's learning style and optimize the learning experience (Riley & Fearing)<sup>3</sup>

### **MENTORING CYCLE**

- ✍ The mentee may pass through five levels of proficiency during their acquisition and development of skills: "novice, advanced beginner, competent, proficient and expert." (Benner, 2004).
- ✍ A mentee starts as a novice, and gains experience learning and communicating with their mentor. The novice mentee passes to advanced-beginner mentee, and, eventually with time, the mentee may progress and acquire sufficient skills to become an expert practitioner and mentor.
- ✍ Methods of mentoring are broad. Some mentors adhere to a rigid meeting schedule with goals, research and defined expectations. They anticipate problems and guide the mentee through challenges using methodologies such as transformational learning, remediation, and peer mentoring (Riley & Fearing, 2009; Jacobson & Sharrod, 2012).
- ✍ Mentoring may involve assigning the mentee tasks or research to facilitate learning. It may also involve traditional and nontraditional learning techniques, as appropriate for the mentee.



✎ Holmes, Hodgson, Simari, and Nishimura describe three models of mentoring. The first model describes the mentor as asking questions to expose the mentee to a broader vision of a particular topic.

✎ The second model involves assigning learning tasks to the mentee,

✎ and the third requires the mentee to study and observe a subject, and take notes (2010). All three approaches enable the mentor to assess the professional scope and academic capabilities of the mentee.

**REFLECTION IN MENTORING** - The mentor and mentee must engage in sincere dialogue as they review their goals and reflect on how to achieve them. Mentors promote bi-directional communication, ongoing insight, reflection, critical thinking, clinical reasoning and clinical decision making in open discussion (Barker, 2006; Holmes, Hodgson, Simari & Nishimura, 2010, Wilson, Andrews & Leners, 2006). Mutual trust, caring, and in some instances confidentiality, provide a scaffold for the mentor-mentee relationship. Understanding the expectations and limitations will determine its success.

**BARRIERS TO MENTORING**

Not all mentor-mentee relationships are successful. Barriers to a successful mentor-mentee relationship may be due to :

- ✎ Lack Of Faculty Sensitivity
  - ✎ Lack Of Academic Preparation
  - ✎ Cultural Miscommunication
  - ✎ Feelings Of Isolation
  - ✎ Fear Of Failure
  - ✎ Difficulty In Establishing Peer Relationships, and
  - ✎ Lack Of Professional Role Models (Wilson, Andrews & Leners, 2006)
- Problems May Occur If The Mentor Or Mentee Are Unable To Maintain The

Commitment Or Lose Communication Due To Responsibilities Or A Career Change (Billings & Kowalski, 2008).<sup>4</sup>

**CONCLUSION**

Mentoring can foster the leadership skills that student nurses need to secure larger roles in developing, designing and delivering health care. Mentoring relationships inside healthcare organizations and academic institutions can help those organizations retain nurses and nurse educators, reducing the cost of turnover. The ideal mentor is not always the most experienced or the most productive, but rather an effective communicator who is accessible and willing to enter into a mentoring relationship. Establishing and maintaining the mentor-mentee relationship cannot be overemphasized because it is the relationship that serves as the cornerstone for mentoring success.

**REFERENCES**

1. Allen, S. (2006). *Mentoring: The magic partnership. Canadian Operating Room Journal*, 24 (4), 30.
2. Anderson, L. (2011). *A learning resource for developing effective mentorship in practice. Nursing Standard*, 25 (51), 48–56.
3. Barker, E. R. (2006). *Mentoring—a complex relationship. Journal of the Academy of Nurse Practitioners*, 18, 56–61.
4. Benner, P. (2004). *Using the Dry fuss model of skill acquisition to describe and interpret skill acquisition in nursing practice and education. Bulletin of Science Technology & Society*, 24 (3), 188–199.
5. Billings, D. & Kowalski, K. (2008). *Developing your career as a nurse educator: The importance of having (or being) a mentor. The Journal of Continuing Education in Nursing*, 39(11), 490–491.
6. Blauvelt, M., & Spath, M. (2008). *A faculty mentoring program: At one school of nursing. Nursing Education Perspectives*, 29 (1), 29–33.



**Ms. Beulah Jasmine Rao** Assistant Professor, Pursuing PhD In Nursing, Mangalayatan University Extended NCR 33rd Milestone, Aligarh-Mathura, Highway, Beswan, Uttar Pradesh 202145



## A WEB APPLICATION ON HEALTH AND FITNESS “MY FITNESS BUDDY”

<sup>1</sup>Avi Kadam, <sup>2</sup>Aakash Maheshwari, <sup>3</sup>Aman Thakre

### ABSTRACT

*Health is the most important factor of human life. To carry out the system problem for the possibility of developing a Health Management System for improving and modernization of the system. Design a system for better patient care. Maintaining the data in the database. Save the time. Track the appointment scheduling from home and manage to reach to the hospital/clinic on time. Better coordination between various health departments. Physical inactivity is a modifiable risk factor for cardiovascular disease and a widening variety of other chronic diseases, including diabetes mellitus, cancer (colon and breast), obesity, hypertension, bone and joint diseases (osteoporosis and osteoarthritis), and depression. The benefits of physical activity and fitness extend to patients with established cardiovascular disease.*

*Your body is your best friend what you do is what you get, but because of the busy lifestyle and unhealthy eating habits 78% population of India is getting obese, which is the major cause of various health problems like high BP, Sugar, and various other heart related diseases which can cause be severe if not taken proper care.*

*Nothing tastes as good as being fit feels, every time you're working out and you get discouraged or feel like giving up a little early, remember that you're trying to burn this thing off your body, and more & more comes off with every minute you keep pushing.*

*By the use of Fitness Buddy we are trying to offer every fitness related query at a single place with proper customized Indian diet plans veg/nonveg you can stay on your fitness track monitor your body fat and plan your diet accordingly. An increase in physical fitness will reduce the risk of premature death, and a decrease in physical fitness will increase the risk. This is important because, for a long time, rest and physical inactivity had been recommended for patients with heart disease. Unlike studies of primary*

### INTRODUCTION

General fitness is a part of overall health. It means having a healthy body weight as well as an ability to perform physical activities without tiring easily. Specific fitness is the opposite of this form of fitness. It refers to how well a person is able to master specific levels in a sport. Physical fitness is a basic state of wellness and well-being and, especially, the capacity to perform aspects of sports, occupations and day-to-day movements. Physical fitness is customarily completed by means of proper nutrition, average-vigorous physical recreation, physical awareness, and sufficient rest. It is examined that the improvement of common health by means of physical awareness to expand physically recreation and recreation adherence. Awareness about Physical activity can also reduce the risk of injuries, as well as improve physical fitness, weight management,

cognitive function, and quality of life. Despite having knowledge about physical health, Indian people still not meeting the recommended level of physical activity[2]. Indian society has limited sources to promote physical activity like lack of exercise planning, training, instruments and cross-sectional analysis. Many people who move to ground are active enough to take part in vibration, but unconscious about the real motive behind physical activity. Unawareness leads the m to the chronic disorder and imbalance. Miss perception of physical activity putting them at risk. We call them active by default not by their part in exercising. People with understanding of low level activity are healthier than unaware physical active masses. It is complex and multi-dimensional behavior which is not easy to access. Knowing y our physique, problem, benefit and the atmosphere, etc.,



are prerequisites for specified sports.

This journal encourages submissions relevant to but not limited to applied sport sciences, physiology and nutrition, human movement involving components of biological, physical and health sciences, biomechanics and neural control, cardiovascular physiology and metabolism, exercise physiology, fitness assessment, kinesiology, metabolism and nutrition, physical therapy and athletic training

The behaviors and traits of today's children, along with their genetics, are determinants of their growth and development; their physical, mental, and psychosocial health; and their physical, cognitive, and academic performance. Technological advances of modern society have contributed to a sedentary lifestyle that has changed the phenotype of children from that of 20 years ago. Children today weigh more and have a higher body mass index (BMI) than their peers of just a generation earlier. Behaviorally, most children fail to engage in vigorous- or moderate-intensity physical activity for the recommended 60 minutes or more each day, with as many as one-third reporting no physical activity in the preceding 5 days. This lack of participation in physical activity has contributed to a greater prevalence of pediatric obesity, a decrease in fitness (e.g., flexibility, muscular strength, cardio respiratory capacity), and a greater risk for disease

An increase in physical fitness will reduce the risk of premature death, and a decrease in physical fitness will increase the risk. The effect appears to be graded, such that even small improvements in physical fitness are associated with a significant reduction in risk. In one study, participants with the highest levels of physical fitness at baseline and who maintained or improved their physical fitness over a prolonged period had the lowest risk of premature death. Modest enhancements in physical fitness in previously sedentary people have been associated with large improvements in health status. For instance, in another study, people who went from unfit to fit over a 5-year period had a reduction of 44% in the relative risk of Death compared with people who remain unfit.

The benefits of physical activity and fitness extend to patients with established cardiovascular disease. This is important because, for a long time, rest and physical inactivity had been recommended for patients with heart disease. There is a paucity of information regarding the effectiveness of physical activity in preventing death from cancer or from any cause in patients with cancer. An early (5.5-year) follow-up study involving women with breast cancer revealed little association between total recreational

physical activity and the risk of death from breast cancer.

Assessed origination and exploration which have attempted to relate wellbeing preparing to upgrades on mental variables amongst expected in the same class as chose experimental populaces. Hypothetical theories in this subject are studied, and look into plans are assessed as pre-test and post-test or pre-exploratory and consequently to a great extent un- physical wellbeing results in a better state of mind, self-

idea, and work propensities; the confirmation is a great deal less clear as to its outcomes on intellectual working the exception of self- thought, personal qualities must not be experiencing upgrades in considerable wellbeing. It was once understood that rationally hindered adolescents show mental development taking after physical well being preparing, yet no conclusion can become to including the impacts of substantial wellbeing drilling with other clinical disorders. The current learn broke down 27 male focuses who demonstrated self-control and low levels of substantial wellness. Points singled out first in the meantime standing discreetly on a treadmill test, at that point while walking rapidly on a mechanized treadmill, and eventually for the span of mending from undertaking (extended HR however social peacefulness). Results confirmed that simplest the average health workforce showed knowledge for the duration of pastime haven demonstrated it that the larger part persons acquire themselves occupied with diversion for twenty to sixty min for each day, three days for every week, including on the level of force i.e. seventy to eighty percent of greatest. Heart rate will have inferred at any rate some wellbeing related favorable circumstances connected with improved cardio respiratory wellness and first class physical make-up weight. Donors displaying least cardio-respiratory wellness can commonly get main points from wellness have risen as exceedingly created with entertainment test modalities coordinated as nearly as reasonable to determined games.

Comparable improvements have used to evaluations of anaerobic life. Among nonathletic populaces there is an interest for circuitous techniques for evaluating work potential by the utilization of sub-maximal responses and order appraisals. Such tests are currently close by for use with subjects veering off in age, intercourse, phase of wellness and preparing distinction. Considerable wellness is a multivariate idea and subsequently is not agreeable to expose in a private wellbeing test.

A writing diagram of behavior revision and undertaking adherence demonstrated that just a little amount of the studies analyzed reported physical



wellness appraisals [9]. Of the meetings inspected, best 7 out of 31 measured individual wellness pre and post test. Leith Recommended that these discoveries were for the most part stunning, for the reason that by foremost of encounters analyzed said likely the most transcendent quest for behavioral alteration programs as impacting physical wellness scores. All things considered, all the more as of late, meetings have coordinated a real wellness deciding result. This audit joined 11 surveys that analyzed the result of their intercession on cardio respiratory wellbeing. The pooled impact scores had been certain and moderate for cardio respiratory wellbeing (0.52 9 5% CI 0.14 to 0.90).

A number of meetings has analyzed the relationship amongst walking, jogging and wellbeing impacts to examine if going for activities at a lively percent, a measure of activity force, is contrarily identified with danger or a create in wellness. One study found that walkers can enormously enhance their strolling events on a sub maximal walking test following a 12- week program, demonstrating an expand in wellbeing [10]. One more be taught when analyzed the medical advantages of walking three miles, 5 days for every week at both a walk (20 minutes/mile), a lively walk (quarter-hour/mile) or a cardio walk (12 minutes/mile). The result demonstrated that each one walkers had gigantic upgrades in the  $VO_{2max}$  when contrasted with a control staff and that the cardio walkers had a colossal change over the strollers yet not the lively walkers.

Physical effort has additionally been recommended in expressions of the number of calories consumed at unmistakable periods of profundity and METs. A MET is a few of the resting metabolic cost of oxygen devoured per kilogram of body mass every moment (3.5/ml/kg/min;) [11]. As needs be, a MET of six speaks to aside interest that is six events the resting oxygen utilization of anyone at recreation. In the amusement writing, substantial wellness is a man's cardio limit, or maximal oxygen utilization, and speaks to a man's ability for cardio force switch. High-impact limit is at times called cardio power, or maximal oxygen uptake ( $VO_{2max}$ ). Estimating  $VO_{2max}$  by means of normal maximal treadmill conventions or sub maximal step tests or running checks is seen to yield target measures of cardio energy that don't rely on upon bear in mind or self-archive mastery.

Analyzed the impacts of a randomized oversaw trial of ways to deal with promote physical undertaking.

Physical attempt was measured with the national wellness Survey poll. This Observed information from the Australian Bureau of insights

three cross-sectional country wide wellbeing Surveys, carried out in 1989–1990, 1995–1996 and 2000, lengthy-term people replies in 1996 bodily physical activity(PA) ideas.

Earlier 2 weeks do not forget of the amount of occasions & complete time consumed running on behalf of leisure or recreation, and exploit reasonable & lively pastime, had been arrived at the midpoint of for 1 week to make a measure of adequately dynamic : greater than 5 week by week sessions of a hundred and fifty min/week of in any event sensible power diversion. Aside from grown-ups matured greater than 60 years, from 1989 -2000, there have been expansions inside of the event of strolling (plus 8%) and in normal power movement (Plus 4%), prompting a huge decay (mines six percent) in the rate of these reporting no satisfaction time try. Discoveries of the betaught portray that cooperation in brimming with life diversion stayed unaltered, and there used to be a 'people shift' in normal minutes and sessions of going for strolls from 1995 - 2000, however the rate of standard walking greater than 5 events and  $\geq 150$ /week) stayed unaltered. A little yet immense expansion (plus two percent) in the proportion of grown-ups who met the Physical Activity thoughts was once well known more usually for men lower than 30 years and for men's. Study gave each member a physical undertaking positioning taking into account the amount of, reported sessions of normal fiery undertaking enduring no less than 20 minutes in the last four weeks [12]. Real leisure activity rankings at 12 weeks had been 22% bigger in the intercession bunch contrasted with the control workforce, which used to be presently not rescted measurably critical.

Rice offered data to help the sort and level of physical try that are major for wellbeing advantages in youths, and for later a voidance of illness as grownups are not accessible. Expressed absence of comprehension is additionally realized by method for irregularity in phrasing and by method for issues and issues with to be had gadgets to gauge the idea. High aim of this content is to handle measurement issues concerning substantial undertaking/amusement or physical wellness in youths. Significances of these issues for scientists and professionals are talked about. prevention, many studies of secondary preventions. Several systematic reviews have clearly shown the importance of engaging in regular exercise to attenuate or reverse the disease process in patients with cardiovascular disease.

As importance of web based application is increasing day by day, it is important to manage all the healthcare data online. Now everyone has internet connection and it is easy to use web application. This



application will reduce the work of patient as well as doctor. Doctor does not need to take patient's weight, patient's blood group, because all this information is entered at the time of registration of patient on website. Doctor will automatically see patient's information. There is no more hardware required for patient and doctor. Efficient appointment schedules reduced patient waiting time while keeping doctor idle time as low as possible without adding extra resources. Efficient and effective management of healthcare is imperative due to the efficient appointment scheduling.

### OBJECTIVES OF STUDY

- To explore the perceptions toward developments about physical activity.

- To improve the general fitness of, the people through physical fitness awareness.
- To analyze the impact of, physical fitness awareness on, physical activity levels.
- Physical fitness awareness has positive effects on fitness exercise and health.

### METHODOLOGY

#### Participants

Twenty-four (n=27) male participants were selected randomly from the regular visitors in public park, Lahore, India. The participants were already doing their regular activity for general fitness. Age of each participant was 20 .

### RESULTS

Variables	Minimum	Maximum	Mean	S.D	Skewness
Shuttle Run 20m (in sec)	29.3	40	33.81	2.70	0.22
Push-ups (in reps)	7	30	21.50	5.56	-0.57
Standing broad jump (in meters)	1.3	2.75	2.10	0.35	-0.36
Core Plank (in min)	0.3	2.42	1.31	0.65	0.27
Sprint 100m (in sec)	13.59	16	14.12	2.64	-4.27
Running 600m (in sec)	2.01	3.67	2.60	0.37	0.92

Table-2: Descriptive Statistics of Post-Test of the Participants (n=27)

Variables	Minimum	Maximum	Mean	S.D	Skewness
Shuttle Run 20m (in sec)	29	37	31.88	2.05	0.75
Push-ups (in reps)	10	37	27.46	5.96	-0.91
Standing broad jump (in meters)	1.7	2.91	2.50	0.30	-1.17
Core Plank (in min)	1.00	2.90	1.98	0.53	-0.28
Sprint 100m (in sec)	11.55	15	12.36	0.88	0.78
Running 600m (in sec)	1.41	3.01	1.96	0.38	0.41

Table-3: Pre-Test Correlation Coefficients of Test Variables (n=27)

Variables	Push-Ups	Core Plank	Standing Broad Jump	Shuttle Run 20m	Sprint 100m	Running 600m
Push-Ups	1	0.79**	0.41*	-0.28	-0.51*	-0.64**
Core Plank		1	0.48*	-0.39	-0.49*	-0.62**
Standing Broad Jump			1	-0.64**	-0.66**	-0.60**
Shuttle Run 20m				1	0.65**	0.70**
Sprint 100m					1	0.67**
Running 600m						1



Table-4: Post-Test Correlation Coefficients of Test Variables (n=27)

Variables	Push-Ups	Core Plank	Standing Broad Jump	Shuttle Run 20m	Sprint 100m	Running 600m
Push-Ups	1	0.61**	0.38	-0.26	0.50*	-0.84**
Core Plank		1	0.34	-0.25	0.23	-0.56**
Standing Broad Jump			1	-0.70**	0.32	-0.60**
Shuttle Run 20m				1	-0.30	0.60**
Sprint100m					1	-0.48*
Running 600m						1