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ROLE OF *TINOSPORA CORDIFOLIA* (GILOY) IN BONE MAINTENANCE DISORDER (OSTEOPOROSIS) BY DOCKING ANALYTICAL STUDY

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ABSTRACT

T. cordifolia commonly known as guduchi is an indigenous plant and has medicinal values for ethnic groups of Himalayan region. It belongs to the family Menispermaceae. It is traditionally valued for rejuvenile drug with immune-modulatory potential, treatment of gout, meha, antidote of snake bite. This review paper provides comprehensive information on the botany, traditional uses, phytochemistry, and pharmacological research on *T. cordifolia*, based on the scientific literature. It has important role in local and popular medicine, specifically for boosting immune system in humans and helps to improve bone related disorder like, Osteoporosis (Fig 1). More than 30 active constituents are present in this plant that can be extracted by ethanolic extraction process. They are highly active to bind with RANKL/ OPG genes. This in-silico docking study suggest Berberine, Palmatine, cordifolioside A, Tinosporinone, Ecdysterone, Isocolumbin and Tinocordifolin have low binding affinity and they carry significant role in Bone maintenance disorder (Osteoporosis).

KEY WORDS- *T. cordifolia*, Guduchi, Osteoporosis, Osteoblast, Osteoclast, RANKL, OPG, BMD, M-CSF.

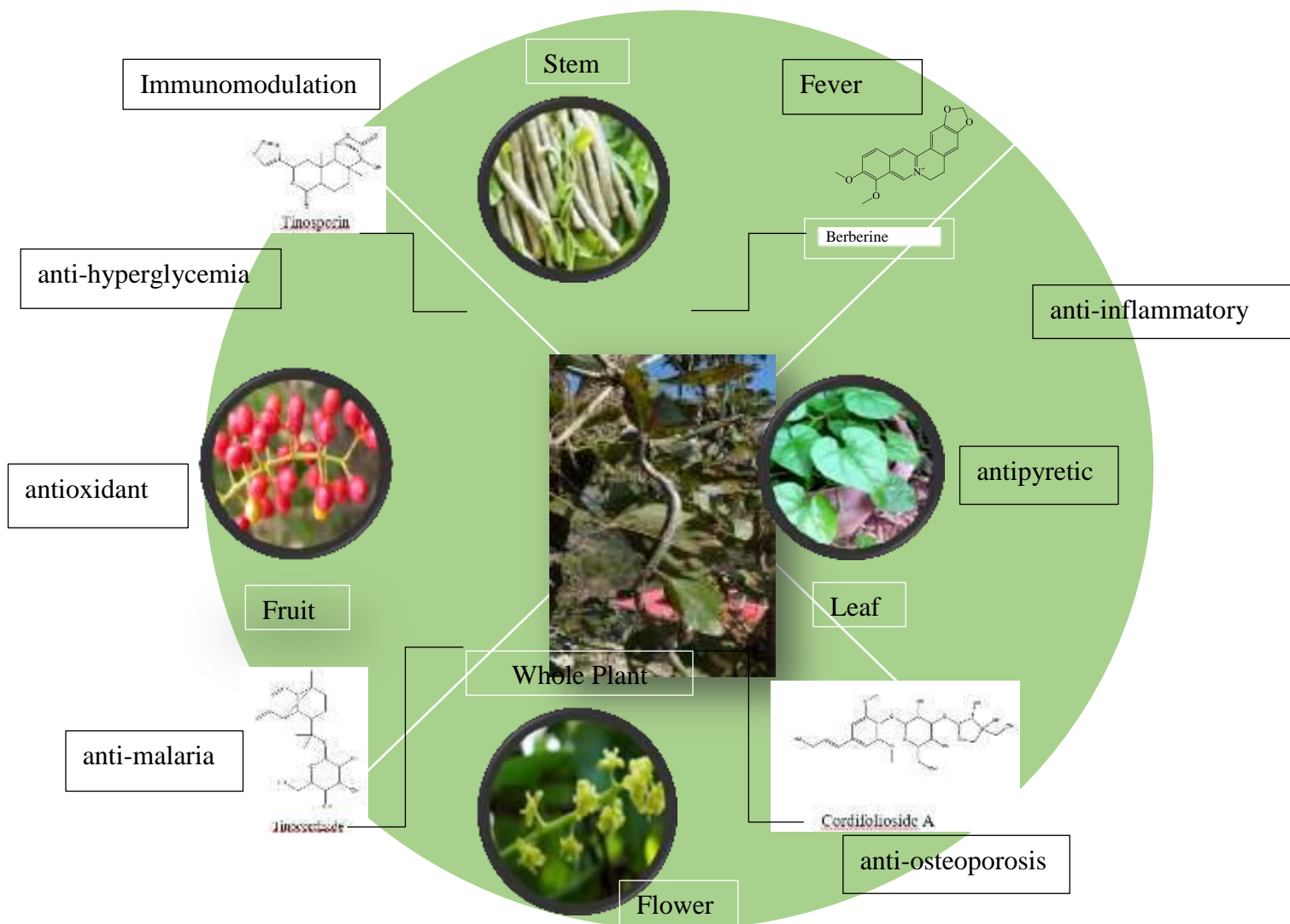


Fig 1- T. cordifolia is used traditionally to cure several disease



1. INTRODUCTION

T. cordifolia, climbing shrub used in the treatment of uncountable diseases such as diabetes, rheumatoid arthritis, gonorrhea, secondary syphilis, anemia, dermatological diseases, cancer, gout, jaundice, asthma, leprosy, bone fractures, liver & intestinal disorders, purifies the blood. It native to India (Fig 2), Sri Lanka, Myanmar, China, Bangladesh, South Africa and West Africa. Some of the drugs are trusted to encourage positive health and maintain resistance against infections. It is one of the main genera of Menispermaceae family. The family consists of approximately 70 genera with 450 species that find in tropical regions (Choudhary, et al., 2013). There are about 34 species of *Tinospora* distributed worldwide such as, *T. cordifolia*, *T. capillipes*, *T. sagittata*, *T. sinensis*, *T. oblongifolia*, *T. hainanensis*, etc. *Tinospora* genus increase immune system, prevent respiratory infections, also treat for diabetes (Chi, et al., 2016). There are more than 100 vernacular names of this plant like, seendal, chittamruthu, amrita, amrutha balli, etc. This plant commonly known as 'Guduchi' in Sanskrit, 'Giloe' in Hindi and 'Heart-leaved Moonseed plant' in English. In Ayurveda *Rasayana*, the plant is commonly known as "Amrita" and have an adaptogen and anti-stress activity (Bharath, et al., 2020). From ancient time some Ayurvedic medicines are prepared from this plant such as, *Sanjivanivati*, *Amritashtakachurana*, *Kanta-kariavleha*, *Dashmoolarishta*, *Guduchisaatva*, *Guduchighrita*, etc. (Sharma, et al., 2018).

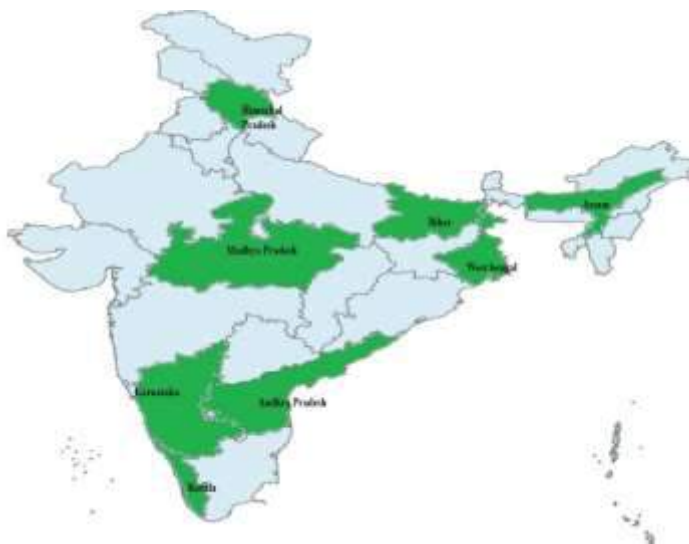


Fig 2- Geographical distribution of *T. cordifolia* in India

Osteoporosis, a major skeletal disease that affects both men and women, causes mainly estrogen deficiency, reduction in bone mineral density and bone deterioration. According to statistics from the International Osteoporosis Foundation, it has been estimated that more than 200 million men and women are suffering from osteoporosis. Approx. 1 in 3 women over 50 years old and 1 in 5 men will osteoprotic (Sarafrazi, et al., 2021).

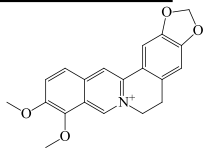
2. OBJECTIVES

To comprehend the fragmented literature available on the botanical & geographical description, traditional use, phyto-chemistry, pharmacological properties of *T. cordifolia* and detail molecular biology of bone maintenance and disorders consist with gene expressions.

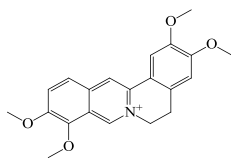
The main aim of this review article is to improve bone re-absorption, cure bone disorder like Osteoporosis by Giloy, as it is an plant so it's active constituents have less side effect. The active constituents of this plant have several pharmacological use. All the structure of active constituent present in *T. cordifolia* are given below.



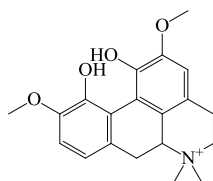
Alkaloids



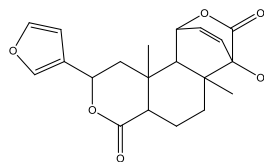
Berberine



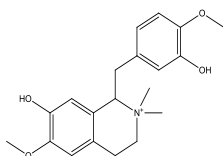
Palmatine



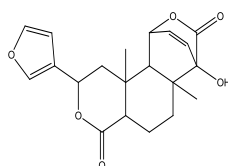
Magnoflorine



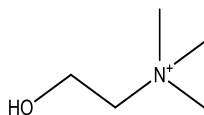
Tinosporin



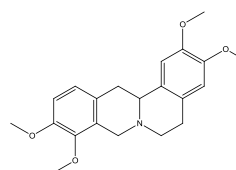
Tembetarine



Isocolumbin

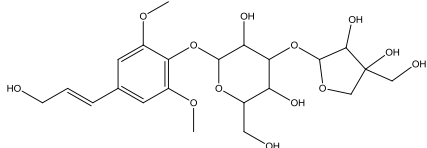


Choline

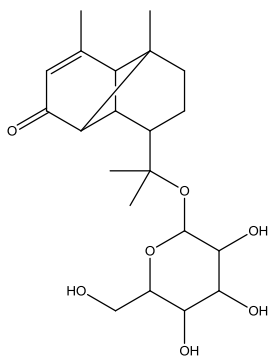


Rotundine

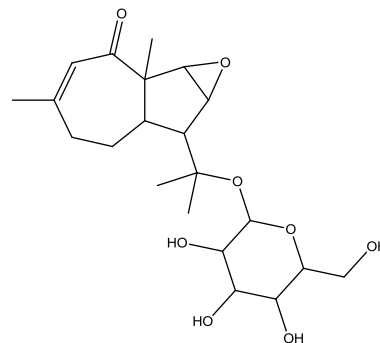
Glycosides



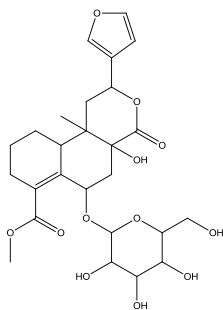
Cordifolioside A



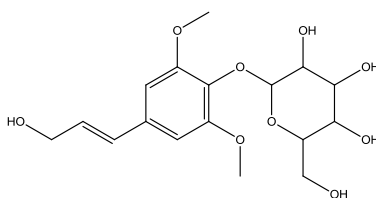
Tinocordiside



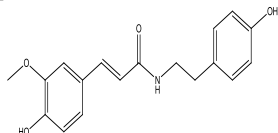
Tinocordifolioside



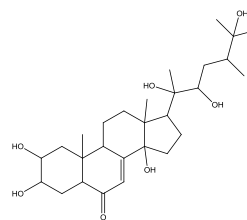
Cordioside



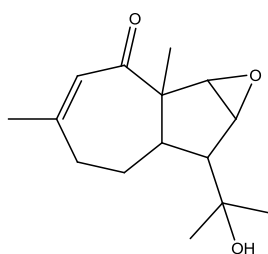
Syringin

**Miscellaneous compounds**

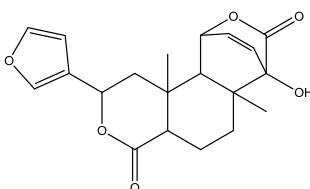
N-trans-Feruloyltyramine



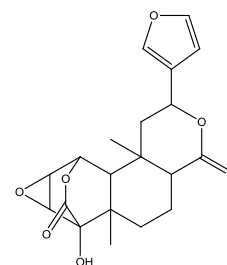
Makisterone A

Sesquiterpinoids

Tinocordifolin

Diterpenoid lactones

Columbin



Tinosporide

Aliphatic compounds

Heptacosanol



Nonacosan-15-one



Octacosanol

2.1. Bone Biology

Bone modeling and remodeling maintain through the balanced of osteoblast and osteoclast, that are responsible for bone resorption and bone formation respectively. For menopausal women the loss of bone mineral density after 5- 10 years of menopause is termed postmenopausal or age-related osteoporosis (Gao, et al., 2021). Estrogen, a strong inhibitor of function and differentiation of osteoclasts. Estrogen deficiency origins the expression of the estrogen-induced receptor activator for nuclear factor kappa- B ligand (RANKL), antagonist osteoprotegerin (OPG) to decrease, resulting in activation and proliferation of osteoclasts through the OPG/RANKL pathway. The bone re-modelling cycle take place in 5 stages- **Activation**, In which stage osteoblastic expression of M-CSF (macrophage colony-stimulating factor) and RANKL stimulate pre-osteoclast progenitor maturation and diferentiation into osteoclasts). **Re-absorption** of bone by the help of osteoclasts. **Reversal**, formation of new bone by osteoblasts. **Termination**, bone returns to quiescent phase. **Bone re-modelling** is stimulated by PTH and calcitriol, is inhibited during the quiescent phase by sclerostin, which inhibits WNT signaling driven bone development and OPG which inhibits RANK-RANKL interaction (Rowel, et al., 2022) (Fig 3).

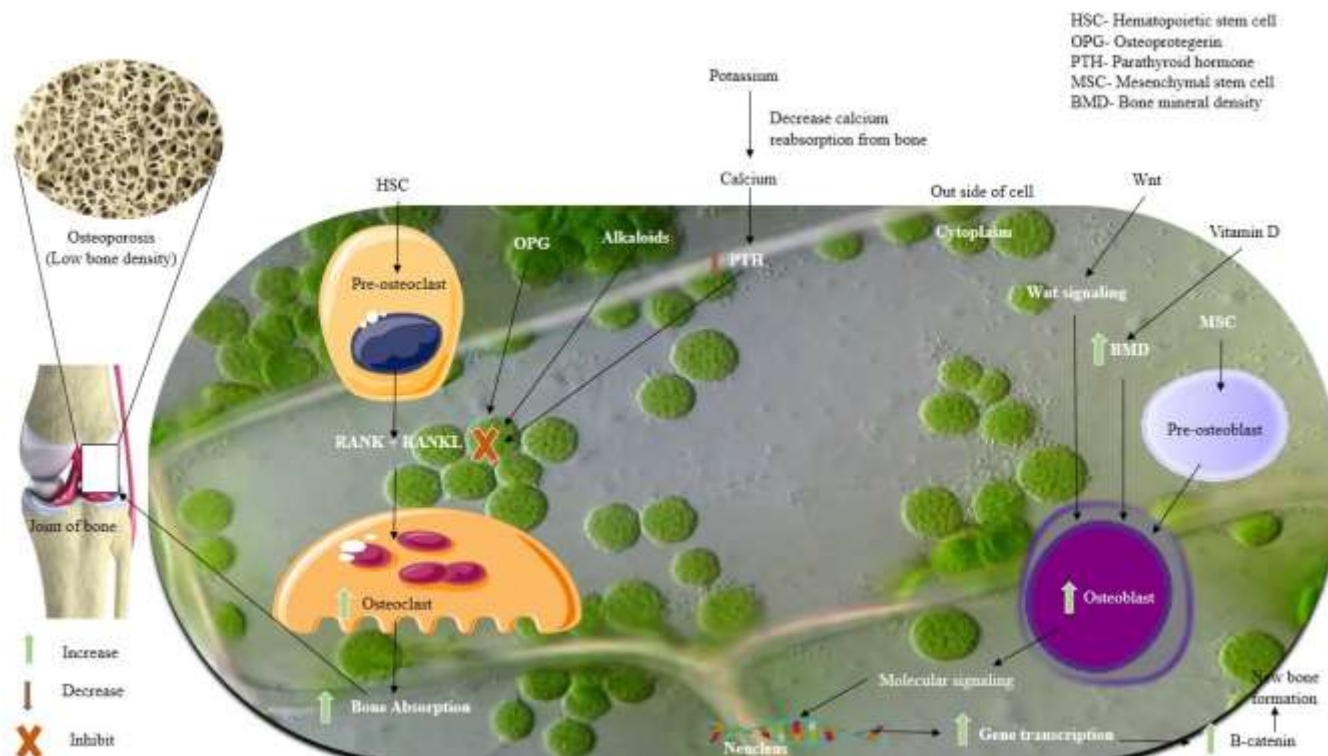


Fig 3- Re-modelling cycle and regulators of bone.

3. TREATMENTS

There are several pharmacological options for osteoporotic treatment that aim to decrease the risk of fractures. These include:

- Calcium and vitamin D
- Antiresorptive therapy- Denosumab, Bisphosphonates (They bind strongly to hydroxyapatite which inhibit osteoclast-mediated bone resorption, increase BMD).
- Hormonal treatment- PTH analogues, Testosterone, Selective oestrogen receptor modulators (They decrease the RANK-RANKL interaction for that osteoclast activity decrease).
- Novel therapies- Romosozumab, Dickkopf-1 (Dkk1) inhibitors (They work as an antagonist of Wnt molecular signaling pathways, increase osteoblastic activity for bone formation) (Barnsley, et al., 2021).

4. RESULTS & DISCUSSION

Molecular docking study of *T. cordifolia* active constituents and their activity on RANKL/ OPG with tinosporinone (Fig 4)-

Tinosporine is an alkaloids with molecular formula $C_{19}H_{18}O_6$, 342.3 molecular weight, containing canonical SMILES- CC(C(=O)C1=CC2=C(C=C1)OCO2)C(=O)C3=C(C=C(C=C3)OC)OC, present in *T. cordifolia*. In chemical compound data base (Pubchem) Tinosporine is known as Tinosporione, Pubchem CID- 42607646. According to molicular docking It is hingly active compund can bind with H bonds, Z chains of RANKL/ OPG. In figure 5 we can see the green area becomes less after binding as Tinosporione rstrick the Z chain and H bonds of the RANKL/ OPG (Table 1).

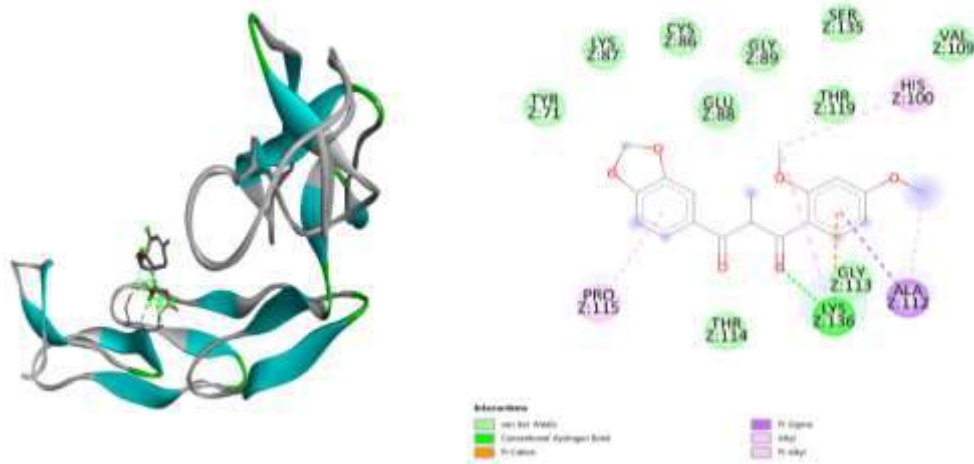


Fig 4- Tinosporinone binding to z-chain of RANKL/OPG complex

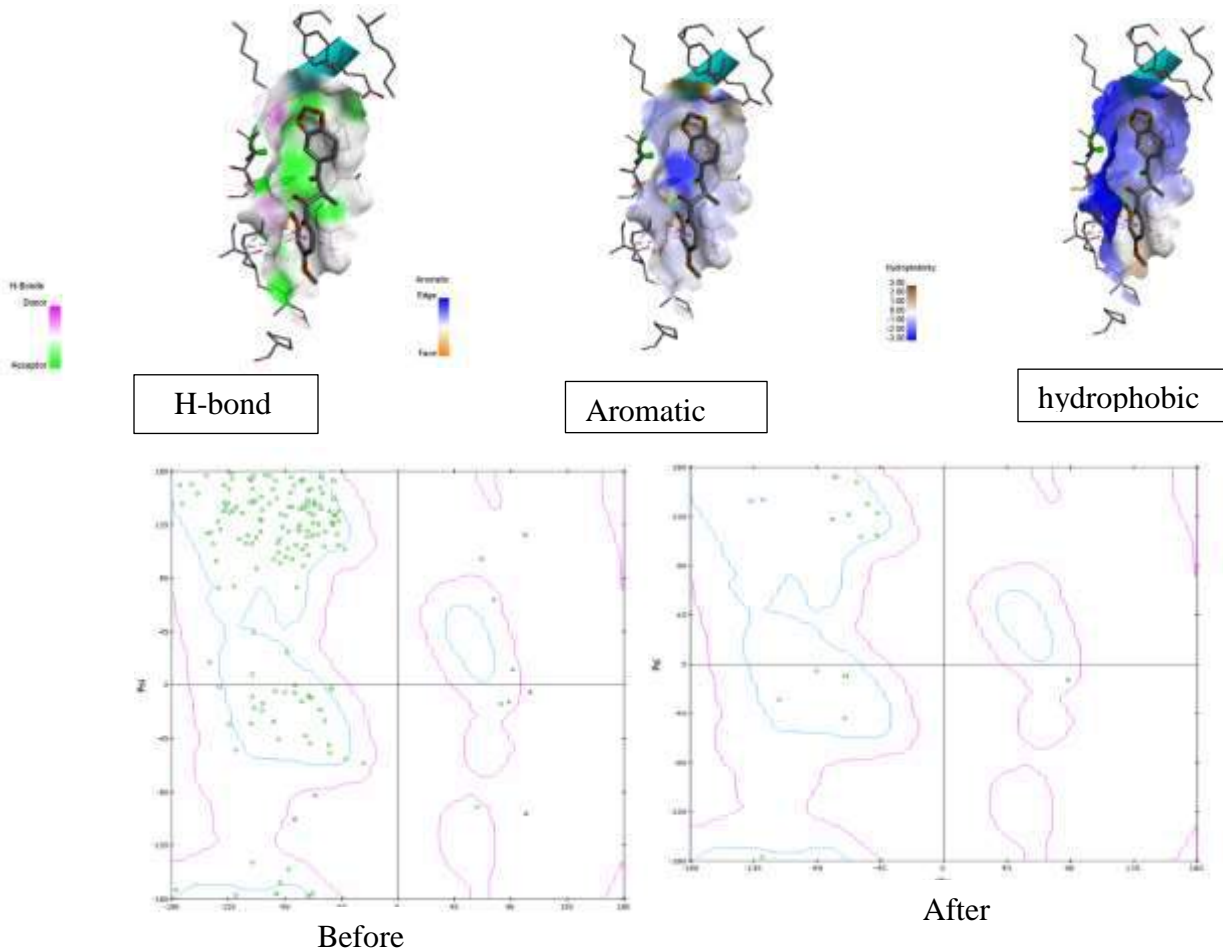


Fig 5- Ramachandran plot for z-chain of RANKL/OPG before and after docking with tinosporinone.

**Table 1- Binding Affinity of different ligands on RANKL/OPG complex**

Sl. No.	Ligand- RANKL/OPG complex	Binding Affinity
1.	Tinosporinone (3urf.mod_100926540_uff_E=1853.03)	-5.2
2.	Berberine (3urf.mod_2353_uff_E=579.86)	-6
3.	Ecdysterone(S) (3urf.mod_12304165_uff_E=1002.21)	-5.9
4.	Isocolumbin (3urf.mod_24721165_uff_E=902.37)	-6.4
5.	Tinocordifolin (3urf.mod_100926540_uff_E=1853.03)	-5.2

5. CONCLUSION

As a versatile traditional medicine, *T. cordifolia* is a promising ethno-medicinal plant with extracts and phyto compounds exhibiting multifarious bioactivities. The extensive literature survey revealed, Giloy used for the treatment of antibacterial, antioxidant, and anti-inflammatory, anti-cancer, antioxidant, antiulcer, antidiarrheal, neuroprotective, gastroprotective, hepatoprotective and antidepressant from ancient time. Traditional uses of Giloy has validated through in vitro and in vivo pharmacological studies. Present review focussed on the Molecular docking on RANKL/ OPG gene, which play an important role in Bone maintenance disorder. Currently, more than 41 compounds have been isolated by ethanolic extraction process; among them Berberine, Palmatine, cordifolioside A, Tinosporinone, Ecdysterone, Isocolumbin, Tinocordifolin are the major active constituents. In-depth studies on chemical ingredients, their natural activity site, binding affinity to the RANKL/ OPG genes are needed to be conducted with some clinical practices on rats. Moreover, clinical trials are needed to identify any adverse effects and possible interactions between this herbal drugs and synthetic medicines containing Berberine, Palmatine, cordifolioside A, Tinosporinone, Ecdysterone, Isocolumbin and Tinocordifolin. Several studies suggest that this plant is non-toxic, meaning that the dose needed for showing pharmacological activities are very low compared to their toxic levels. To better establish the safety limits for this plant toxicity studies should be carried out.

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THE RELATIONSHIP BETWEEN EXTERNAL PUBLIC DEBT AND ECONOMIC GROWTH: AS A CASE OF UZBEKISTAN

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ABSTRACT

This study investigates the relationship between external debt and economic growth in the Uzbekistan during the period 2010–2020. Two-step Engle and Granger Cointegration method is employed to determine the cointegration relationship between external debt and GDP growth. Our findings show that there is a negative significant relationship between external debt and economic growth. We can also observe that a 1% increase in external debt will lead to a 24% decrease in GDP growth. Also the results of ECM model suggests that if economic shocks and periodic downturn occur in GDP as a result of external debt, then 86.0% will return to its equilibrium in each subsequent short period. This suggests that GDP growth may return to its equilibrium after a period of 1.17 (1/86) from debt crisis and shocks.

KEYWORDS: economic growth, cointegration, debt overhang, external public debt, error correction model.

INTRODUCTION

Almost all economies have public debt, and external public debt plays an important role in determining economic growth. Public debt is a universal phenomenon that occurs in all countries and has a significant impact on the economy in the short and long term. (Lakshmanasamy, 2021). The sources of public debt are internal and external public debt. The sources of internal public debts from which the government borrows include individuals, banks, business firms and others and the sources of external debt are the foreign commercial banks, international financial institutions like IMF, World Bank, and other national governments, as debt owed to non-residents repayable in terms of foreign currency, food or service. The effect of external debt on investment and economic growth of the country has remained questionable and there has not been consensus on the impact of external debt on economic growth. External debt may be used to stimulate the economy but whenever a nation accumulates substantial debt, a reasonable proportion of public expenditure and foreign exchange earnings will be absorbed by debt servicing and repayment with heavy opportunity cost (Wijeweera et al. 2007). The conventional view is that public debt reflects deficit financing and hence stimulate aggregate demand and output in the short run, but crowds out capital and reduces output in the long run (Elmendorf and Mankiw, 1999) An excessive external debt constitutes an obstacle to

sustainable economic growth and poverty reduction (Ajayi and Oke, 2012). Moreover, public debt, foreign debt, has an independent existence outside the budget and public finance.

Public debt influences the economy through several channels. High levels of public debt can adversely affect capital accumulation and growth via higher long-term interest rates, higher future distortionary taxation, inflation, and greater uncertainty about prospects and policies. In more extreme cases of a debt crisis, by triggering a banking or currency crisis, these effects can be magnified. High external debt is also likely to constrain the scope for countercyclical fiscal policies, which may result in higher volatility and further lower growth. In the standard neoclassical growth theory, an increase in government debt leads to slower growth due to a fiscal deficit, a temporary decline in growth along the transition path to a new steady-state while in the endogenous growth, high government debt leads to a permanent decline in economic growth.

In developing country contexts, few available studies on the impact of external debt on economic growth are motivated by the debt overhang hypothesis, a situation where a country's debt service burden is so heavy that a large portion of output accrues to foreign lenders and consequently creates disincentives to invest. Even few available evidence on the public-debt-economic growth relationship in developing countries are mixed. While studies like Imbs and Ranciere



(2005) and Pattillo et al. (2011) find a nonlinear effect of external debt on growth i.e. a negative and significant impact on growth at high debt levels, typically over 60 percent of GDP and an insignificant impact at low debt levels, Cordella et al. (2010) find evidence of debt overhang for intermediate debt levels but an insignificant debt-growth relationship at very low and very high levels of debt. Despite the theoretical predictions and empirical evidence in advanced economies, there is little systematic analysis and evidence of the impact on GDP growth of high public debt. Specifically, little is known on the public debt effects on growth along with the other determinants of growth as well as issues such as reverse causality i.e. low growth can lead to large public debt (Lakshmanasamy, 2021).

Therefore, this study attempts to examine the statistical relationship between external public debt and economic growth in Uzbekistan along with other macroeconomic variables. This study uses annual time series data for 10 years from 2010 to 2020. The data are derived from the World Development Indicators of the World Bank. The macro variables considered are the GDP growth, gross capital formation, percentage share of external public debt to GDP. Empirically, this study applies the two-step Engle and Granger cointegration approach to study the behaviour of the variables in Uzbekistan.

LITERATURE REVIEW

Sulaiman and Azeez (2012) carried out a study on the effect of external debt on economic growth in Nigeria. An annual time series data covering the period 1970-2010 was used. The empirical analysis carried out using the Ordinary Least Squares (OLS) revealed that a long-run relationship exist between external debt and economic growth. The findings from the error correction model revealed that external debt contributes positively to economic growth of the Nigerian economy. The findings supported the Keynesian proposition which states that the absolute size of the debt does not matter, but what matters most are the interest payments on the debt. Foreign funding can supplement domestic savings so as to boost economic growth. In addition, the study also recommended that the Nigerian economy should ensure political and economic stability so as to ensure effective debt management.

A similar study by Faraji and Makame (2013) found mixed results whilst investigating the impact of external debt on the economic growth in Tanzania. Time series data on external debt and economic growth covering the period 1990-2010 was used. The Johansen test of cointegration showed that there is no long-run relationship between external debt and economic growth in Tanzania. Nevertheless, the findings showed that external debt stock and debt service both have significant impact on real GDP growth. Total external debt stock had a significant positive effect and debt service payment had a significant negative effect on economic growth. The findings favor the crowding-out hypothesis which states that debt service payments have more detrimental effects to economic growth rather than the debt stock.

Contrary to the above findings, Clements et.al (2003) found a non-linear relationship between external debt and economic growth using a panel dataset of 55 low-income countries over the time period 1970 to 1999. The researchers estimated that the critical threshold turning point in the net present value of external debt is in the range of 20 percent to 30 percent of GDP. Their conclusion is closely related to the debt-overhang hypothesis as defined by Krugman (1988). Beyond a certain threshold, the value of the debt will have opposing effects on growth due to growing uncertainty over a country's repayment ability. The end result will be reduced investment incentives and potential growth.

Shah and Pervin (2012) analyse the effect of external debt on economic growth in Bangladesh. during the period 1974 to 2010 applying the error correction model. To specify the debt overhang and crowding out effect of external public debt, the debt burden has been segmented into two parts - external debt stock and external debt service. The study shows a significant negative effect of external public debt service and a positive effect of external public debt stock on GDP in the long run. In the short run, the external public debt has a negative effect while the debt stock does not have any significant effect on the GDP. The study finds no evidence of debt overhang on GDP as there is no significant adverse effect of debt stock on GDP, but finds evidence of an adverse effect of debt service payment resulting in the crowding-out effect on economic growth. There is a dichotomy between debt stock and service payment, and hence the reconciliation of debt should be prudent to optimise growth.

Woo and Kumar (2015) explore the long-run effects of high public debt on economic growth for a panel of advanced and emerging economies over the period 1970-2007. The study finds an inverse relationship between initial debt and subsequent growth. With a ten percent increase in the debt-GDP ratio, the annual growth of real GDP per capita decreases by 0.2 percentage points per year. The effect is much muted in developed countries. Only high levels of debt above 90 percent of GDP have a significant negative effect on growth. Patillo et al. (2011) show that the marginal impact of the net present value of external debt on economic growth becomes negative for debt ratios ranging from 5 to 50 percent of GDP.

Hadhek and Fatma (2014) examine the effects of debt on economic growth and the contribution of investment to the economic growth of 19 developing countries covering the period 1990 to 2011 and applying dynamic panel data methods. The study hypothesizes a negative effect of two measures viz. total external debt to GDP and external debt as a percentage of GNI ratio, on economic growth and negative interaction between these two debt measures and investment. The study finds external debt negatively affects economic growth and negative interaction between external debt and investment in these countries.

METHODOLOGY AND DATA

Following neo classical growth model GDP growth rate is dependent variable and the independent variables are labour, capital, and external debt. The GDP growth (GDP_growth), Population of working age group



(15-64) as percentage of total population (WAG) used as proxy of labour force, Gross capital formation (GCP) used as capital variable and External debt to GDP (ExD) data are derived from world development indicator (WDI) of World Bank. Gross capital formation data is converted to natural logarithm data (lnGCF).

The General Empirical Model

Empirical model is formulated from the analysis of neoclassical production function. Following Cunningham (1993) the production function is used to explain the relationship of GDP growth and External debt. The production function is similar as export considering production function. The external debt affects the productivity of labour and accumulation of capital. So it is rational to include external debt in the production function.

$$Y = f(K, L, ED)$$

Where, Y= GDP growth, K= capital, L=labour, ED=external debt

Only external public debt burden is included in this model though Cunningham model includes nation's total debt burden. So general model is specified as

$$GDP_growth = \alpha + \alpha_1 * lnGCF + \alpha_2 * WAG + \alpha_3 * ED + \mu$$

GDP = gross domestic product growth

lnGCF = natural logarithm of gross capital formation
WAG = percentage share of working age population to total population

ExD = percentage share of external public debt to GDP
 α = constant term

α_i = responsiveness coefficient of independent variable to dependent variable.

μ = error term

STATA16 has been used for the necessary calculations.

ANALYSIS AND RESULTS

The econometric technique used in the empirical analysis is the Engle and Granger cointegration methodology. To avoid any inconsistency in the coefficient estimation, the series is required to be stationary. Therefore, it is critical to check the presence of unit root and to identify the integration order of the series.

Unit Root Test

The unit root test of stationary of time series data was determined before the cointegration and Error correction model. The unit root test was performed using the Argumented Dickey-Fuller (ADF) test, developed by Dickey and Fuller (1981), to examine variables from a stationary point of view.

Table 1
Results of the ADF Unit Root Test Variable

	Level I(0)		1st difference I(1)
GDP_growth	-1.954	Δ GDP_growth	-8.108 ***
LnGCF	-2.018	Δ LnGCF	-3.298**
WAG	-1.805	Δ WAG	-7.099 ***
ExD	-1.448	Δ ExD	-4.380**

***1% significance level, **5% significance level.

Decision criteria: If the Argumented Dickey-Fuller (ADF) test statistic is greater than the MacKinnon critical value, the variable is stationary, and if the ADF test statistic is less than the MacKinnon critical value, the variable is not considered stationary. The maximum lag lengths were set to 1 and Akaike (AIC) Criterion was used to determine the optimal lag length.

The results of the unit root test of the variables are given in Table 1. If the given variables are not stationary at level I (0), but are stationary in the first differences, at I (1), then the cointegration test can be performed. Cointegration is one of the most important tools in modeling long-term relationships, mainly in time series data. Cointegration is a statistical method used to verify the relationship between two or more non-stationary time series over a long period of time or over a specified period of time. This method helps to determine the equilibrium of two or more sets of variables with long-term parameters. In our cases, the results of the unit root tests show that all variables are non-stationary in level I(0) but stationary in first differences I(1), so the two-step Engle and Granger cointegration test between the variables can be performed for Uzbekistan.

ENGLE AND GRANGER COINTEGRATION MODEL

The cointegration test is used to determine if there is a correlation between two or more variables in the long-term. This theory was first introduced in 1987 by Nobel laureates Engle and Granger. Among a number of alternative methods, the Engle-Granger Cointegration model has received considerable attention in recent years. One of its main advantages is that the long-run equilibrium relationship between these variables (cointegration regression) can be modeled and determined by straightforward regression, including the levels of the variables.

In the first step of the Engle-Granger Cointegration model, all dynamics are not taken into account and cointegration regression is evaluated using the standard OLS (Ordinary least squares) evaluation method and whether there is a long-term correlation between variables. (Regression Equation 1).

$$Y_t = \beta_0 + \beta_1 X_t + \varepsilon_t \quad (\text{Equation 1})$$

$$GDP_growth_t = \beta_0 + \beta_1 * LnGCF_t + \beta_2 * WAG + \beta_3 * ExD + \varepsilon_t \quad (\text{Equation 1.1})$$



Using cointegration equations in the analysis, GDP_growth is evaluated as a dependent variable (Regression equation 1.1). The residuals of these regression equation are determined and checked for stationary. If the OLS residuals (ε_t

-residuals) are stationary at level I (0), it can be concluded that there is a long-term relationship between variables. The results of stationary OLS residuals (ε_t -residuals) are given in Table 2.

Table 2
Augmented Dickey-Fuller (ADF) stationary statistical test results of residuals

Variables	Augmented Dickey-Fuller test statistic	p-value	MacKinnon critical value			Results
			1%	5%	10%	
GDP _{dependent}	-9.171	0.0000	-2.660	-1.950	-1.610	stationary

According to Table 2, all residuals of regression equations are stationary at level I(0), indicating that there is a long-term relationship between GDP_growth and external debt in the country.

The second step Engle-Granger Cointegration model involves assessing the relationship between external debt and GDP_growth using the Error Correction Model (ECM) (Regression Equation 2). In this model, the error correction term (ECT) or, in other words, the speed of return to the previous stable cycle must be negative and statistically significant.

Error Correction Model

$$\Delta y_t = c + \beta_0 \Delta x_t + \gamma \text{ect}_{t-1} + u_t \quad (\text{Equation 2})$$

Where: Error correction term (ECT) - this shows the speed of return to the previous stable cycle for each subsequent short period when an unbalance occurs in a time series in a dependent variable under the influence of certain economic shocks.

Table 3
Regression Result of ECM, Δ GDP growth as Dependent Variable

Δ GDP_growth	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
$\Delta \ln$ GCF	-1.22	1.521	3.43	.019	1.312	9.129	**
Δ WAG	.438	.365	1.20	.285	-.502	1.377	
Δ ExD	-.241	.047	-5.13	.004	-.361	-.12	***
ect _{t-1}	-.859	.319	-5.82	.002	-2.679	-1.038	***
Constant	.053	.221	0.24	.82	-.514	.621	
Mean dependent var		-0.588	SD dependent var			1.417	
R-squared		0.941	Number of obs			10	
F-test		19.929	Prob > F			0.003	
Akaike crit. (AIC)		16.003	Bayesian crit. (BIC)			17.516	

*** $p < .01$, ** $p < .05$, * $p < .1$

The estimated ECM results are quite satisfactory especially as the speed of correction in short term disturbance towards the long-run stable relationship (-0.859) is negative and statistically significant. The ECM indicates that any divergence from the long-run relation in the current period should be adjusted by around 86 percent in the following period. This shows that the short-run disequilibrium is corrected by about 86 percent every year and eventually the long-run relationship would be restored in a short span of time. While an increase in share of working age population to total population positively affects economic growth and statistically insignificant, external debt reduces economic growth by -24 percent. Further, the effect of the changes in the gross capital formation on growth is significantly negative. This implies the crowding-out effect of external debt, that external debt crowds out capital and reduce output growth in the long run. Thus, external debt impacts economic growth negatively in Uzbekistan.

CONCLUSION

This study examines the effect of external public debt on economic growth in Uzbekistan over a period of 10 years from 2010 to 2020. The study applies the Engle-Granger Cointegration method to estimate the long-run and short run relationship of external debt on GDP growth using the aggregate data derived from the World Bank statistics.

Firstly, to achieve the goal of this study, the stationary of the variables and their order of integration (I) were tested using the Augmented-Dickey Fuller (ADF) test.

The ADF test results show that all variables are not stationary at I(0), but were found to be stationary at I(1) in their first differences. Therefore, the Engle-Granger Cointegration test was used in all versions of the regression models.

The first step of the Engle-Granger Cointegration test examined whether there was a long-term correlation between external debt and GDP growth. And the results the first step has shown that there is a long-term relationship between external debt and GDP growth.



In the second step of the Engle-Granger Cointegration test, short-term correlations between external debt and GDP were assessed using the Error correction model (ECM).

The analysis of model of ECM shows that the Error correction term is -0.86, if economic shocks and periodic downturn occur in GDP as a result of external debt, then 86.0% will return to its equilibrium in each subsequent short period. This suggests that GDP growth may return to its equilibrium after a period of 1.17 (1/86) from debt crisis and shocks. We can also observe that a 1% increase in external debt will lead to a 24% decrease in GDP growth.

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EFFECTS OF IMAGERY TRAINING ON PHYSIOLOGICAL VARIABLES AMONG HANDBALL PLAYERS

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ABSTRACT

The aim of the present study was to find out the effects of imagery training on physiological variables among handball players. To achieve the purpose of the study male handball players were selected from Government Arts and Science College, (Affiliated to Bharathiar University, Coimbatore) Modakkurichi, Erode, Tamilnadu, India. The subject's age ranges from 19 to 24 years. The selected subjects were divided into two equal groups consists of fifteen male handball players each namely experimental group and control group. The experimental group underwent a game specific exercise package programme for twelve weeks. The control group was not taking part in any training during the course of the study. Resting pulse rate and breath holding time was taken as criterion variable in this study. The selected subjects were tested on resting pulse rate and breath holding time was measured through pulse oximeter and digital stop watch. Pre-test was taken before the training period and post- test was measured immediately after the twelve-week training period. Statistical technique 't' ratio was used to analyze the means of the pre-test and post test data of experimental group and control group. The results revealed that there was a significant difference found on the criterion variable. The difference is found due to imagery training package given to the experimental group on resting pulse rate and breath holding time when compared to control group.

KEYWORDS: Imagery Training, Handball Players, Resting Pulse Rate and Breath Holding Time.

1. INTRODUCTION

Imagery training is a most powerful mental training technique. Most of the world's top sports persons regularly practice imagery. Imagery is nothing more than systematic practice of creating and strengthening strong positive mental image. It is dramatically effective for converting the desires from mental state to physical state. Imagery is one of the popular mental preparation strategies where players try to mentally picture themselves (going through the actual movement in their mind) prior to competition/training. The different terms used for imagery are visualization, mental rehearsal and mental practice. Modern team handball consists of intense, intermittent activities such as running, sprinting, jumping as well as regular in fights between players (i.e. holding, pushing etc.). Research indicates that heavy, strong players, who are not compromised in regard to running capacity or speed seems to be superior. The need for bigger, stronger and faster team handball players is supported by the development in anthropometrics and physical performance parameters over the years. Besides the advantage of physical superiority, tactical and technical skills are better expressed if a player is not inhibited by poor conditioning. In addition, tougher tournaments, more games per season and more aggressive playing supports the need of optimal conditioning. Thus such type of imagery training program is a need for the player to excellent in sport. Thus the present study has been carried out to study the effects of imagery training on physiological variables among handball players.

2. METHODOLOGY

2.1 Selection of Subjects

The aim of the present study was to find out the effects of imagery training on physiological variables among handball players. To achieve the purpose of the study male handball players were selected from Government Arts and Science College, (Affiliated to Bharathiar University, Coimbatore) Modakkurichi, Erode, Tamilnadu, India.



2.2 Selection of Variables

Independent Variable

- Imagery Training

Dependent Variables

- Resting Pulse Rate
- Breath Holding Time

3. EXPERIMENTAL DESIGN AND IMPLEMENTATION

The selected subjects were divided into two equal groups consists of 15 male handball players each namely experimental group and control group. The experimental group underwent an Imagery Training package programme for twelve weeks. The control group was not taking part in any training during the course of the study. Resting pulse rate and breath holding time was taken as criterion variable in this study. The selected subjects were tested on resting pulse rate and breath holding time was measured through pulse oximeter and digital stop watch. Pre-test was taken before the training period and post- test was measured immediately after the twelve-week training period.

4. STATISTICAL TECHNIQUE

The dependent 't' test was used to analysis the significant differences, if any, difference between the correspondingly.

4.1 Level of Significance

The 0.05 level of confidence was fixed to test the level of significance which was considered as an appropriate.

4.2 Analysis of the Data

The significance of the difference among the means of the experimental group was found out by pre-test. The data were analyzed and dependent 't' test was used with 0.05 levels as confidence.

Table-I
Comparison of Mean, and't'-Values of Physiological Variables between Pre & Post Test among Experimental and Control Groups

S. No	Skill Performance Variables	Groups	Test	Mean	't' Values	
1.	Resting Pulse Rate	Experimental group	Pre Test	72.83	10.19*	
			Post Test	70.18		
		Control group	Pre Test	72.33		1.12
			Post Test	72.40		
2.	Breath Holding Time	Experimental group	Pre Test	51.50	8.90*	
			Post Test	58.98		
		Control group	Pre Test	51.20		1.12
			Post Test	52.38		

*Significant at 0.05 level of confidence

Table-I reveals that the obtained mean values of per test and post test of experimental group for resting pulse rate and breath holding time were 72.83 and 70.18, 51.50 and 58.98 respectively; the obtained 't' ratio were 10.19* and 8.90* respectively. The tabulated't' value is 2.14 at 0.05 level of confidence for the degree of freedom 14. The calculated't' ratio was greater than the table value. It is found to be significant change in resting pulse rate and breath holding time of the handball players. The obtained mean values of pre test and post test scores of control group were 72.33 and 72.40, 51.20 and 52.38 respectively, the obtained't' ratio was 1.12 and 1.12. The required table value is 2.14 at 0.05 level of confidence for the degree of freedom 14. The calculated't' ratio was lesser than the table value. It is found to be insignificant changes in resting pulse rate and breath holding time of the handball players. The mean values of resting pulse rate and breath holding time among experimental group and control group are graphically represented in figure-1

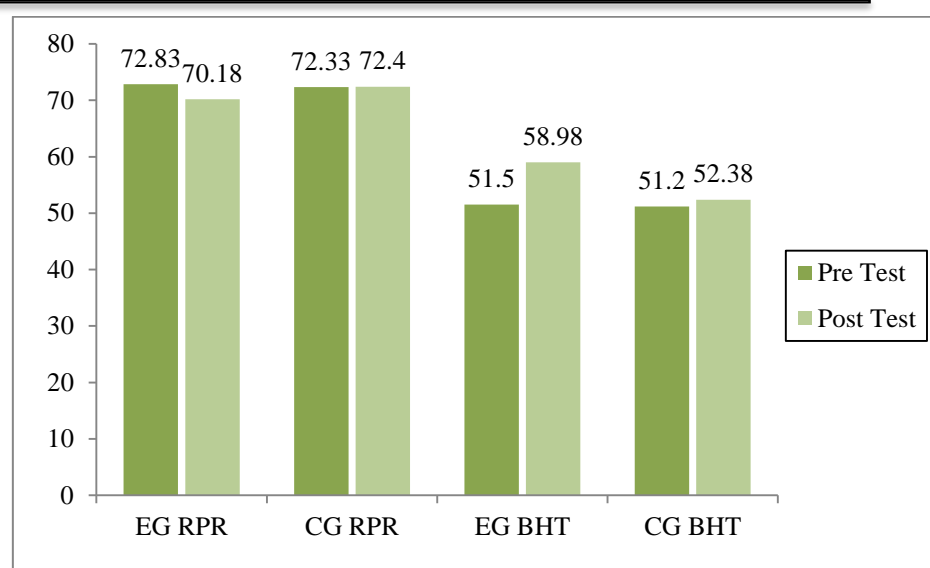


Figure-1: Bar Diagram Showing the Pre Test and Post Test on Resting Pulse Rate and Breath Holding Time of Experimental and Control Groups.

5. DISCUSSION ON FINDINGS

The effects of the study indicates that the experimental group, namely impacts of imagery training group had significantly improved the selected dependent variable, namely resting pulse rate and breath holding time, when compared to the control group. It is also found that the progress caused by imagery training when compared to the control group.

It is inferred from the literature and from the result of the present study. That systematically designed training develops dependent variables are very importance quilts for better performance in almost all sports and games. Hence it is concluded that systematically designed training may be programmes of all the discipline in order to achieve maximum given due recognition and implemented properly in the training performance. These findings are in accordance with the findings of **Senthil Kumaran (2021)**⁴, **Senthil kumaran & mahaboobjan (2018)**¹⁴, **Senthil Kumaran, Jenith, Abdul Halik & Kodeeswaran (2021)**⁹, **Ooraniyan & Senthil Kumaran (2018)**¹⁶ and **Muniyappan & Vallimurugan (2017)**¹⁷.

6. CONCLUSIONS

On the basis of the results obtained the following conclusions are drawn,

- ✚ There was a significant variation between experimental and control group on resting pulse rate and breath holding time after the training period.
- ✚ There was a significant improvement in resting pulse rate and breath holding time. However, the improvement was in favor of experimental group due to twelve weeks of imagery training.

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KEY CHALLENGES FACED BY ISLAMIC FINANCIAL INSTITUTIONS IN SRI LANKA IN OFFERING SHARIAH COMPLIANT PRODUCTS AND SERVICES

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ABSTRACT

Islamic banking and finance industry is a speedily and widely-ranging growing sector globally since its structured business initiation in the late 20th century AD. It is actual fact that Islamic and non Islamic nations are seriously concerning their curiosity to implement this potential banking and finance system in their countries and states presently as a result of negative impacts of burdensome interest system on their economics. At the same time, Islamic banking industry started its functions few decades ago among the influence of well established conventional banking and finance sector in Sri Lanka and it is developing gradually among the Muslims and other community people. However, it is notable that in Sri Lanka where Muslims are living minority level, the Islamic banking and financial institutions have to confront a number of challenges in their daily functions and the development as well. Consequently, the main objective of this study is to clarify the major Challenges faced by Islamic financial institutions in Sri Lanka. Accordingly, the study is designed as qualitative method and personal direct interview with semi structured questionnaire is used in data collection. The questionnaire for interview is dealt with selected important matters relating to the particular study. Furthermore, the secondary data required is also collected and utilized from related literatures and sources. Descriptive statistic analytical techniques are used in data analyzing to carry out the study effectively. In this context, the findings reveal that there are many negative impacts faced by Islamic banking and financial institutions in Sri Lanka in the operations of offering Shariah compliant products and services by means of the major challenges. Consequently, it is much important to find proper solutions to overcome these challenges and in the development of the sector.

KEY WORDS: *Islamic Financial Institutions, Challenges, Shariah compliant, Sri Lanka, Finance Products and Financial Services*

INTRODUCTION

It is important to notify that the banks and financial institutions are playing crucial role by way of various strategic manners within the financial sector globally at present. They provide numerous financial services in the economy of countries and states and offer many kinds of financial services and products for their customers through their branches almost in all parts of the world. Specially, these banks and financial institutions mobilize funds from investors and apply them to investments in trade and business activities (Natalie Schoon, 2010). Moreover, their operations and activities are closely observed in many countries for the past many years including Sri Lanka to change the features of financial transactions in various methodical ways.

Nevertheless, the financial operations and services of these conventional banks and financial institutions are generally perceived by Muslim scholars deeply absorbed in giving respect to the Syariah as laid systems on the foundation of interest partly. They strongly believe that, it sets out against the principles of Islamic Syariah (Ahmet Akgunduz, 2009) which utterly prohibits any kinds of interest system found in the business or any financial transactions among the Muslims. In this context, it is pertinent to recall or remind what the Almighty Allah reveals in the holy Qur'an as:

“O you, who have believed, Devour not usury, doubled and multiplied; but fear Allah that ye may (really) prosper” (Surah Al - Imran 3:130)



Hence, it is obvious that there are Islamic barriers against the system of interest taxation, regulation and standardization of non Islamic banking system for implementation in accordance with the perspective of the holy Qur'an as well as the Hadiths of prophet Muhammad (PBUH).

On the other hand, the Islamic banks and financial institutions are presently well recognized in the world financial sectors systematic, specially, for their dynamic functions in enhancing the process of the trade and industry development without the practice of interest (Riba). In the present situation, these excellent banks and financial Institutions are extensively and widely established with more enthusiastically in each and every parts of the Muslim World.

In the early establishment of the industry, many Muslim countries in the world paid their solemn attentions to introduce Islamic banking and finance in their monetary system since the middle of 20th Century AD. Initially, the Islamic Development Bank (IDB) was officially established in October 1973, with founding members from 22 Islamic countries, and then it started its banking activities on 20th October 1975. The bank's main office is located in Jeddah, Kingdom of Saudi Arabia. It has two regional offices in Rabat, Kingdom of Morocco, and another in Kuala Lumpur, Malaysia. Subsequently, Dubai Islamic Bank was established in Dubai in 1975 by a group of businessmen from several countries as the first private Islamic bank in the world. Moreover, Faisal Islamic Bank in Egypt in 1977 and Faisal Islamic Bank in Sudan were also established as private Islamic banks and the Kuwait Finance House was set up by the government of Kuwait (Amr Mohamed El Tibi Ahmad and Amr Mohamed El Tibi, 2011). Presently, many kinds of financial services and products are being offered by these prominent banks among the Muslims in many parts of the world in line with extending its main objectives.

At the same time, Islamic Banking and finance sector is growing rapidly with the annual substantial rate globally, and familiarizing among the non-Muslims as well with the positive signs of future growth. This industry has a large number of Islamic banks and financial institutions in many countries in the world with enormous total transaction value. In fact, there are currently more than three hundred Islamic financial institutions spread over 51 countries, plus well over two hundred and fifty mutual funds in addition that comply with Islamic principles. Over the last decade, this industry has experienced growth rate of 10 - 15 percent per annum - a trend that is expected to continue with more involvement (Juan Sole, 2007).

Meanwhile, in the history of Sri Lankan financial sector, the establishment of Islamic financial institution originally took place in 1997. Amana Investment Limited (AIL), the pioneer Islamic financial Institution of the country, entered into the market to offer Islamic finance products and services first time in the beginning period of Islamic banking system. Continuously, several conventional banks and financial institutions began to disclose their deep interest and curiosity in establishing the Islamic banking windows under their banking

structure in a quick manner. Islamic banking and finance is allowed in the country by special provision in the regulation (conventional law). The provisions allow Islamic banks and financial institutions to exist as special financial organizations (Faleel Jamaldeen, 2012). In this scenario, subsequent to the entry of Amana, other 04 major conventional banks and financial institutions such as People's Bank, Bank of Ceylon, Muslim commercial Bank, and Lanka Oryx leasing financial company have also started Islamic banking windows and business units in their Banks and financial Institutions one by one to attract Muslims customers towards their banking and finance operations in par with Syariah compliant banking system. In this way, these 05 banking and finance institutions are major market players in the Sri Lankan Islamic banking and finance industry. Except, few other small unregistered financial institutions are also in the market to offer Islamic financial services.

Although these Islamic financial institutions and Islamic banking windows are functioning since 1997 onwards in the country, they have to confront a lot of major challenges and disputes in their smooth functions and development. Mainly, they are endeavoring very hard to carry out their day by day financial operations and transactions efficiently and effectively because of these pressing challenges found heavily and seriously. Therefore, it is pertinent to study and find out the actual facts as to how can the Islamic Financial Institutions be developed in Sri Lanka where Muslims are living as minor community? How can the Islamic Financial Institutions to be built up an equal to the non Islamic financial institutions for the betterment and achieve the aspiration of Muslim community in Sri Lanka? In this way, this study gets important to find out the major challenges which confronted by Islamic financial institutions in Sri Lanka, and to suggest proper recommendations and solutions to overcome strategically its expectation.

RESEARCH QUESTIONS

In order to achieve the objectives of the study, the following 03 research questions are developed by the researcher;

- What sort of major challenges do the Sri Lankan Islamic financial institutions mostly confront in Sri Lanka?
- Are there any affects and distress caused by these major challenges in the operations of Islamic financial institutions in Sri Lanka?
- Are these challenges as major impediments in the development of Islamic finance in Sri Lanka?

OBJECTIVES OF THE STUDY

The main objectives of the study are as follows;

- To find out what are the products and services offered by Islamic banks and financial institutions in Sri Lanka to Muslims and non Muslim customers and how do



they substantiate the Shariah compliant in those products and services.

- To clarify the major challenges confronted by Islamic banks and financial institutions in Sri Lanka in the technological, globalization and legal context and its impact on the development of Islamic finance industry.
- To contribute constructively valuable for major Islamic banks and financial institutions in the development the industry in Sri Lanka with proper recommendation

REVIEW OF LITERATURE

It is discussed in this sector with regard to the previous related researches and studies which are very close on to the exacting topic area. As a result of Islamic banking and finance is comparatively new in Sri Lanka, a few literatures were totally written and are accessible in this particular topic. In this way, the following literatures published in Sri Lanka as well as in other countries in the world are distinguished to review the related information and facts. Accordingly, one of the research articles explains that non-interest financing has traditionally been restricted to the informal sector, with transactions taking place within the Islamic communities whilst formal banking practices have remained un-Islamic throughout the post-independence period. As a minority group, the majority of Sri Lankan Muslims are forced to partake in the formal banking system which operates by flexing different forms of interest based services (Shuhada, 2009). In the meantime, another article reveals the curiosity of Sri Lankan Muslims on interest-free banking system. The editorial item points out that Sri Lankan Muslims have long awaited the entry of a full – fledged Islamic financial Institution that can provide them an opportunity to invest or deposit their money in a Syariah compliant manner (Riyazi Farook, 2007).

A further available editorial in this field focuses that a few key Islamic finance instruments available in the Sri Lankan marketplace and how they mirror the image of their counterparts within the framework of Syariah law as well as the tax and regulatory frameworks that govern it (Sarah Afker, 2009).

At the same time, it is vital to bring out some researches and studies done to on the subject of the challenges and problems faced in implementing Islamic Financial System in some other Muslim minority countries like Russia, India, Singapore, Hong Kong and United Kingdom. It is also helping us to compare the nature of the similar challenges of those countries with Sri Lankan Islamic financial institutions and banking windows. In this way, Renat Bakkin who is the Researcher of Moscow State Institute of International Relations states that with over 15 Million Muslims living in Russia today, the domestic introduction of Islamic financial services has been discussed and attempted by both businessman and scholars. But, is the country ready for it? (Renat Bakkin). He challenges to ask raising questions in the article.

Dr. Javed Ahamed Khan of the Institute of Objective Studies, India carried out his research on “Islamic Banking in

India - Scopes and Challenges” which contains selected papers on the diverse issues of Islamic Banking and finance in the context of a secular country like India, presented at a workshop organized by the Institute of the Objective studies in March 2000 at New Delhi. This research principally focuses on the mechanism as well as functions of Islamic Banking system with an objective to prove its viability and stability in an environment dominated by interest – based conventional banking system. Drawing upon the empirical researches, the authors assess the Muslim investor’s perceptions and behaviour on Islamic finance. In the light of existing rules and regulations of the Security and the Exchange Board of India, they raise the issues and challenges faced in the development of Islamic financial Institutions in India.

Another study reveals that how does Syariah Compliance work? I touched upon the challenges that Hong Kong government faces when trying to implement the required changes to establish a level of playing field between traditional financial products and the alternatives presented by Islamic finance. Looking at the experience in the UK provides a useful example of the absolute potential and growth this financial services niche offers (Rudiger Prenzlín, 2009).

METHODOLOGY OF THE STUDY

Data collection

This research is designed as qualitative method, and the Sri Lankan Islamic financial institutions are taken for the study. Compliant with the chosen topic, Primary and secondary data collection methods are very essential to carry out the research efficiently and effectively to explore the major challenges faced by Islamic financial institutions and its affects. Therefore, direct interviews with semi-structured questionnaire and the system of resource references are to be followed.

In this way, the direct interview and discussions held with the suitable personalities such as senior bank managers and executives of the selected Sri Lankan Islamic banks and financial institutions, Syariah scholars, lawyers, Quazi Judges, businessmen, other educated intellectual personalities and effective ordinary people, specially, who have the financial transactions with Islamic financial institutions as well as the conventional banks and non Islamic financial institutions in Sri Lanka, to gather valuable information related with research topic from them for the better productivity.

Based on the secondary data collection method, the necessary data were analyzed from the following resources;

- Annual Report of the Central Bank of Sri Lanka
- Annual Reports of related Islamic Financial Institutions
- Books and Manuscripts
- Magazines and Journals
- Appropriate Websites
- Audios, Videos and Broadcasts
- Syariah Standards

**Data Analyzing**

For data analysis, descriptive analytical techniques such as column chart, pie chart, bar chart were used and for the data analysis the researcher applied Microsoft excel software package to analyze the primary essential data obtained from direct interview to accomplish the main objectives of the study.

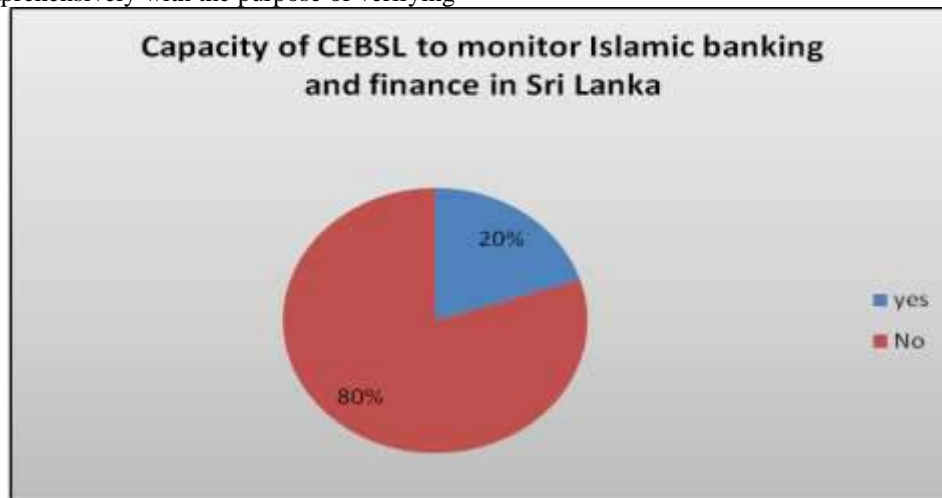
FINDINGS AND DISCUSSION

The Muslims living in Sri Lanka were gravely attempting to implement the Syariah perspectives in their daily financial transactions and banking activities like in other doings for long term. After the establishment of Islamic financial institutions in the country, many of them stopped up their close links with conventional banks and finance companies gradually and entered into Islamic banking industry. Their entry toward these bank and financial institutions are mounting afterward on a daily basis. In this way, there are several Islamic financial institutions and Islamic banking widows functioning at the moment in the midst of many challenges and problems to offer different finance products and services to the people. So, it is necessary at this juncture to find out those challenges and issues being faced by the Islamic financial institutions and the Islamic banking windows of the island, especially from the point of following views deeply and comprehensively with the purpose of verifying

the present state of them. In this context, it is emphasized the major challenges and issues one by one which are common for major Islamic banks and financial institutions in Sri Lanka.

Lack of ability of the Central Bank of Sri Lanka to monitor Islamic Banks and financial institutions

In the present Sri Lankan financial system, the Central Bank of Sri Lanka has the authority to regulate and supervise the banks, finance companies, leasing companies and financial institutions. These banks finance and leasing companies should register properly under the banking, leasing and financial act and get the approval license from the Central bank of Sri Lanka to carry out their official banking operations, leasing and financial activities. The Central Bank of Sri Lanka has the system to regulate, especially, the conventional banks and finance companies which are in operation in the country at present via its monetary functioning board. It statutorily and administratively controls and supervises the operation of banks, as well as, finance and leasing companies Nihal Sri Ameresekere, 2011). On the other hand, it has not established a panel of expert yet under its roof to supervise the Islamic banks and financial institutions functioning in the country in proper ways.



Source: Survey Data Based on Direct Interview during the Study

In accordance with the survey data 80% of the respondents are disagree with the Central Bank of Sri Lanka have the adequate capability to monitor and evaluate Islamic banking and financial institutions in Sri Lanka.

Misunderstandings and Misinformation among the Muslims and Non Muslims

It is also fact to point out at this juncture that there are still numbers of Muslims in the island who have the custom to reach the conventional banks and finance companies to meet their various financial needs albeit the Islamic bank and

financial institutions are in the positive process. Although the conventional banks and finance companies are being operated with the huge experiences and familiarity in the field to provide diverse finance products and services to the people almost in the every major parts of the island for many centuries, the revolutionized concept and system was exposed in the financial structure of Sri Lanka instead of interest based financial system similar to the many other nations in recent years.

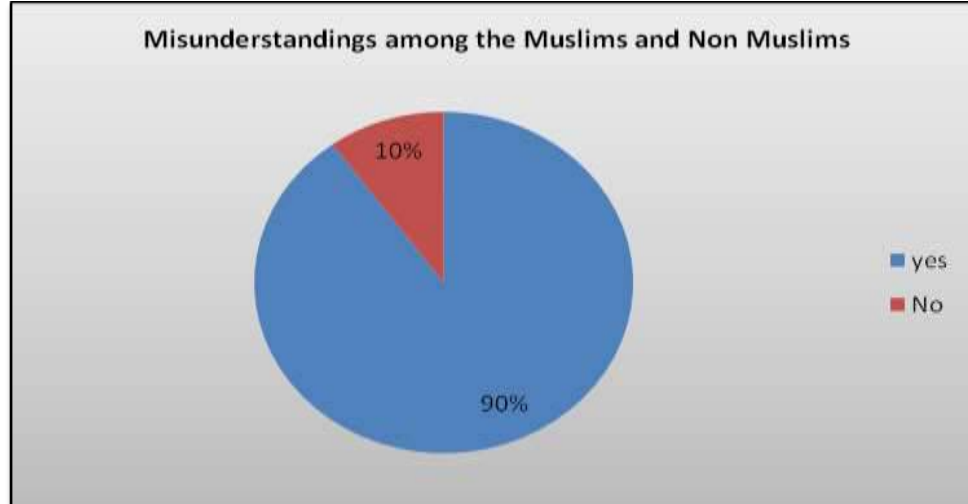
In such way, the Shariah compliant finance system and transactions offered by Islamic bank and financial institutions came in to the practice in the midst of long term strong



expectations of many Muslims, who are living in various parts of the Island with the aim of practicing the financial system and transactions which allowed in Islam. At the same time, the misunderstandings and confusions are as well seemed in many countries among the Muslims as well as the non Muslims, where Syariah compliant financial operations are practiced via Islamic banks and financial institutions for long period. As a result it is not a common problem faced by only the Islamic banking industry of Sri Lanka where Muslims have just 1.5 million of the total 2.1 million populations, but the problem in the countries also where Muslims are in majority. In the context of above particulars it may be one of the main reasons for the situation that many of those people do not know the Islamic law deeply which relate to Islamic finance and how the law is implemented in the respective field. Two combined authors who made their research in the relevant field quoted in their publication with regard to the issue that in the last three decades Islamic finance

has emerged as one of the most significant and successful modern implementations of Islamic legal system, and a test case for future Islamic legal innovation and development. Nevertheless, Islamic finance remains subject to a variety of misunderstandings by both Muslims and non Muslims. For example it is widely known that the Islamic finance prohibits the charging of interest on loan. But most do not know that Islamic law does not reject the notion of the time value of money (Frank E. Vogel, Samuel L. Hayes, 1998). There are no any need to have confusions in the matters which the almighty Allah has permitted to do for us through the holy Qur'an and the Sunnah of Prophet Muhammad (PBUH). At the same time, it is very noteworthy as well in the economics and finance affairs to strictly avoid the actions and doings which completely barred in Islam such as interest.

The following figure enlighten Misunderstandings and Misinformation among the Muslims and Non Muslims



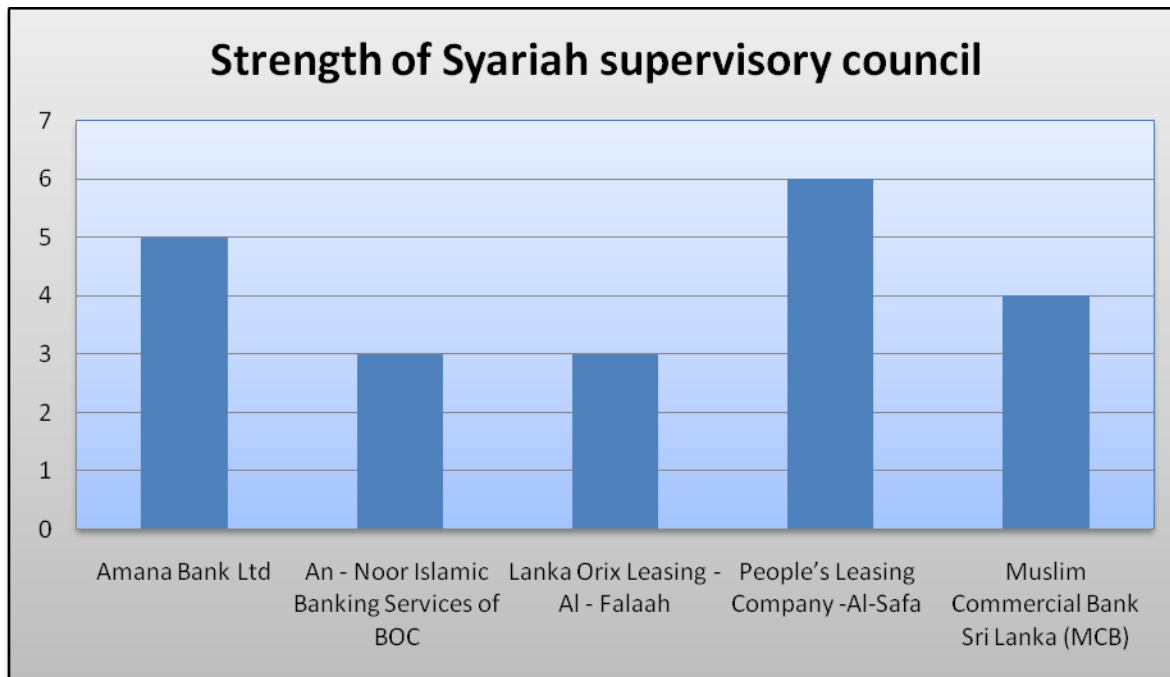
Source: Survey Data Based on the Direct Interview

Shortage of Shariah Supervisory Experts and Scholars

In the present situation of the growing Islamic banking industry in Sri Lanka, the shortage of Syariah supervisory experts and scholars is being a major challenge. It is very important that having qualified field experts, skillful team and staff in the respective field to build up whichever sectors in their operations. Consequently, there is high expectation in the development of Sri Lankan Islamic banking and finance industry in having the well specialists, skilled workforce and professionals in the related stream in both sides, academically and practically.

Nevertheless, the situation is extremely different at the moment in the country like many other countries in the world. The shortage of Syariah supervisory scholars is as well the significant common problem in many countries in the present

situation. In this way, the role of Syariah scholars is critical in Islamic finance and to the growth of the industry; given that Syariah scholars are one of the most significant stakeholders, their code of conduct, mode of operation and governance pose a serious challenge. During the last three decades, Syariah scholars have played a positive role in the growth and development of Islamic finance, but their role has also come under scrutiny and sometimes they have been unfairly attacked. Respectable Shariah scholars such as Dr. Nejjatullah Siddiqi, Sheikh Yousuf Delorenzo and Mufti Taqi Usmani have often highlighted anomalies in the role and practices of Syariah Scholars (Hussein Askari, Zamir Iqbal and Abbas Mirakhor, 2009).



Source: Web Pages of the Related Islamic financial institutions

In this way, it could be identified the following major problems anticipated by Islamic banks, banking windows, finance and leasing companies which have Islamic business units, educational institutions and higher educational institutions as stated below;

- a. Very shortage of qualified academics and scholars to educate in educational and higher educational institutions, and to contribute in the growth of the field in Sri Lanka.
- b. Very shortage of expert professionals and skilled workforce in Islamic banks and financial institutions of the country to provide their most excellent services in the development of those institutions.

In view of above facts it was very important to find out proper resolution mechanism to overcome these issues and challenges confronted in Sri Lankan Islamic banking and finance industry. Therefore, the appropriate solutions and recommendations which gained through the study are here suggested to conquer these situations as Follows;

- Establishment of Expert Panel in Central Bank of Sri Lanka
- Enhancement of the Capability to Offer Best Islamic Finance Products and Services
- Making Awareness and credibly among the Muslims and non Muslims
- Formulating Separate Legislation, ACT and Framework for Islamic Finance
- Formation of Proper Mechanism to Invest in Syariah Compliant Treasury Products
- Establishment of Arbitration (Dispute) Board

- Affiliation with Shariah Supervisory Council Members and Scholars

CONCLUSION

In conclusion, it is important to points out very important facts, which are very crucial to summarize, in the understanding of this research topic. As a result of Sri Lanka has comprised only 8% Muslims under its total population and many of those Muslims have less knowledge and understanding regarding Islamic banking and finance, including the educated people, it would be a big task to develop the particular banking and finance industry in the country. Nevertheless there are a number of Muslims who are very favour in the matter of Interest free banking and finance system in accordance with their religious faith. But, there are still some Muslim dominated areas in the northern part of the island especially in Mannar, Jaffna and Vavuniya districts where there is no any single branch of Islamic banks and financial institution to launch financial dealings with these banks. Many Muslims living these areas are having the financial links with conventional banks and financial institutions for their banking needs.

In the case of Sri Lankan non Muslims, majority of them are as well not familiar amply with Islamic banking and finance field yet because of they are still maintaining their sturdy relationship for long period with experienced and prominent conventional banks and financial institutions. The opportunities are high in the country for them to easily access and maintain their links with these conventional financial institutions for various finance transactions and services. On the other hand, the leading such type of conventional banks and financial institutions are also endeavoring to formulate attractiveness



among the people. In this way, they have established a large number of branches to offer their financial services and products to the customers who reach their branches network island wide. For instance, People's Bank and Bank of Ceylon, the leading state commercial banks, have more than 650 and 300 branches under their main roof respectively to be a focus for the customers throughout the island.

In this way, recently established Islamic banking and finance industry, which comprises a few number of financial institutions and their branch networks for financial operations in some parts of the island, has to face a lot of major challenges in their procedural development while their operations are ongoing among the Muslim minority community. These challenges and problems have been clearly identified and pointed out in this research study. The respective banks and financial institutions should consider endeavoring to overcome these barriers and obstacles which are against their smooth function and operation. Consequently, the Islamic banking and finance industry should take necessary measures to apply the strategies and approaches, which have been suggested and recommended in the final chapter of the study, to conquer these major challenges in their future development.

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CURRENT STATUS OF HUMAN RESOURCE MANAGEMENT ON COVID 19 CRISES

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ABSTRACT

Today's organizations have to remain alert and adaptive to unforeseen events, such as external crises, which create increased uncertainty among their workforce and pose immediate threats to the organizations' performance and viability. However, with the recent COVID-19 pandemic, organizations suddenly have to navigate the unprecedented and thereby find new solutions to challenges arising across many areas of their operations. In this article, we discuss some of these challenges, focusing on the implications COVID-19 has for human resource management (HRM) as organizations help their workforce cope with and adjust to their newly altered work environment. The purpose of this study is to explore challenges and opportunities of human resource management during covid 19 crisis. The research methodology is a qualitative methodology using semi-structured interviews with five HR (human resources) professionals in the Bangladesh. The semi-structured interviews address the areas of HR planning, reward management, performance management, training and development, health and safety and employee relations, and their change in an era of digital transformation. This study analyses the effect of covid 19 from the aspect of organisation and employee.

KEYWORDS: Covid -19, Human Resource Management, Technological Transformation, Challenges, Satisfaction Level.

INTRODUCTION

Organizations are faced with increasing uncertainty as they navigate today's "grand challenges", or highly significant challenges not typically confined to national, economic, or societal borders (Eisenhardt, Graebner, & Sonenshein, 2016; Ferraro, Etzion, & Gehman, 2015). The grand challenges of today are diverse, involving a range of complex issues such as climate change, severe economic downturns, and political instability (George, Howard-Grenville, Joshi, & Tihanyi, 2016). In our interconnected world, these significant challenges can pose an immediate threat to organizations' vitality and survival, encouraging organizations to remain responsive and adaptive as they organize and manage their workforce. But with the recent outbreak of COVID-19 ("Coronavirus (COVID-19)", 2020), organizations face a grand challenge of unparalleled proportions, one that forces them to dive into and directly manage unprecedented territory as they alter their workforce in technical, physical and socio-psychological ways not seen before. The COVID-19 pandemic has created a particularly challenging environment for human resource management (HRM) – with managers having to quickly venture into the "unknown unknowns" as they strive to help their workforce adapt to and cope with radical changes occurring in the work and social environment. For example, employee who formerly spent all or most of their time working inside their organization's physical boundaries now have to quickly adjust to remote work environments. Due to

shelter in place orders and the closure of nonessential businesses, even those who might be well adjusted to remote working conditions are now faced with their own unique challenges due to an inability to seek alternative workspaces (e.g., cafés, libraries, coworking-spaces) outside of the home itself. This has likely further limited the segmentation between work and private spheres leading to greater difficulties in "unplugging" from work demands (Chawla, MacGowan, Gabriel, & Podsakoff, 2020). Aside from the increased inability to separate work and private life, the closure of schools and childcare services has increased parental demands for employee, further blurring the lines between work and family spheres. While these work-family interconnections seem particularly demanding for employee with children, single and childless workers are not immune to the negative consequences of such altered working conditions, as they may be at greatest risk of loneliness, a felt lack of purpose, and associated negative effects on well-being (Achor, Kellerman, Reece, & Robichaux, 2018). At the same time, the current grand challenge of COVID-19 provides an opportune moment for management scholars to coordinate research efforts and turn them into actionable insights to support organizations in tackling one of the greatest challenges in modern history. It also offers scholars the exciting opportunity to look across disciplines for guidance and inspiration so that the unique HRM issues organizations currently face can be managed in an integrative way. For even if potential solutions exist, this



global challenges requires coordinated and integrated (research) action.

Community transmission of COVID-19 is happening in Bangladesh—the country which did not have a noteworthy health policy and legislative structures to combat a pandemic like COVID-19. Early strategic planning and groundwork for evolving and established challenges are crucial to assemble resources and react in an appropriate timely manner.

HR technology providers are increasingly designing applications for employee first, to enable workers to learn and develop, collaborate, share feedback, steer their careers, and even manage other people more effectively. The trend reflects a major shift from a decade ago, when vendors designed HR systems primarily to streamline HR administration, improve record-keeping, and help redesign HR processes. Today, digital technologies are transforming nearly every aspect of HR, from sourcing and recruiting to talent and performance management.

Digital technologies play an increasingly influential role in both the working lives of employee and human resource management (HRM), which is to be affected in multiple ways (Parry & Strohmeier, 2014). The purpose of this study is to discover the changing role of human resource management as a result of digital transformation. Digital transformation strategies can best be understood in a business centric perspective. These strategies have as their focus the transformation of products, processes and all organizational aspects as a result of new technology. Digital transformation strategies bring about changes to and have implications for business models as a whole (Matt et al., 2015). Similarly human resource management is also business centric and brings about change by adding value to organizations as a strategic partner, administrative expert and employee champion (Ulrich, 1997). Bengtsson & Bloom (2017) claim that whilst it is clear that digitalization is effecting organizations and human capital there has been little research about how digitalization is experienced by HR managers in practice. This research tries to address this gap in literature by studying the perspectives of HR managers. Another contribution of this research study is that it addresses critical factors for making a successful digital transformation. This area of study is still underexplored (Liu et al., 2011).

On the human resource management in a digital age, Palmer et al. (2017) claim that human resource management is as a result more varied, more people-oriented with the responsibility of designing diverse, challenging jobs to keep the young employee more engaged in their work. Digital transformation puts into questions the traditional ways the HR functions are carried out in organisations. Bell et al. (2006) state that the digital transformation has resulted in further implications for the role of HR, its capabilities and competencies. Furthermore, Larkin (2017) argues the change to the HR department that digital technology will bring will be all pervasive and omni-directional throughout every company. Consequently, digitalization affects HRM more than just through facilitating daily administrative work. The use of technology facilitates the actual HR functions (functions addressed in this study are: HR planning; recruitment and

selection; performance management; reward management; health and safety; employee relations; work design) however has also added new demands on the HR function as the latter ensures that the human capital in the organization is one that is aligned with the strategic needs of a digital era. Hays & Kearney (2001) write about how HRM is a field that is very sensitive to changes in the broad environment. They write how technological innovations push mainstream personnel techniques to their expiration date. HR Managers in an era of digitalization are loyal to traditional values however dedicate more time to managing information and mastering software (Human Resource Information Systems - HRIS). Technology is changing the way HR accesses, manipulates, transmits and store massive amounts of data.

REVIEW OF LITERATURE

As organizations navigate the challenges posed by COVID-19, they will also need to remain attentive to employee who might be disproportionately affected by current alterations of the work environment. Perhaps most notably, the changes we have witnessed in response to the current health crisis have already begun to exacerbate work-family conflict, which refers to “a form of interrole conflict in which the role pressures from the work and family domains are mutually incompatible in some respect” (Greenhaus & Beutell, 1985, p. 77). The past few years have witnessed an increasing interest in and application of family-friendly workplace practices such as flexible work arrangements, services including on-site childcare, and benefits that include childcare subsidies. These policies have been found to be important for reducing family to work conflict (Neal, Chapman, Ingersoll-Dayton, & Emlen, 1993), particularly among employee working from home (Golden, Veiga, & Simsek, 2006). Miles & Snow (1994) used the term strategic fit to emphasize that organizations need to find a match between their internal resources/capabilities and the demands of their external environments in order to enhance their competitive advantage. HR planning ensures that there is a strategic fit between the human resources of a company and the demands of digital transformation by forecasting the needs of a company in terms of resources and capabilities and setting the right goals to meet those needs. Action is taken by the HR department to recruit and select the required resources and capabilities to meet the demands of a digital era. Each business will have different transformational objectives so defining the digital transformation goals is an essential first step in determining the core business capabilities required to achieve the transformational objectives of a digital era. Stonehouse & Pemberton (2002) report that strategy-oriented planning comprises the establishment and design of organizational schemes that establish the flexible and general goals, techniques, and policies of a firm, which can bring the company what its leaders envision in the long term (Aldehayyat & Anchor, 2010). Moreover, strategy-oriented planning is seen as a required management tool in firms that intend to ensure that a suitable resource base is available to them, along with desirable places and times for achieving corporate goals. A study conducted by Gifford (2011) on the development of human resource revealed that Human resource



planning identifies the skill requirements for various levels of jobs. A study by Mursi (2003) revealed that there is a significant and positive relationship between human resource planning and organizational performance. A study by Amaratunga (2012) on how human resource planning can Assuring Adequate staff levels found that a primary function of human resources planning is making certain that various company departments have sufficient staff to complete all the work required to meet the organization's goals. Anya, Umoh and Worlu (2017) studied human resource planning and organization performance in oil and gas firms in Port Harcourt Nigeria and found that human resource planning has a strong influence on organizational performance in forecasting future demand of business and environment which helps to manage human resource demand as required.

OBJECTIVES

1. To analyse Challenges faced by the human resource department in the organization during this covid19-situation
2. To analyse the satisfaction level of employee during this covid19-situation

RESEARCH METHODOLOGY

Research methodology refers that the method which used for this study. This study is descriptive in nature and makes use of a descriptive research design. Both primary and secondary data are used for this study. Primary data is collected through survey. Secondary data were collected from website, books, journals etc. Primary data was collected from 200 samples. The questionnaire constructed for organisation and employees as separately. So two structured questionnaire were prepared to analyse the challenges and satisfaction level of organisation as well as employees. The data were analyzed via SPSS 20.0 for Windows. Descriptive statistics were used

to describe and summarize the properties of the mass of data collected from the respondents. the methodology adopted in the research comprises of primary and secondary data and their systematic analysis. Confirmatory factor analysis (CFA), In this study, AMOS 18.0 was used and the SEM estimation procedure is maximum likelihood estimation. Structural equation modeling (SEM) is a statistical technique that takes a confirmatory approach to the analysis of a structural theory bearing on some phenomenon. SEM conveys two important aspects of the procedures: a) causal process under study is represented by a series of structural (regression) equations, and b) these structural relationships can be modelled to facilitate a clearer conceptualization of the theory under study. The hypothesized model is statistically tested simultaneously to examine its consistency with the data through goodness of fit measures. Regression analysis is the statistical tool to identify the relation between two or more variables. It is a quantitative tool. City Group, Concord Group, Jamuna Group, Jiban Bima group and Meghna Group of industries are the selected organisation for collecting the data.

DATA ANALYSIS AND INTERPRETATION

First objective of this study is to analyse the challenges faced by the human resource management in the organization during this covid19-situation. SEM is used to identify the challenges faced by the organisations during covid 19- crisis. That we test the hypothesis

H₁: Coordination and execution is a major challenge faced by the organisation during covid 19- crisis.

H₂: Relationship between managers and employee is a major challenge faced by the organisation during covid 19- crisis.

H₃: Employee training is a major challenge faced by the organisation during covid 19- crisis.

H₄: Employee retention is a major challenge faced by the organisation during covid 19- crisis.

Table 1 Model fit Indices for CFA Challenges faced by organisation

	χ^2	DF	P	Normed γ^2	GFI	AGFI	NFI	TLI	CFI	RMR	RMSEA
Challenges	4.210	2	.122	2.105	.989	.947	.746	.372	.791	.108	.075

(source: survey data)

All the attributes loaded significantly on the latent constructs. The value of the fit indices indicates a reasonable fit of the

measurement model with data. In short the measurement model confirms to the factor structure of the constructs.

Table 2 Regression coefficient

Path	Estimate	CR	P	Variance explained
Coordination and execution ->Challenges	0.259	2.867	0.005	6.7
Relationship between managers and employee ->Challenges	0.246	2.717	0.008	6.0
Employee training ->Challenges	0.344	3.879	0.000	8.6
Employee retention ->Challenges	0.293	3.265	0.001	11.8

(source: survey data)



The results exhibited in Table 4 .4 0 revealed that the standardised direct effect of the all construct on Challenges was less than 0.4 . So we accept the hypothesis H₁ to H₄ and conclude that Common challenges of organisation, Coordination and execution, Relationship between managers and employee, Employee training, Employee retention are the major challenges faced by the organisation during covid 19- crisis.

Second objective is to analyses the satisfaction of employee during this covid19-situation.

In other words we use SEM to test the following hypothesis

H₁: Timing leads to employee satisfaction.

H₂: Flexibility leads to employee satisfaction.

H₃: Work life balance leads to employee satisfaction.

H₄: Efficiency leads to employee satisfaction.

H₅: Economical aspect leads to employee satisfaction.

H₆: Relationship between managers and co-workers leads to employee satisfaction.

H₇: Communication leads to employee satisfaction.

H₈: Job security leads to employee satisfaction.

Table 3 Model fit Indices for CFA Employee satisfaction

	χ^2	DF	P	Normed χ^2	GFI	AGFI	NFI	TLI	CFI	RMR	RMSEA
Employee satisfaction	12.491	11	.328	1.136	.985	.950	.959	.986	.995	.082	.026

(source: survey data)

All the attributes loaded significantly on the latent constructs. The value of the fit indices indicates a reasonable fit of the

measurement model with data. In short the measurement model confirms to the factor structure of the constructs.

Table 4 Regression coefficient

Path	Estimate	CR	P	Variance explained
Timing->Employee Satisfaction	0.714	12.566	<0.001	51.0
Flexibility ->Employee Satisfaction	-0.006	-0.084	0.933	0.0
Work life balance->Employee Satisfaction	0.237	3.391	0.001	5.6
Efficiency ->Employee Satisfaction	0.562	8.923	<0.001	31.6
Economical aspect->Employee Satisfaction	-0.119	-1.678	0.095	1.4
Relationship between managers and co-workers ->Employee Satisfaction	0.445	6.715	<0.001	19.8
Communication ->Employee Satisfaction	0.521	8.109	<0.001	27.2
Job security -> Employee Satisfaction	0.342	5.002	<0.001	11.7

H₁: Timing leads to employee satisfaction.

The results exhibited in Table 4 revealed that the Timing had significant influence on Employee Satisfaction as the standardised direct effect of this construct on Employee Satisfaction was 0.714 , which is more than 0.4 (also p value was significant). So we accept the hypothesis H₁ and conclude that Timing leads to employee satisfaction

H₂: Flexibility leads to employee satisfaction.

The results exhibited in Table 4 revealed that the Web site of the bank had no significant influence on Employee Satisfaction as the standardised direct effect of this construct on Employee Satisfaction was -0.006, which is more than 0.4 (also p value was not significant). So we reject the hypothesis H₂and conclude that Flexibility does not leads to employee satisfaction

H₃: Work life balance leads to employee satisfaction.

The results exhibited in Table 4 revealed that the Work life balance had no significant influence on Employee Satisfaction as the standardised direct effect of this construct

on Employee Satisfaction was 0.237, which is more than 0.4 (also p value was not significant). So we reject the hypothesis H₃and conclude that Work life balance does not leads to employee satisfaction

H₄: Efficiency leads to employee satisfaction.

The results exhibited in Table 4 revealed that the Efficiency had significant influence on Employee Satisfaction as the standardised direct effect of this construct on Employee Satisfaction was 0.562, which is more than 0.4 (also p value was significant). So we accept the hypothesis H₄and conclude that Efficiency leads to employee satisfaction

H₅: Economical aspect leads to employee satisfaction.

The results exhibited in Table 4 revealed that the Economical aspect had no significant influence on Employee Satisfaction as the standardised direct effect of this construct on Employee Satisfaction was -0.119, which is more than 0.4 (also p value was not significant). So we reject the hypothesis H₅and conclude that Economical aspect does not leads to employee satisfaction

H₆: Relationship between managers and co-workers leads to employee satisfaction.

The results exhibited in Table 4 revealed that the Relationship between managers and co-workers had significant influence on Employee Satisfaction as the standardised direct effect of this construct on Employee Satisfaction was 0.445, which is more than 0.4 (also p value was significant). So we accept the hypothesis H₆ and conclude that Relationship between managers and co-workers leads to employee satisfaction.

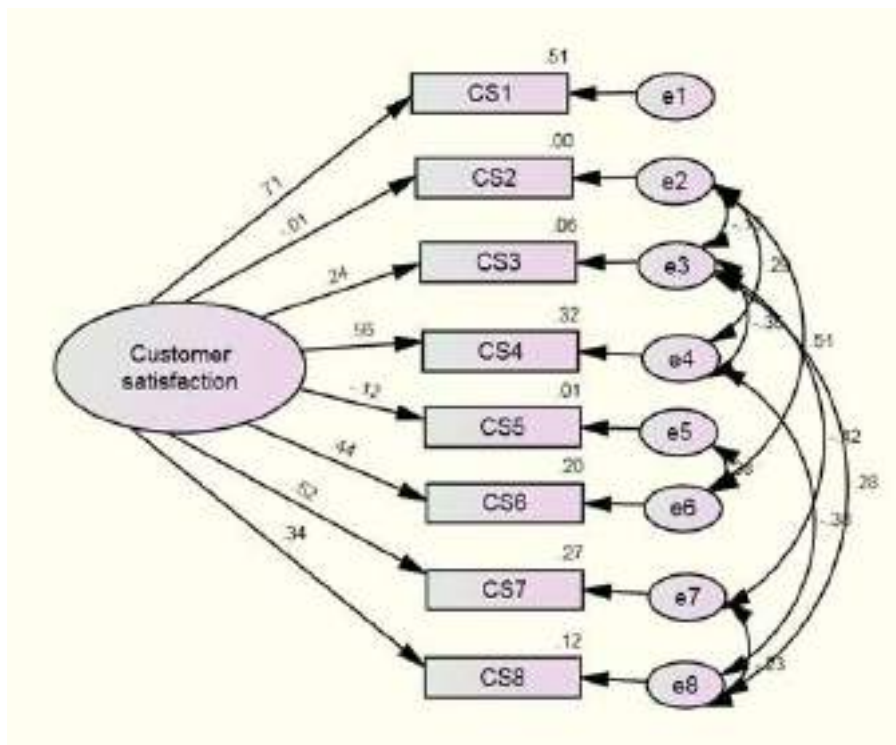
H₇: Communication leads to employee satisfaction.

The results exhibited in Table 4 revealed that the Communication had significant influence on Employee

Satisfaction as the standardised direct effect of this construct on Employee Satisfaction was 0.521, which is more than 0.4 (also p value was significant). So we accept the hypothesis H₇ and conclude that Communication leads to employee satisfaction

H₈: Job security leads to employee satisfaction.

The results exhibited in Table 4 revealed that the Job security by the bank had no significant influence on Employee Satisfaction as the standardised direct effect of this construct on Employee Satisfaction was 0.342, which is more than 0.4 (also p value was not significant). So we reject the hypothesis H₈ and conclude that Job security does not leads to employee satisfaction



FINDINGS

This study focus to identify the challenges faced by the organisation and the satisfaction level of employees during the work nature of covid 19 situation. This situation could effect the human resource management. Coordination and execution, Relationship between managers and employee, Employee training, Employee retention are the major challenges faced by the organisation during covid 19- crisis. Timing, efficiency, Relationship between managers and co-workers and communication leads to employee satisfaction. Flexibility, Work life balance, economical aspect and job security are does not leads to employee satisfaction.

RESEARCH GAP

This study deals with the challenges faced by the human resource department in the organization during this covid19-situation and the satisfaction level of employee during this covid19-situation. But future study can resolve the

absence of economic growth analysis in this study. There is a wide scope to evaluate the economic growth from the aspect of human resource management.

CONCLUSION

The recent COVID-19 pandemic, organizations suddenly have to navigate the unprecedented and thereby find new solutions to challenges arising across many areas of their operations. In this article, we discusses some of these challenges, focusing on the implications COVID-19 has for human resource management (HRM) as organizations help their workforce cope with and adjust to their newly altered work environment. The purpose of this study is to explore challenges and satisfaction level of human resource management during covid 19 crisis, from the perspective of organization and employee's. Coordination and execution, Relationship between managers and employee, Employee training, Employee retention are the major challenges faced by the organisation during covid 19- crisis. Timing,



efficiency, Relationship between managers and co-workers and communication leads to employee satisfaction. Flexibility, Work life balance, economical aspect and job security are does not leads to employee satisfaction.

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FOOTBALL PLAYERS STRESS LEVEL OUTPUT IN RESPONSE TO ASANAS AND MEDITATION

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ABSTRACT

The purpose of the study was to effect of asanas and meditation on stress level of football players in University College of Engineering, Ramanathapuram, Tamilnadu, India were constituted the population of the study. For this study thirty male football players were selected constituted the population of the study were randomly selected as a subject and their age ranged between 18 to 25 years. They were divided group into two equal groups namely Experimental group (n=15) and Control group (n=15) Perceived Stress scale Questionnaire for the analysis of results the level of significance to test t-ratio was set at 0.05 level of confidence for this study. The collected data on Stress was analysed by computing mean and standard deviation. The collected data were analysed statistically by dependent 't' test from the analysis of data proved that there is significant difference between Experimental group and Control group were tested for stress level before and after asanas and meditation program for twelve weeks. The study has painted the requirements of the college level male football players to need exact and suitable evidence approximately mental health to survive.

KEYWORDS: Stress, Asana, Meditation and football players.

1. INTRODUCTION

Yoga treatment might comprise a range of strategies or a combination of them. Asanas, meditation techniques, stress reduction and entertainment techniques (Anithya bhava), and awareness are examples of these. Yoga can be performed with specific techniques or a combination of approaches to restore equilibrium in the body and mind, depending on the health condition or the underlying cause of illness. Yoga encourages people to make conscious movements or positional changes in their bodies, sometimes known as proprioception or kinaesthesia, in order to locate and strengthen areas of limitation. As a result, the way the body moves and operates will be more balanced, reducing stress, pain, and tension.

2. MATERIAL AND METHODS

2.1 Subjects

Totally thirty male football players were randomly selected those are study from from University College of Engineering, Ramanathapuram, Tamilnadu for the present study. Their aged ranged between 18 to 25 years. They were divided into two equal group experimental group (N=15), and

Control Group (N=15). The experimental and control group were tested for stress level before and after asanas and meditation program for twelve weeks.

2.2 Valuation Implements and Organization

To collect data, the questionnaire of PSS-21 (Perceived Stress Scale-21) was used. The validity and reliability of this standard questionnaire was examined by Sahebi et al. and Cronbach's alpha was estimated 0.76 for stress, respectively. In a study entitled "validation of stress scale for an Iranian population". Each of the above mentioned states are assessed with seven questions. Asanas and meditation exercises and training sessions were held three time/weeks; 60-70 min each (postures, breathing techniques, meditation) by a specialist. Before the intervention, questionnaires were completed by football players.

3. STATISTICAL PROCEDURES

The obtained data were analyzed using SPSS version 20. According to the established normality, paired sample t-test was used for comparing the results before and after the intervention. The threshold of significance was set at $P < 0.05$.



Table-I
COMPUTATION OF “t” RATIO ON STRESS LEVEL OF FOOTBALL PLAYERS ON EXPERIMENTAL GROUP AND CONTROL GROUPS (SCORES IN POINTS)

Group	Variables	Test	Mean	N	Std. Deviation	Std. Error Mean	t ratio
Experimental Group	Stress	Pre	21.76	15	5.12	0.62	5.80*
		Post	20.57	15	5.08		
Control Group	Stress	Pre	18.92	15	2.65	0.54	1.63
		Post	18.90	15	2.86		

Table I reveals that the mean values of pre test and post test of control group for stress were 2.65 and 2.86 respectively; the obtained t ratio was 1.63 respectively. The tabulated t value is 2.09 at 0.05 level of confidence for the degree of freedom 1 and 14. The calculated t ratio was lesser than the table value. It is found to be insignificant change in stress of the male college level football players. The obtained mean and standard deviation values of pre test and post test

scores of yogic training group were 5.12 and 5.08 respectively; the obtained t ratio was 5.80. The required table value is 2.09 at 0.05 level of confidence for the degree of freedom 1 and 14. The obtained t ratio was greater than the table value. It is found to be significant changes in stress of the male college level football players. The mean values on yogic training group and control group are graphically represented in figure-1

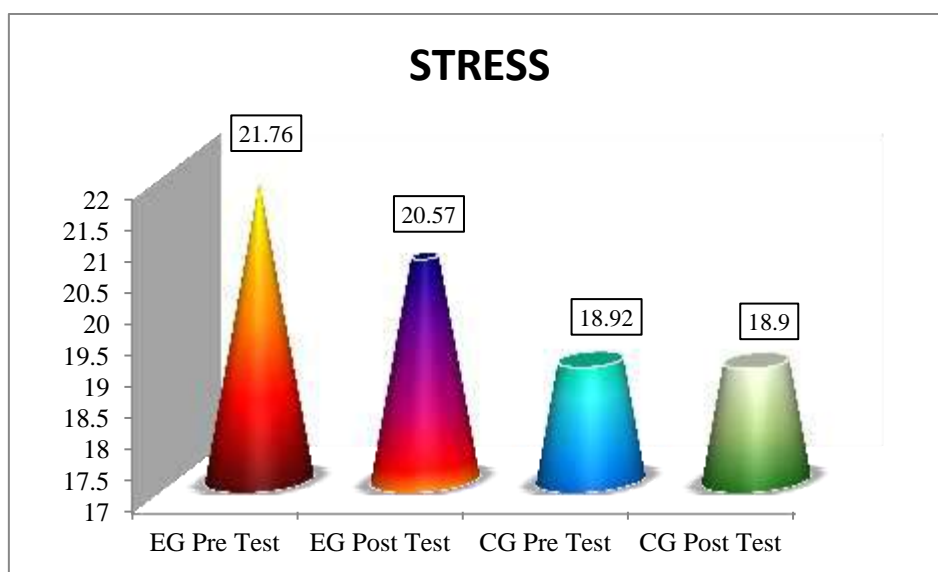


Fig 1: Bar Diagram Showing the Mean Value of Stress Pre and Post Test of Experimental and Control Groups

4. RESULTS

The result of the study proved the different beneficial asanas and meditation practices on stress. The post readings of parameters such as Stress extended notably (<0.05) following asanas and meditation practices. This suggests that some asanas help them to come out of stress. The meditation practice readings of stress level would possibly reduce their stress level and are also statistically significant results shown in table I.

5. DISCUSSION ON FINDINGS

The results of the study indicated that the psychological variable such as stress level was improved significantly after undergoing asanas and meditation training.

The changes in the selected parameters were attributed the proper planning, preparation and execution of the training package given to the football players. The findings of the present study had similarity with the findings of **Prabakaran et al (2021)¹, Eswari et al (2021)², Vallimurugan & Vijay (2021)⁴, Srikumar & Vallimurugan (2016)⁶ and Vijayarani (2012)⁷**. The result of the present study indicates that the asanas and meditation training methods is appropriate protocol to improve stress level of college level male football players. From the result of the present study it is very clear that the psychological variable such as stress level decreased significantly due to asanas and meditation training.



6. CONCLUSIONS

For this purpose the study is created and after twelve weeks of asanas and meditation practices the readings of Stress showed improvement in mental health. From the present study we may additionally conclude that asanas and meditation can be recommended to enhance the team sports, IT professionals and humans working mechanically and subsequently maintain their family situation to prevent their mental health in future. These really useful effects of different asanas and meditation practices can be used as a stress level. The daily practice should also be components of mentally health and life style changing applications in conserving better intellectual health. asanas and meditation practices improves the stress level.

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SIMULATION FOR CHARGING OF ULTRA CAPACITOR

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ABSTRACT

For the short-term ultracapacitor models, first-, second-, third- and fourth-order transfer functions consistent with an RC ladder model are assumed. The transfer function coefficients are identified by a least squares algorithm based on experimental data consisting of time-varying current excitations and the resulting terminal voltage responses. A long-term model with six RC branches is developed by fitting the terminal voltage transient response to an impulse charging current. Hundreds of thousands of terminal voltage data points are recorded and least squares identification is employed to determine the optimal values of the unknown parameters in the long-term model.

From the ultracapacitor models derived, terminal voltages under different current profiles can be determined accurately over the time frame of one hour with an error less than 0.1 V, the impulse charging and discharging response over a time frame of two months can be simulated with an error less than 0.08 V, and the instantaneous power available can be calculated.

1. INTRODUCTION

Ultracapacitors were first used in military projects to start the engines of battle tanks and submarines and to replace batteries in missiles. With the maturity of the manufacturing and nano-material technology, the cost of ultracapacitors has fallen, and the nominal capacitances have increased significantly. As a result, ultracapacitors have begun to appear in more applications, such as diesel engine starting, railroad locomotives, actuators and memory backup. More recently, ultracapacitors have become a topic of some interest in the green energy world, where their ability to soak up energy quickly makes them particularly suitable for regenerative braking applications [1,2,3]; in contrast, batteries have difficulty in this application due to their lower rated charging current and shorter cycle life.

2. BACKGROUND AND RELATED WORK

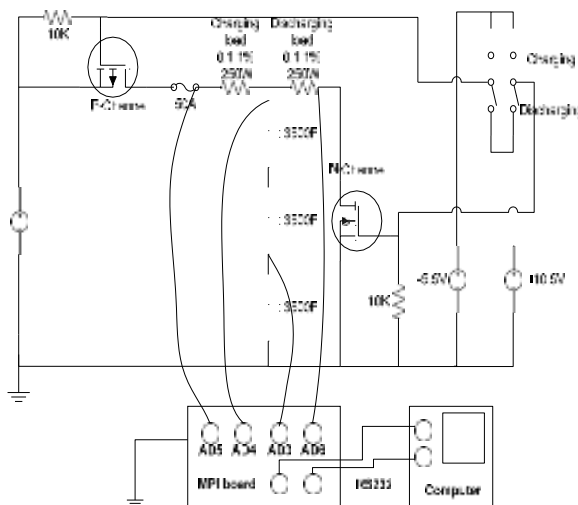
Theoretical lumped parameter models may be developed based on ultracapacitors' physical structure. Although this kind of model represents the ultracapacitor structure, it may include a large number of parameters as well as non-linear characteristics that make it difficult to implement in practice. As a result, a lot of published work to model ultracapacitors tries to derive simple models to represent the dynamic behavior and voltage dependence of ultracapacitors.

3. EXPERIMENTAL SET-UP

Determining the parameters of an ultracapacitor model requires first that current and voltage information be captured from the ultracapacitor under test, and then that least squares identification be done using that current and voltage data. In this chapter, the experimental set-up used to capture the data is described. This includes circuitry to control the charging and discharging of the ultracapacitor, as well as the program to measure and record the voltage and current information.

Test Circuit

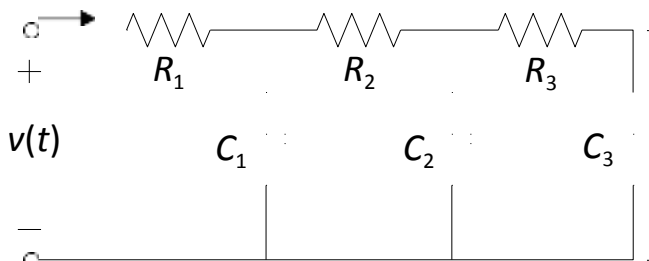
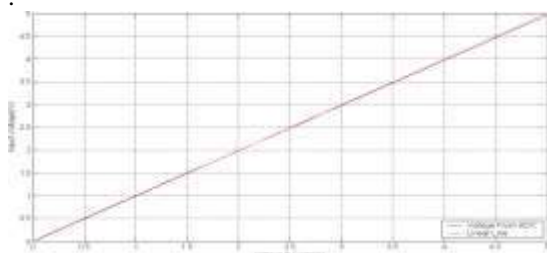
The test circuit, shown in Figure 3.1, consists of three NESSCAP3500P ultracapacitors in series excited by a 5-V, 1100-W power supply. A 50-A fuse is connected in the test circuit to protect the power supply. The rated voltage for each ultracapacitor cell is 2.7 V. To avoid exceeding the rated terminal voltages, three identical ultracapacitor cells are connected in series and their initial voltages are made equal. Two kinds of MOSFET switches are employed so that the charging and discharging processes can be controlled separately. Five p-channel MOSFETs, each of which can pass a maximum of 13 A of current, are employed in parallel as the charging switch; when charging, their gates are connected together to the preset -5.5-V constant voltage supply through a three-position switch.



Data Acquisition

A microcontroller board (dsPICDEM2) was employed for the terminal voltage and current measurements. The charging current is measured indirectly by measuring the voltage across the power resistor in series with the charging source; similarly, the discharging current is measured indirectly by measuring the voltage across the power resistor

that serves as the discharging load. This is done by measuring the potentials of both terminals of the power resistor with respect to the ground, subtracting the potentials to find the voltage difference across the resistor, and converting to current through the resistor by dividing the voltage by the resistance



Flow Chart

The flow chart for the program in the dsPIC30F4013 on the dsPICDEM2 MPI board that samples, measures and records data.

4. SHORT-TERM MODEL

A simple first-order RC model was used to estimate the available energy in the ultracapacitor bank that serves as the main electrical energy storage system for the University of Akron’s Challenge X vehicle. A higher-order model would allow for better control. where the sections are organized such that the fastest time constant is associated with the R and C closest to the terminals, and the time constants get longer and longer for sections further from the terminals. This accurately models the behavior seen on the bench: when an ultracapacitor is charged, the terminal voltage rises quickly, but once the charging current is cut off, the terminal voltage slowly drops, as charge

short-term models are sufficient for simulating charging and discharging of the ultracapacitor, which are fast phenomena, they cannot be used to accurately simulate long-term behavior. An understanding of long-term behavior is important, for example, to estimate the terminal voltage of the ultracapacitor after it has been relaxed for two months. Thus, long-term models are needed for implementation of control strategies for some practical cases.

6. CONCLUSIONS

Ultracapacitors are attracting more and more people’s attention as efficient and environmentally friendly energy storage devices. In this thesis we present short-term and long-term linear models to predict the dynamic voltage and current response of an ultracapacitor cell. The models could be useful in the design of a control strategy for ultracapacitors as an energy storage system. For the short-term model we use a third-order transfer function to represent the dynamic behavior of ultracapacitor within a time frame of around one hour. The data for the model identification are produced using a dynamic current excitation and measured using only ordinary

5. LONG-TERM MODEL

These models fit the dynamic behavior of the ultracapacitor over a time frame of around one hour. While the



laboratory instruments such as an oscilloscope and multimeters. As far as the long-term model is concerned, we want to know the terminal voltage and instantaneous available power information for the ultracapacitor if we settle it for a long time. We use six RC branches to describe the behavior of the ultracapacitor within a time frame of around two months. In order to make it possible to calculate the instantaneous power we design the long-term model to have real poles and zeros; as for the short-term models, this time we use least squares identification to search for the optimal coefficients, based on two months of data.

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THE ROLE OF ALISHER NAVOI'S SPIRITUAL HERITAGE IN THE MORAL EDUCATION OF YOUTH

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ANNOTATION

The article is devoted to the system of moral views in the spiritual heritage of the great thinker Alisher Navoi, its value not only for its time, but also in modern times in terms of theoretical and practical significance and that it must consist of truth. Today, it is important to educate our youth on the principles of honesty and integrity, as well as to ensure the continuity and continuity of the process by which such qualities are established in the minds of young people and become a standard of living.

KEY WORDS: *Alisher Navoi, Koran, Hadith, Khamsa, "Hayratu-l-abror", "Tarixi anbiyo va hukamo", "Nasoyim ul-muhabbat", phenomenon, meanness*

The prospects, development and prosperity of Uzbekistan are directly related to the spiritual and moral perfection of our youth, the maturity of their intellectual potential. This demonstrates the importance of studying the spiritual heritage of thinkers and scholars who have made a significant contribution to the development of socio-philosophical, spiritual and moral thinking in the East and inculcating its moral ideas in the minds of our youth. One of such thinkers is Alisher Navoi, the founder of Uzbek literature, philosopher and ethicist. Therefore, the President of the Republic of Uzbekistan Sh.M.Mirziyoev emphasizes the need to "pay tribute to the memory of our ancestor Alisher Navoi, to study his sacred heritage, to pass it on to our younger generation." [p1;113.]

Navoi created a philosophy of life with a deep meaning. Navoi's philosophy of life was reflected in his philosophical, political and moral ideas. In the works of Alisher Navoi, advanced philosophical and moral ideas are reflected through the images of positive heroes. This thinker considers morality to be a practical science. The practical nature of this social phenomenon is seen in the upbringing of members of society. According to Alisher Navoi, it is a method of joining morality (virtue) (abstinence) and avoiding shortcomings (corruption). [p 2;13.]

According to Alisher Navoi, morality regulates the existing relationships between people, family and society, and behavior. The main content of Navoi's work is the essence of man, his spiritual world, beauty, manners, behavior, abilities. In his works, the great thinker analyzes the criteria of a perfect man and evaluates the activities of members of society from this point of view.

While Navoi expresses more romantic feelings in his ghazals, his rubai reflects his philosophical views, socio-political, moral experiences and thoughts on the continent. The great poet, using the ideas of the Qur'an and hadiths in his works, wrote "History of the Prophet and the Ruler", "Nasayimul-Muhabbat" and criticized the unclean people who tried to deceive the people under the guise of religion. This proves that the great poet was extremely just. Alisher Navoi's valuable views on the spiritual maturity of society have become even more relevant during the period of independence of Uzbekistan. Recognizing that one of the great figures who influenced the formation of the spiritual world of the Uzbek people, the first President IA Karimov, was Alisher Navoi, he wrote: "We are always proud of his glorious name, the immortality of his creative heritage, the fact that his artistic genius knows no boundaries of time and space. [p 3;47.]

The system of moral views of the thinker is valuable not only for its time, but also for its theoretical and practical significance in the present. According to Navoi, a person must first be honest and truthful. Truthfulness is a moral quality that comes from human nature. Also, no matter who a person is, the meaning of his life should be honesty and truthfulness. Educating our youth on the principles of honesty and integrity is of great importance today. The process by which such qualities are established in the minds of young people and become a standard of living requires continuity and continuity. In general, there is also the idea that moral upbringing depends on human genetics. But at the same time, it should not be overlooked to focus on a systematic approach to moral education. Achieving harmony in society, family, kindergarten, neighborhood, educational institutions, in short,



all links in the social system is an important factor in the moral education of young people.

Navoi believes that it is necessary to be honest and truthful not only in words but also in heart. It follows that it is expedient for man's appearance to be in harmony with his spiritual world. According to the ethics scholar YJ Jumabaev, "Two conclusions should be drawn from these ideas of the poet: first, Navoi's idea of unity of thought, word, and action has its roots in a very distant past; Apparently, the thinker was well acquainted with the same moral doctrine of the Avesta: zero Avesto morality was also expressed in this trinity, and secondly, Navoi advanced the idea that man should speak the truth, even in a situation of false domination, sooner or later "He wanted to prove that victory is on the side of truth." [p 4;34 .]

In Navoi's view, bad flaws are not unique to one class or category. The poet points out that bad defects can also occur in a king, a sheikh, a commander, and a merchant. Navoi believes such people should be strongly condemned. The thinker analyzes the concepts of falsehood and justice in his works and contrasts them with each other. In this observation of the poet we see that there is a constant, uncompromising struggle between them. He concludes that the life of a lie is short, that it is helpless before the truth, and that the victory of truth is inevitable. Navoi is based on the idea that the level of knowledge of members of society is one of the important factors of development. The thinker therefore expresses the idea that those who have a low level of knowledge and do not seek to acquire knowledge, enrich it, and pass it on to others are not worthy of respect. In the society of educated people, sincere relations are formed, the people live well, achieve happiness, and in general, there are positive trends in development. Therefore, during the years of independence in our country, serious attention is paid to the development of young people with intellectual potential.

Certain positive results have been achieved in this area. But the issue of training competitive personnel globally is important. Therefore, our President Sh.M. Mirziyoev: "We will mobilize all the forces and capabilities of our state and society for the development and happiness of our young people as independent thinkers, with high intellectual and spiritual potential, who are not idle to their peers in any field in the world". [p 5;14 .]

According to Navoi, a person should have such moral qualities as patience, perseverance, generosity and magnanimity and kindness, because his greatness is reflected in them. Such moral qualities are associated with the true heart of man. Such a virtuous person will have a collective moral character.

As an opinion of Navoi, life is like a school, so a person should strive to acquire knowledge in this space and time, to have positive moral qualities. The first poem of Navoi's "Khamisa" in "Hayratul-abror" aims to highlight the moral doctrine, to show its application in public life. In the play, Navoi illuminated the morals of his time. Here you can see the huge compositional art of Navoi. It is characteristic of all works to glorify high moral qualities.



EFFICACY OF COGNITIVE BEHAVIOURAL THERAPY IN REDUCING DEPRESSION AMONG IDPs IN THE NORTH EAST AND NORTH CENTRAL, NIGERIA

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ABSTRACT

This study found out the efficacy of cognitive behavioural therapy in reducing depression among IDPs in the North east and North central, Nigeria. The study was a quasi-experimental study which adopted pretest/post-test control group design. The population consisted of male and female IDPs with mild and moderate symptoms of depression in Borno and Benue States. The sample size for the study was made up of 60 IDPs. Out of this, 30 were drawn from Agan, Benue State (15 in the treatment group and 15 in the control group) and 30 from Mongonu, Borno State (15 in the treatment group and 15 in the control group). It was hypothesized that there was no significant difference in the pretest and posttest scores of symptoms of depression among the IDPs in Benue and Borno States after the application of cognitive behavioural therapy, and that there was no significant effect of age, gender and marital status on the efficacy of cognitive behavioural therapy in reducing symptoms of depression among IDPs in Benue and Borno States. Independent t-test and ANOVA were used as statistical analysis. Results showed that significant differences existed in the pre-test and post-test mean scores of depression symptoms among the IDPs in the treatment groups in both States. There was no significant effect of age, gender and marital status on the efficacy of cognitive behavioural therapy in reducing symptoms of depression among IDPs in both Benue and Borno States. It was recommended among others that adequate provisions should be made by Benue and Borno State governments and of course the Federal government for urgent and regular application of cognitive behavioural therapy by experienced psychologists in all the IDP camps in order to treat the IDPs with symptoms of depression and that Benue and Borno State governments and all relevant stakeholders should be mindful of possible occurrence of cognitive depression among the IDPs irrespective of their ages, and use cognitive behavioural therapy directed at all age groups to treat them of depression symptoms if they manifest.

INTRODUCTION

Nigeria, like other parts of the world, is confronted with security threats including political upheavals, armed conflicts, trans-national organized crime and terrorism. Many of these threats have had adverse implications on the security and well-being of the people of Nigeria. Such threats have engendered huge humanitarian crisis such as death, hunger, poverty and mass displacement of people from their homes. The forced migration of people from their homes has often resulted in the problem of Internally Displaced Persons (IDPs).

The primary responsibility of protecting and ensuring the survival, livelihood and dignity of Internally Displaced Persons (IDPs) rests with the Federal Government of Nigeria. To achieve this, the government established the National

Commission for Refugees, Migrants and Internally Displaced Persons (NCFRMI) to manage IDPs in Nigeria. The management of IDPs in the country has however increasingly become one of the most daunting challenges in recent times (Akume, 2015).

In Nigeria, armed attacks perpetrated by Boko Haram Terrorists (BHT) in the North East (NE) states of Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe have led to over 2,863,436 IDPs as at November, 2021 (Alhassan, 2021). The IDPs spreading across the NE and North Central (NC) zones of Nigeria as well as the Federal Capital Territory (FCT) account for about 88.16 per cent of IDPs in the country. These IDPs suffer emotional problems associated with memory of fearful events, loss of livelihood, frustration, assault and human rights abuse, amongst others which are among the



causative factors of depression. The activities of Boko Haram Terrorists, unknown gun men and armed bandits have also festered social vices such as crime, assassination and sexual abuse against the IDPs, particularly the children, which represent 62.81 per cent of the IDP population. These problems have subjected the IDPs to depressive state culminating in High blood pressure, paralysis and death in some cases.

Depression, as a mood disorder is characterized by sadness, despair, feelings of worthlessness and low self-esteem. It often leads the depressed individual to be physically, mentally and socially inactive. It is the most common psychological disorder that places people in an emotional trap from which it is increasingly difficult to escape (Ashfield, 2010). As one of the most common mental health problems, an episode of major depression may last from 6 to 12 months or longer. Half the people who recover from an untreated episode of depression will slip back into their former state of depression within two years of their former episode.

Given the prevalence of IDP camps in North central and North eastern parts of the country with a large population of IDPs in such camps, and given the fact that they are still possibly experiencing some stressors causing depression, it is very important that a remedy is provided. How this could be achieved through cognitive behavioural therapy is the thrust of this research.

PROBLEM STATEMENT

Internally Displaced Persons camps were supposed to be alternative temporary homes for the victims where adequate succor is provided. Though home is home, but the IDPs camps were supposed to be managed in such a manner that the victims could heave a sigh of relief. Unfortunately, the management of IDPs camps today are far from ideal. In most of the existing camps, both in the North East and North Central, ugly reports abound about the management of the existing IDPs camps which accommodate victims of series of deadly attacks that have claimed several lives and property and leaving the people homeless. This is a strong causative factor of depression as, in the first place, no amount of provision made in the camps could be like the ancestral home of the victims and secondly, this is worsened by the poor management of the camps. There are repeated reports of sexual harassment, inadequate food, water, public services, healthcare as well as education (Hassan, 2017; Agundor, 2018).

In recent times, the IDPs suffer neglect, with limited government support for their basic needs such as food and clothing thus placing extra burden and stress on the host communities. Consequently, the IDPs are exposed to threats such as disease, hunger, crime, abuse, social conflict and political repression. Having lost their ancestral homes, loved ones and property, the poorly-managed IDPs' camps worsen the physical, psychological and emotional frame of mind of the IDPs to the extent that they become depressed. Once depressed, the IDPs feel worthless, hopeless and guilty. They develop poor self-concept and suicidal thoughts as their cognitions lose complete touch with reality.

Worse still, people who are depressed are disinterested, disenchanted, lack energy and motivation. They are irritated and may not see the point of doing anything worthwhile as depression takes over the whole person's emotions, bodily functions, behaviours and thoughts. They become less physically, mentally and socially active which tends to worsen depression (Ashfield, 2010; Raven, 2013). This is dangerous to a democratic and developing society like Nigeria and Benue State in particular. If the IDPs in Benue State are allowed in their present depressed state of mind, they could become a menace to themselves, their host communities and the State. This calls for an urgent need for a study of this nature to remedy the situation especially as the insecurity situation persists and the IDPs remain in the camps.

RESEARCH HYPOTHESES

The following null hypotheses were generated and tested at 0.05 level of significance:

- Ho1:** There is no significant difference in the pretest and posttest scores of symptoms of depression among IDPs in Benue and Borno States after the application of cognitive behavioural therapy.
- Ho2:** There is no significant effect of age on the efficacy of cognitive behavioural therapy in reducing symptoms of depression among IDPs in Benue and Borno States.
- Ho3:** There is no significant effect of gender on the efficacy of cognitive behavioural therapy in reducing symptoms of depression among IDPs in Benue and Borno States.
- Ho4:** There is no significant effect of marital status on the efficacy of cognitive behavioural therapy in reducing symptoms of depression among IDPs in Benue and Borno States.

LITERATURE REVIEW

Depression, according to Oltmanns and Emery (2016), can refer either to a mood or to a clinical syndrome or a combination of emotional, cognitive and behavioural symptoms. The feelings associated with a depressed mood often include disappointment and despair. Baron (2018) defined depression as "a mood disorder involving intense sadness, lack of energy, and feelings of worthlessness and despair". To recognize the onset of depression, some of the warning signs according to Baron are feeling down, sad, and blue every day of the week, ongoing lack of interest in all pleasurable activities including ones previously enjoyed, significant weight loss when a person is not dieting, fatigue and loss of energy every day, insomnia or sleeping too much, persistent inability to think or concentrate, or consistent feelings of indecisiveness.

In his explanation, Terry (2010) noted that the causes and risk factors of depression in older adults and the elderly include:

- i) Health problems – Illness and disability; chronic or severe pain; cognitive decline; damage to body image due to surgery or disease.
- ii) Loneliness and isolation – Living alone; a dwindling social circle due to deaths or



relocation; decreased mobility due to illness or loss of driving privileges.

- iii) Reduced sense of purpose – Feelings of purposelessness or loss of identity due to retirement or physical limitations on activities.
- iv) Fears – Fear of death or dying; anxiety over financial problems or health issues.
- v) Recent bereavements – The death of friends, family members, and pets; the loss of a spouse or partner.

SYMPTOMS OF DEPRESSION

In analyzing different case studies of episodes of depression, Oltmanns and Emery, (2016) explain that many of the most important symptoms and signs of depression can be divided into four general areas namely; emotional symptoms, cognitive symptoms, somatic symptoms, behavioral symptoms. Episodes of major depression and mania typically involve in all four kinds of symptoms.

Emotional symptoms of depression, according to Oltmanns and Emery, (op.cit.) include such negative emotions as sadness, anxiety, fear and anger. These reactions may last only a few moments at a time. Emotional symptoms also called dysphoric (unpleasant) mood is the most common and obvious symptom of depression. Most people who are depressed described themselves as feeling utterly gloomy, dejected or despondent. Cognitive symptoms of depression involve changes in the thinking of the depressed. Such symptoms, according to psychologist (e.g. Piaget, 1990; Oltmanns and Emery, 2016; DSM-IV-TR, 2000; Owojaye, 2015) include inability to concentrate, pay sustained attention, difficulty in making simple decision, easy distraction, feeling of hopelessness, worthlessness and guilt (self-blame), feelings of low self-esteem, delusions and hallucinations, suicidal thoughts, inability to think and remember constructively (memory impairment) or cognitive slowness. Somatic symptoms or physical symptoms of depression are related to basic physiological or bodily functions. They include fatigue, aches and pains, and serious changes in appetite and sleep patterns.

Oltmanns and Emery (2016) note that most obvious behavioural symptoms of depression is slowed movement. Depressed people may talk and walk as if they are in slow motion. Others become completely immobile and may stop speaking altogether.

TYPES OF DEPRESSION

There are two basic types of depression: bipolar and unipolar. People with bipolar depression experience emotional extreme at both ends of the mood continuum, going through periods of both depression and mania (excitement and elation). The mood swings in bipolar depression can be patterned in many ways. People with unipolar depression experience emotional extremes at just one end of the mood continuum as they are troubled only by periodic bouts of depression.

The Diagnostic and Statistical Manual of Mental Disorders-IV (2000) approach to classifying mood

disorders recognizes several subtypes of depression, placing special emphasis on the distinction between unipolar and bipolar depression. Under unipolar, there are two types of depression namely; Major depression and Dysthymia. Under bipolar, there are bipolar I (manic depression), bipolar II (hypomanic depression). Major depressive disorder, according to Kassin (2017) is a disorder where people show persistent feelings of sadness and despair and loss in interest in major sources of pleasure.

Symptoms listed in Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition. Text Revision (DSM-IV-TR) for major depressive episode includes:

- i) Depressed mood most of the day, nearly every day, as indicated either by subjective report (for example, feels sad or empty) or observation made by others (for example, appear tearful). In children and adolescent, it can be irritable mood.
- ii) Markedly diminished interest or pleasure in all or almost all activities of the day, nearly all day.
- iii) Significant weight loss when not dieting or weight gain (for example a change of more than 5 percent of body weight in a month), or decrease or increase in appetite nearly every day.
- iv) Insomnia or hypersomnia nearly every day.
- v) Psychomotor agitation or retardation nearly every day (observable by others).
- vi) Fatigue or loss of energy nearly every day.
- vii) Feelings of worthlessness or excessive or inappropriate guilt nearly every day (not merely self-reproach or guilt about being sick).

The DSM-IV-TR criteria for bipolar include:

- i. Inflated self-esteem and grandiosity
- ii. Decreased need for sleep- for example, feels rested after only 3 hours of sleep.
- iii. More talkative than usual, or pressure to keep talking.
- iv. Flight of ideas or subjective experience that thoughts are racing.
- v. Distractibility-that is attention too easily drawn unimportant or irrelevant external stimuli.
- vi. Increase in goal directed activity either socially, or at work or school, or sexually or psychomotor agitation.
- vii. Excessive engagement in pleasurable activities that have a high potential for painful consequences- for example, the person engages in unrestrained buying sprees, sexual indiscretion, or foolish investments.

Causative Factors of Depression

According to Ashfield, (2010), many factors contribute to depression. These include:

- i. Family history of depression
- ii. Hormonal changes (in women and men)
- iii. Emotional stress (e.g. bereavement, job loss, relationship breakdown).
- iv. Medicines (e.g. some cancer and heart medicines).



- v. Personality i.e. the type of person one is and how one responds to life events.
- vi. Social support- whether one has sufficient supportive people around one. People isolated on farms or station properties may lack important social support.
- vii. Life changes-major life changes such as birth of a baby may increase the risk of developing depression.
- viii. Medical conditions such as thyroid and other hormone problems, or battling with a chronic or terminal illness.

Social causes of depression in women, (as with men too) along with lifestyle choices, relationship, and coping skills, according to Baron (2018) include:

- i. Marital or relationship problems
- ii. Family responsibilities such as caring for children, spouse or ageing parents.
- iii. Experiencing discrimination at work or not reaching important goals, losing or changing a job, retirement, or embarking on military service.
- iv. Persistent money problems.
- v. Death of love one or other stressful life event that leaves the person feeling useless, helpless, alone, or profoundly sad.

THEORETICAL FRAMEWORK

In order to treat and prevent depression, there is the emergence of various theories of depression. However, the most relevant to this research is Beck's Cognitive Theory:

Beck's Cognitive Theory of Depression

In analyzing the intricacies of depression, Beck, (2004) believes that a psychological mechanism that plays a key role in depression is negative views about oneself. According to Becks, individuals suffering from depression often possess negative self-schemas- negative conceptions of their own traits, abilities, and behaviours. They have in habitual thinking errors that underlie their disorder. Depressed people tend to (1) blame their setbacks on personal inadequacies without considering circumstantial explanations, (2) focus selectively on negative events while ignoring positive events, (3) make unduly pessimistic projections about the future and (4) draw negative conclusions about their worth as a person based on insignificant.

Beck notes that the depressed-prone individuals tend to be highly sensitive to criticism from others and are often very concerned about disapproval from them. Because they are more likely to notice and remember negative information, their feelings of worthlessness strengthen, and when they are exposed to various stressors (e.g. the breakup of a romantic relationship, a failure at work), their thinking becomes distorted in important events in a negative light-for instance, they interpret a complement from a friend as insincere, or someone's being late for an appointment as a sign off rejection.

This theory is the basis on which this research is anchored. It explains how the depressed are likely to make

negative assertions about themselves in terms of their beliefs, interpretations, and perceptions about the past, the present and the future which results to depression. Besides, Beck the proponent of this theory developed the Cognitive Behavioural Therapy for depression which is being experimented in this research to find out its efficacy in reducing depression symptoms among the IDPs in Benue and Borno States.

Age and Depression

Weissman, (2011) noted that old age is often portrayed as a time of rest, reflection and opportunities to do things that were put off while raising families and pursuing careers. Unfortunately, the aging process is not always so idyllic. Negative life events associated with old age such as chronic and protracted medical disorders, loss of peers and loved ones and the inability to take part in once-cherished activities can take a heavy toll on an aging person's emotional well-being. An older adult may also sense a loss of control over his or her life due to failing eyesight, hearing loss and other physical changes, as well as external pressures such as limited financial resources. These and other issues often give rise to negative emotions such as sadness, anxiety, loneliness and lowered self-esteem, which in turn lead to social withdrawal and apathy (Eegunius, 1992).

Gender Differences and Depression

Depressed men are less likely than women to acknowledge feelings of self-loathing and hopelessness. Instead, they tend to complain about fatigue, irritability, sleep problems, and loss of interest in work and hobbies. Other signs and symptoms of depression in men include anger, aggression, violence, reckless behavior, and substance abuse. Even though depression rates for women are twice or thrice as high as those in men, men are at higher suicide risk, especially older men (Nolen-Hoeksema 2002 in Oltmanns & Emery, 2016). The high rates of depression in women could be due to hormonal factors, particularly when it comes to premenstrual syndrome (PMS), Premenstrual Dysphonic Disorder (PMDD), postpartum depression, and premenopausal depression. Nolen-Hoeksema 2002 cited in Hockenbury and Hockenbury (2010), notes that as for signs and symptoms, women are more likely than men to experience pronounced feelings of guilt, sleep excessively, overeat, and gain weight. Women are also more likely to suffer from seasonal affective disorder. This pattern has been reported in study after study, using samples of treated patients as well as community surveys and regardless of assessment procedure employed.

Marital Status and Depression

According to Gross (2011), it is not so much being married that is the issue but rather, the qualities and pattern of the relationship, characteristics of the partner and the consequences of marriage for the individual's lifestyle that matter. It seems that married young adults (and those who are cohabiting) are happier, healthier, live longer and have lower rates of various psychiatric disorders than those without a partner. Those who seem to benefit most are married men (compared with single, divorced and widowed men and



women) while unmarried men are the worst off. Gross emphasizes that married women are slightly better off than unmarried women, but unmarried women are considerably healthier and happier than unmarried men.

In contributing to literature with respect to marriage and depression, Bee (1994) cited in Gross (2011) suggests that married adults are less vulnerable to both disease and depression because they are buffered by support from their attachment to their partner. Men seem to benefit most of all from the protective nature of marriage partly because they are less likely to have close confidants outside marriage and because wives (more than husbands) provide emotional warmth/support to their spouse.

METHODOLOGY

The study was a quasi-experimental study which adopted pretest/post-test control group design. In its simplest form, the design consisted of two groups of IDPs – the treatment group and the control group which were equated on all the relevant variables. The participants were pretested using Beck Depression Inventory (BDI) so as to get a baseline data on their levels of symptoms of depression. The Cognitive Behavioral Therapy was then applied on the treatment groups in both States while the control groups were given a placebo in form of mere literacy lessons. Later, the BDI was reapplied to both groups (post-test).

The population for this study consisted of male and female IDPs with mild and moderate symptoms of depression in Borno and Benue States who had been in IDPs camps and

exposed to various stressors that could cause depression. Borno represented North East while Benue represented North central. They totaled 1,667 in Borno and 887 in Benue (National Commission for Refugees, Migrants and Internally Displaced Persons NCFRMI, 2021; The State Emergency Management Agency SEMA, 2021).

The sample size for the study was made up of 60 IDPs. Out of this, 30 were drawn from Agan, Benue State (15 in the treatment group and 15 in the control group) and 30 from Mongonu, Borno State (15 in the treatment group and 15 in the control group). Experts (e.g. Gay cited in Olayiwola, (2007); Okoli, (2000) suggest a minimum of 15 participants per group. Besides, psychotherapists (e.g. Rush & Beck, 2000; Beck, 2004), suggest that a typical psychotherapy group comprises of at least 12 to 15 participants.

The treatment procedure was in line with Beck's CBT template cited in Ogbu (2015). It has eight treatment stages which were administered in sessions for eight weeks. The treatment stages were Introductory/preparation stage; Cognitive rehearsal stage; Empirical validity test stage; Writing in a journal; Guided discovery stage; Modeling stage; Systematic positive reinforcement stage and Termination of the CBT. Independent t-test and ANOVA were used to analyze the data.

RESULTS

Participants' Socio Demographic Data.

The personal data of the participants used for the study include age, gender, and marital status.

Table 1: Treatment Group

Group	Frequency	Percentage
Treatment	30	50
Control	30	50
Total	60	100

As shown in table 1, 60 participants (30 (50%) in the treatment group and 30 (50%) in the control group were involved in the study in both States. Out of the 30 in each state, 15 were in the treatment group and 15 in the control

group. Those in the treatment group were those who were exposed to Cognitive Behavioural Therapy, while those in the control group were not exposed to the therapy but were given mere placebo in form of literacy education.

Table 2: Age of the Participants in the Treatment Group

Age Range	Frequency	Percentage
30-40 Yrs.	14	46.6
41-50 Yrs.	8	26.7
51-60 Yrs.	8	26.7
Total	30	100

Table 2 shows that 14(46.6%) of the participants were between 30-40 years while 8(26.7%) were between 41-

50 years and the rest 8(26.7%) were aged between 51-60years.

Table 3 Gender of the Participants in the Treatment Group

Gender	Frequency	Percentage
Male	18	60
Female	12	40
Total	30	100



As shown in table 3, there were 18 male participants representing 60% in the treatment group (10 in Borno State

and 8 in Benue State), while 12 representing 40% (7 in Benue State and 5 in Benue State) were females.

Table 4: Marital status of the Participants in the Treatment Group

Marital Status	Frequency	Percentage
Married	24	80
Unmarried	6	20
Total	30	100

According to table 4, 24 (80%) of the participants were married (12 in Borno State and 11 in Benue State) while the remaining 6(20%) were unmarried (3 in Borno State and 3 in Benue State).

IDPs in Benue and Borno States after the application of cognitive behavioural therapy.

To test this hypothesis, the pre-test and post-test mean cognitive symptoms of depression of the IDPs in the treatment groups in both States were computed and comparatively analyzed using the independent t-test analysis to determine the presence or absence of significant difference in the level of their depression symptoms. The result is shown in table 5.

HYPOTHESES TESTING

Ho1: There is no significant difference in the pretest and posttest scores of symptoms of depression among

Table 5: Independent-test on the Mean Depression Symptoms of the IDPs in the Treatment Groups.

Variables	CBT Treatment	N	Mean Scores	Std. dev.	Std. err	Df	T-Value	Sig (p)
Mean depression symptoms	Pre-Treatment	15	20.07	2.87	0.739	28	9.240	0.000
Scores:	Post-Treatment	15	11.37	2.26	0.582			

P calculated < 0.05, t calculated > 1.96 at df 28

The result of the above independent t-test statistics in table 11 shows that there was significant difference in the pre-test and post-test scores of depression symptoms among the IDPs in both Benue and Borno States after the application cognitive behavioural therapy. Reason being the fact that the p value of 9.240 is higher than the critical value of 1.96 ($p < 0.05$; $t > 1.96$). This means that cognitive behavioural therapy was effective in reducing the cognitive symptoms of depression of the IDPs in the treatment groups in both States. Therefore, the null hypothesis which states that there is no significant difference in the pretest and posttest scores of symptoms of

depression among IDPs in Benue and Borno States after the application of cognitive behavioural therapy is hereby rejected.

Ho2: There is no significant effect of age on the efficacy of cognitive behavioural therapy in reducing symptoms of depression among IDPs in Benue and Borno States.

To test this hypothesis, the combined mean cognitive symptoms of depression among the three ages of the IDPs in the treatment groups were computed and compared using the Analysis of Variance Statistics. The result of the test is shown in table 6.

Table 6: Analysis of Variance (ANOVA) Statistics on the Mean Depression Symptoms of the IDPs in the Treatment Groups on the Basis of their Age Groups.

Variation	Sum of Squares	Df	Mean Square	F	F critical	Sig. (P)
Between Groups	5.644	3	2.822	.516	2.60	.609
Within Groups	65.589	12	5.466			
Total	71.233	14				

**Table: 6 (b) Descriptive Statistics on the Mean Cognitive Depression Symptoms of the IDPs in the Treatment Groups on the basis of their Age Groups.**

Age Groups	N	Mean	Std. Dev.
30-40yrs	14	10.9286	2.84939
41-50yrs	8	11.1250	1.93111
51-60yrs	8	12.3750	1.37689
Total	30	11.3667	2.25568

The outcome of the analysis of variance (ANOVA) statistics on table 6 shows that there was no significant effect of age on the effectiveness of cognitive behavioural therapy in reducing symptoms of depression among IDPs in both Benue and Borno States. Reason being the fact that the p value of 0.609 is higher than the 0.05 level of significance while the calculated F ratio value of 0.516 is lower than the 2.60 F critical value ($P > 0.05$; $F < 2.60$) at df 2 for between groups, and 12 for within groups. This implies that age has no effect on the effectiveness of cognitive behavioural therapy in reducing cognitive symptoms of depression among the IDPs. Therefore, the null hypothesis which states that there is no significant effect of

age on the efficacy of cognitive behavioural therapy in reducing depression symptoms among IDPs in Benue and Borno States is hereby retained.

Ho3: There is no significant effect of gender on the efficacy of cognitive behavioural therapy in reducing symptoms of depression among IDPs in Benue and Borno States.

To test this hypothesis, the pre-test and the post-test mean depression symptoms among male and female IDPs in the treatment group were computed and comparatively analyzed using the independent t-test analysis. The result of the test is shown in table 7.

Table 7: Independent t-test on the Mean Depression Symptoms of Male and Female IDPs in the Treatment Group.

Variable	Gender	N	Mean	Std. Dev.	Std. Err.	Df	T-Value	Sig (P)
Mean depression symptoms scores	Male	9	7.38	1.80	0.90	13	..107	.288
	Female	6	11.45	2.80	0.70			

P calculated > 0.05, t calculated < 1.96 at df 13

The result of the above independent t-test statistics in table 7 shows that there was no significant effect of gender on the effectiveness of cognitive behavioural therapy in reducing depression symptoms among IDPs in Benue and Borno States respectively. The outcome of the t-test shows that the p value of 288 is higher than the 0.05 alpha level of significance and the calculated t-value of 0.107 is lower than the t critical value of 1.96 ($p > 0.05$; $t < 1.96$) at 13 df simplifying that gender has no effect on the effectiveness of cognitive behavioral therapy in reducing depression symptoms among the IDPs. Therefore, the null hypothesis which states that there is no significant effect of gender on the effectiveness of cognitive

behavioural therapy in reducing depression symptoms among IDPs in Benue and Borno States is retained.

Ho4: There is no significant effect of marital status on the efficacy of cognitive behavioural therapy in reducing symptoms of depression among IDPs in Benue and Borno States.

To test this hypothesis, the pre-test and post-test mean cognitive depression symptoms among married and unmarried IDPs in both treatment groups were computed and comparatively analyzed using the independent t-test analysis. The result is shown in table 8.

Table 8: Independent t-test on the Mean Depression Symptoms of Married and Unmarried IDPs in the Treatment Group.

Variables	Marital Status	N	Mean	Std. Dev.	Std. Err.	Df	T-Value	Sig (P)
Mean Depression	Married	24	12.57	4.424	1.04	13	0.110	.914
Symptoms Scores	Unmarried	6	8.88	2.802	0.70			

P calculated > 0.05, t calculated < 1.96 at df 13

The result of the above independent t-test in table 8 shows that there was no significant effect of marital status on the effectiveness of cognitive behavioural therapy in reducing

depression symptoms among the IDPs in Benue and Borno States. The outcome of the t-test shows that the p value of .914 is higher than the 0.05 alpha level of significance and the



calculated t value of 0.110 is lower than the t critical value of 1.96 ($p > 0.05$; $t < 1.96$) at 13 df implying that marital status has no effect on the effectiveness of cognitive behavioural therapy in reducing depression symptoms among the IDPs. Therefore, the null hypothesis which states that there is no significant effect of marital status on the efficacy of cognitive behavioural therapy in reducing depression symptoms among IDPs in Benue and Borno States is retained.

DISCUSSION

The study found out that significant differences existed in the pre-test and post-test mean scores of depression symptoms among the IDPs in the treatment group. The calculated pre-treatment mean scores of cognitive symptoms of depression dropped significantly among the IDPs in the treatment groups in both Benue and Borno States after the application of cognitive behavioural therapy. At post-treatment stage, there was a mean difference of 8.70 implying that there was a significant reduction of depression symptoms among the IDPs in both States in the treatment groups after the application of cognitive behavioural therapy. Besides, the outcome of hypothesis 1 in this respect shows that significant differences existed in the pre-test and post-test mean scores of depression symptoms among the IDPs in the treatment groups in both States ($t = 9.240$; $p = 0.000$). This result corroborates the observation of Beck (2004) that in his experiment, participants receiving cognitive behavioural therapy experienced a complete and nearly immediate reduction in depression symptoms related to their traumatic memories while those in the control group showed no such change. Beck's (2004) conclusion is upheld by the present findings.

Furthermore, given the outcome of hypothesis 2 ($P > 0.05$; $F < 2.60$), results showed that there was no significant effect of age on the effectiveness of cognitive behavioural therapy in reducing cognitive symptoms of depression among IDPs in both Benue and Borno States. This result upholds Beck's findings in his application of cognitive behavioural therapy which he originally developed for depression and was efficacious on all age groups.

Results also showed, by the outcome of hypothesis 3 ($t = 0.107$; $p = .288$) that there was no significant effect of gender on the efficacy of cognitive behavioural therapy in reducing depression symptoms among IDPs in Benue and Borno States. This result lends credence to the theoretical opinion of Beck (2004) that the goal of cognitive behavioural therapy is to help a person, whether male or female learn to recognize negative patterns of thought, evaluate their validity and replace them with healthier ways of thinking. Beck argues that CBT is a practical approach oriented to changing the behavior of the oppressed, irrespective of gender rather than trying to alter the dynamics of personality.

Lastly, results in Hypothesis 4 ($p > 0.05$; $t < 1.96$) showed that there was no significant effect of marital status on the effectiveness of cognitive behavioural therapy in reducing depression symptoms among the IDPs in Benue and Borno States. The finding agrees with the conclusion reached by Beck (2004) that the cognitive behavioural therapy proved

effective in both married and unmarried depressed individuals who were involved in his experiment.

CONCLUSIONS

Based on the result of the study, it is concluded that the use of cognitive behavioural therapy is effective in reducing symptoms of depression of the IDPs with mild and moderate episodes given the significant drop in the combined mean scores of the symptoms of depression among the IDPs after the treatment. It is also concluded that age, gender and marital status do not affect the efficacy of cognitive behavioural therapy in reducing symptoms of depression.

RECOMMENDATIONS

The following recommendations are made based on the findings of the study:

- 1) Adequate provisions should be made by Benue and Borno State governments and of course the Federal government for urgent and regular application of cognitive behavioural therapy by experienced psychologists in all the IDP camps in order to treat the IDPs with symptoms of depression.
- 2) It is also recommended that Benue and Borno State governments and all relevant stakeholders should be mindful of possible occurrence of cognitive depression among the IDPs irrespective of their ages, and use cognitive behavioural therapy directed at all age groups to treat them of depression symptoms if they manifest.
- 3) It is equally recommended that CBT programmes should be accessible to both male and female IDPs. The State governments and all relevant stakeholders should employ competent psychologists/psychotherapists and provide enabling environment and facilities for regular cognitive behavioural change programme for both young and older IDPs who may be depressed.
- 4) Lastly, it is recommended that the IDPs, whether single, married, divorced, widow or widower but have symptoms of depression should be exposed to cognitive behavioural therapy to help them reduce their symptoms of depression.

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STUDY OF THE POSSIBILITY OF USE OF LOCAL PHOSPHORITES AND SEMI-PRODUCTS OF THE PRODUCTION OF COMPOUND FERTILIZERS AS ADDITIVE TO AMMONIA NITRETRE

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ANNOTATION

The article shows the influence of the products of nitric acid decomposition of phosphorites Of Central Kyzylkum and Karatau, extraction phosphoric acid (EFC) from phosphorites Karatau, and nitric acid solutions of phosphates with a low ratio of CaO/P₂O₅ on the quality of ammonium nitrate. The methods of further improving the quality of ammonium nitrate on the basis of heated nitric acid solution (ACR) of phosphorites Karatau and Central Kyzylkum, EFK and by changing the ratio of CaO/P₂O₅ to ACR phosphates.

KEY WORDS: Nitric acid decomposition, extraction phosphoric acid, ammonium nitrate, phosphorite, phosphate.

INTRODUCTION

In the main directions of economic and social development of the Republic of Uzbekistan for 2017 - 2021. the modernization and intensive development of agriculture is envisaged: - deepening structural reforms and dynamic development of agricultural production, further strengthening the country's food security, expanding the production of environmentally friendly products, a significant increase in the export potential of the agricultural sector, etc.

MAIN PART

We know that year after year development in this direction requires the creation of new modern types of mineral fertilizers used in agriculture. To solve these problems on an industrial scale of the Republic, a number of large-scale measures were taken to produce high-quality local phosphorites and intermediate products of complex fertilizers as an additive to ammonium nitrate that meet modern agricultural requirements. For example, the second stage of the Kyzylkum phosphorite complex of the Navoi Mining and Metallurgical Plant was put into operation, which will increase the output of 26% washed calcined concentrate by more than 1.5 times. Today, the complex is the main resource base for enterprises of the republic that produce phosphate fertilizers. In this complex, a technology for obtaining phosphatized ammonium nitrate (AN) has been developed; the use of highly carbonized phosphorites as a phosphate additive is promising.

However, the processes of obtaining nitrogen-phosphorus fertilizers (APF) by the interaction of NPP melt with various types of phosphate raw materials (FS) of the Central Kyzyl Kum in a wide range of AS:PS mass ratios, followed by granulation of the nitrophosphate melt in the granulation tower by the prilling method, have not been practically studied. There is also no information on the study of the process of obtaining AFC based on concentrated solutions of AS and unenriched phosphorites of the Central Kyzylkum.

It is known that apatite concentrate is a long-distance raw material and the deficit for it increases every year. Therefore, the use of local phosphorites as an additive to ammonium nitrate is more economical. In addition, at present, at many enterprises of the country that produce ammonium nitrate, or near them, production of ammophos and nitroammophos has been established. The use of intermediate products of these industries for the conditioning of ammonium nitrate is of great practical and economic interest. At the same time, there is no need to maintain technologically and operationally complex installations and storage facilities for the preparation of additives in the ammonium nitrate workshops.

Experimental methodology: In order to solve the above issues, we have conducted a study on the effect of products of nitric acid decomposition of phosphorites of the Central Kyzylkum and Karatau, extraction phosphoric acid (EPA) from Karatau phosphorites, and nitric acid solutions of



phosphates with a low CaO / P₂O₅ ratio on the quality indicators of ammonium nitrate. Methods have been developed and proposed for further improving the quality of ammonium nitrate based on a heated nitric acid solution (NAC) of Karatau and Central Kyzylkum phosphorites, EPA and by changing the CaO/P₂O₅ ratio in NAC of phosphates.

Results of the study and their discussion: According to the above methodology, we studied the effect of AKF from phosphorites of the Central Kyzyl Kum and Karatau on the physical and mechanical properties of ammonium nitrate [1-6], and developed the design of the AKP neutralizer of apatite in the passing flow of ammonium nitrate melt.

For the preparation of ACR additives, Kyzylkum phosphorites from the Sardar site, phosphate concentrate obtained from the ores of the Jeroy site, and Karatau phosphate flour were decomposed with 55% nitric acid at a rate of 120% of stoichiometry. The compositions of the original phosphorites and nitric acid extracts after their separation from the insoluble residue are given in table.1.

ACR phosphates were added to the melt of ammonium nitrate at 1800 C and at the same time the required

amount of gaseous ammonia was supplied for neutralization. Granules of ammonium nitrate were obtained by spraying the melt from a height of 12 m.

In order to determine the stability of the quality indicators of saltpeter samples during long-term storage, caking and granule strength were determined after a day and 6 months of storage at room conditions, a thirty-fold modification transition IV ↔ III and moistening of saltpeter by 2%. Analysis of the obtained results (Table 2.) shows that the strength of ammonium nitrate granules with the addition of AKP from the phosphate concentrate of the Jeroy site increases with an increase in the amount of additive introduced (0.2 - 2.0% in terms of P₂O₅) by 2.5 - 5, 0 times compared to saltpeter without additive. When stored for 6 months, the strength of pure nitrate granules decreased by almost 2 times, and the strength of nitrate granules with an additive decreased by only 8.9 - 9.9%. The high strength of the granules is maintained even after a 30-fold modification transition IV↔III, as well as when the product is moistened by 2% [7 - 13].

Table 1. Chemical composition of phosphorites of the Central Kyzylkum, Karatau and ACR based on them

Compo nents	Feedstock, %			Components	Nitric acid solution, %		
	Phos conc. participation Jeroy	Phosphorites involved. Sardar	Phosphorites of Karatau		Phos conc. particip ation Jeroy	Phosphorites involved. Sardar	Phosphorites of Karatau
P ₂ O ₅	22.95	27.38	25.80	CaO	14.73	16.11	14.80
CaO	37.71	48.12	41.80	P ₂ O ₅	8.23	9.34	9.95
MgO	1.20	1.48	2.55	MgO	0.42	0.45	0.95
Fe ₂ O ₃	5.28	0.21	1.21	Fe ₂ O ₃	3.21	0.09	0.85
Al ₂ O ₃	10.36	2.25	1.42	Al ₂ O ₃	5.61	0.95	0.81
CO ₂	4.60	9.42	-	H ₃ PO ₄	11.36	12.88	6.30
F	2.09	2.65	2.10	HNO ₃	10.20	11.20	11.10
H.o.	12.55	11.80	15.80	H.o.	-	-	-

When the content of the additive in the amount of 0.5% P₂O₅ nitrate does not cake. With an increase in the amount of additive, caking decreases at a 30-fold modification transition IV ↔ III and moistening by 2%. As can be seen from the data in the table, additives from phosphorites of the Sardar and Karatau sites have a similar effect on the strength of granules and caking of saltpeter, but to a lesser extent than the additive from Jeroy phosphate concentrate. This can be explained by the different content in the original phosphorites of sesquioxides - iron and aluminum, which, as is known, increase the strength of the granules and reduce the caking of saltpeter, as well as by the different CaO / P₂O₅ ratio in the original phosphorites.

Studies have shown that the separation of AKR from the insoluble residue of phosphorites is an extremely difficult operation, since a significant part of it consists of highly dispersed particles of silicic acid and compounds of sesquioxides. In order to simplify the technology of preparation of ACR, experiments were carried out on introducing it into the melt of ammonium nitrate with a silty

part after separation from the coarse fraction of the insoluble residue by decantation.

CONCLUSION

The results of the study show that the presence of an insoluble residue in the clay part of the ACR significantly improves the physical and mechanical properties of ammonium nitrate.

The above studies indicate the possibility of using phosphorites from the deposits of the Central Kyzylkum and Karatau as an additive to ammonium nitrate without separating the silty part.

The high efficiency of additives based on nitric acid solutions of Karatau and Central Kyzyl Kum phosphorites, extraction phosphoric acid, as well as intermediate products for the production of nitroammophoska - nitrophosphate melt with a reduced ratio of CaO/P₂O₅ was established. A method for introducing these additives into the ammonium nitrate melt is proposed.

**Table 2. Influence of ACR from Kyzylkum and Karatau phosphorites on the physical and mechanical properties of ammonium nitrate**

The amount of additive in terms of P2O5, %	Humidity Fischer, %	Strength of granules, MPa				Слеживаемость, МПа			
		Beginning	After 6 months of storage in rooms. conditions	After 30 modifications. transitions IV ↔ III	When moistened by 2%	Beginning	After 6 months of storage in rooms. conditions	After 30 modifications. transitions IV ↔ III	When moistened by 2%
1	2	3	4	5	6	7	8	9	10
Addition of AKP from the phosphate concentrate of the Jeroy site									
-	0,29	1,21	0,63	0,31	0,28	0,07	0,67	0,44	1,22
1,50	0,29	2,96	2,71	2,59	2,31	not following	0,06	0,08	0,32
1,00	0,30	4,30	3,99	3,56	3,68	not following	not following	0,03	0,11
2,00	0,32	5,81	5,46	4,89	4,74	not following	not following	not following	0,04
The same with the silty part of the insoluble residue									
1,00	0,28	4,76	4,72	4,72	4,58	not following	not following	not following	0,09
2,00	0,30	7,61	6,95	7,30	7,05	not following	not following	not following	not following
Addition of AKP phosphorite of the Sardar site									
0,50	0,28	2,03	1,75	1,73	1,41	0,05	0,25	0,30	0,65
1,00	0,29	3,06	2,99	2,88	2,34	not following	0,18	0,24	0,39
2,00	0,29	3,53	3,51	3,28	2,78	not following	0,11	not following	0,10
The same with the silty part of the insoluble residue									
1,00	0,27	3,87	3,79	3,68	3,06	not following	not following	0,09	0,11
2,00	0,28	4,74	4,61	4,52	4,18	not following	not following	not following	0,05
Addition of AKP phosphorites Karatau									
0,50	0,28	2,14	2,13	1,50	1,38	0,06	0,39	0,56	0,43
1,00	0,30	3,43	2,56	2,50	2,38	not following	0,11	0,20	0,34
2,00	0,33	4,21	3,74	3,65	3,07	not following	not following	0,06	0,14
The same with the silty part of the insoluble residue									
1,00	0,31	2,68	2,60	2,55	2,09	not following	0,13	0,04	0,12
2,00	0,30	4,58	4,24	4,12	3,88	not following	not following	not following	Not following

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DIVERSIFICATION EXPANSION STRATEGIES: THEIR IMPACT ON PROFITABILITY IN RETAIL SECTOR IN ZIMBABWE

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ABSTRACT

The study analysed the impact of diversification expansion strategy on profitability in grocery retail sector. Glueck's (1976) expansion strategy was used as the theoretical framework in this study to explain diversification expansion strategies. The study used quantitative approach with a sample size of 30% that consists of 30 participants drawn from the three retail companies; OK, Spar and TM Pick 'n' Pay. Regression and correlation analysis was used to find the relationship between diversification expansion strategy and profitability. The study found out that diversification was leading to differences in profit volumes by 37%. The study concluded addressing of problems in the diversification expansion strategy to avoid affecting profitability in the retail sector in Zimbabwe.

KEYWORDS: *Diversification expansion strategy, geographical expansion, acquisitions and strategic alliances*

1.0 INTRODUCTION

There has been massive competition in the grocery retail sector in Zimbabwe after introduction of the multicurrency system in Zimbabwe. It now forms one of the critical sectors in providing employment and tax revenue for the country after the Zimdollar era. However some retailers would close unceremoniously without showing any difficulty signs. Major players in the sector are OK, TM Pick 'n' Pay and Spar. These retailers engaged in diversification expansion strategies so as to maximize profits. This study focuses on analyzing the impact of diversification expansion strategies on profitability in retail sector in Zimbabwe.

1.1 Background to the study

The grocery retail sector's future in Zimbabwe has shown light from 2009 due to improvements in disposable income of consumers after introduction of the multicurrency system (Zimbabwe National Chamber of Commerce, 2012). There were so many players in the grocery retail sector after introduction of multi-currency system. These players include Afro foods, Value Chain, Buscod, Food World, Tashas', Food Chain, DCK, TN Holdings, Town & Country, OK Zimbabwe, TM-Pick 'n' Pay, Spar, Choppies, Coolland and many other small medium enterprises (Newsday, 21 June 2012). Surprisingly when the economy was showing some light, many players that were expanding in the multicurrency period had to shut down. Examples of such players include Buscod, Tashas' and Redstar Holdings through its R. Chitrin & Spar divisions (Newsday, 21

June 2012). The main retail sector players with supermarkets across the country; OK Zimbabwe, TM-Pick n Pay and Spar embarked on diversification expansion strategies after multicurrency system for them to maximise profits (Katunga, 2014). Notable diversification expansion strategies used by these retailers were addition of shops. This was through adding shops in new geographical markets or segments, strategic alliances and acquisitions. However according to the Herald (11 June 2014), these retailers were still performing below the standard retail performance of 4%.

These retailers have been adding shops in new geographical areas and segments so as increase sales and profits (The Independent, 18 November 2010). Number of shops added is illustrated in table 1.1 below. OK added new shops in Hwange, Harare and many other places still to be developed (OK Annual Financial Report, 2011 -2014). TM also added shops significantly after Pick 'n' Pay alliance in 2012 (<http://www.meiklesinvestor.com>). Spar as a franchised ran organization, focus on financial figures will be on corporate stores which were under Innscor Africa but the corporate has been increasing number of Spar franchised retail outlets together with corporate stores as shown in table 1.1 after acquiring the rights of the Western Region from Scotia Holdings (www.spar.co.zw).

Expansion through acquisitions to increase segments was another strategy used by these retailers. OK Zimbabwe in 2011 acquired and added OK Mart to the already existing OK supermarkets to cater for all market segments



(<http://www.okziminvestor.co.zw>). TM Supermarkets also made some acquisitions to expand (TM-Pick 'n' Pay Annual Financial Report, 2014). According to Moxon (2012), trading area for TM – Pick 'n' Pay increased to 55 000 square meters. Inncor Spar posted a hyper loss of more than \$9 million in 2014 but in that same year they had made an acquisition of Joina City and

Borrowdale Brooke Spar from Mashonaland businessman Kaukonde (Inncor Spar Annual Financial Report, 2014). Furthermore Inncor Africa made acquisition of the Spar Western Region increasing sources of revenue from 53 to 72 outlets as shown in table 1.1 below.

Table 1.1: OK Zimbabwe, TM-Pick 'n' Pay and Spar Shop Addition and Performance Analysis

	Total Number of shops each year (difference from prior year showing number of shops added)			
	2011	2012	2013	2014
OK Zimbabwe	51	53	54	59
TM-Pick n Pay	49	50	51	53
Inncor Spar and Franchise	53	53	53	72
Sales in US\$				
OK Zimbabwe	257,426,323.00	412,563,027.00	479,635,937.00	483,660,043.00
TM-Pick n Pay	274,277,230.00	296,403,000.00	335,909,000.00	333,907,000.00
Inncor Spar	175,487,625.00	188,197,031.00	167,003,848.00	159,696,009.00
Profits in US\$				
OK Zimbabwe	4 285 700.00	10,306,497.00	12,382,278.00	9,685,412.00
TM-Pick n Pay	(467,483.00)	1,699,000.00	7,043,000.00	5,873,000.00
Inncor Spar	(2,442,421.00)	(1,698,367.00)	(547,486.00)	(9,561,505.00)
Return on Assets (after tax and interest in %)				
OK Zimbabwe	6.23	10.79	10.65	8.3
TM-Pick n Pay	(1.05)	3.4	11.55	7.32
Inncor Spar	(5.88)	(4.2)	(1.18)	(21.35)

Source: OK, TM-Pick 'n' Pay and Inncor Spar Financial Reports, 2011 – 2014

The sector has been engaging in strategic alliances for recapitalization and creation of strong muscles to add shops mostly with South Africa and Sub-Saharan Africa (Chibaya, 2013). OK Zimbabwe converted \$20 million loan into equity investment from Investec Asset Management in a strategic alliance agreement (OK Annual financial report, 2014) while TM lessened its debt through investment of \$13million from Pick n Pay (TM Supermarkets financial report, 2012). According to Zireva, (2014), these strategic alliances decreased finance costs and also improved expansion hence improving business profitability. However after significant fall in finance costs from 2013 to 2014 thus when return on assets and profits fell as shown in table 1.1 above. These retailers were building their capital base but their return on assets were diminishing especially from 2013 to 2014 as indicated in table 1.1 earlier in this section. It is necessary to discuss return on assets ratio under profitability lines since this component emanates from profitability ratios.

Operating costs have been accelerating upwards (OK, TM and Spar Annual Financial reports, 2011 - 2014). According to Lake (2014), operating costs for OK Zimbabwe increased at a higher rate than sales growth. OK Zimbabwe's Net operating expenses moved in an upward trend from \$19.9million, \$27.6million, \$33million and \$32.3million in 2011, 2012, 2013 and 2014 respectively (OK Annual reports, 2011- 2014). Their performance in terms of sales and profits increased from 2011 to

2012 but experienced a decrease from 2013 to 2014 for all organizations as shown in table 1.2 below. According to Zireva (2014) there was a decrease in profit before and after tax & interest for OK Zimbabwe by 20.7% and 21.8% respectively for the year ending 2014. Although sales for 2014 were higher than the previous period, the profits were below than those of the previous period as illustrated in table 1.1 above. Newsday (9 June 2014) also notified the public about the decrease in profits for the sector. TM- Pick 'n' Pay profits decreased by 16.6% from 2013 to 2014 (TM-Pick 'n' Pay Annual Report, 2014). However Spar Corporate stores had been experiencing losses from 2011 to 2014 as reported in the annual reports and the loss worsened in 2014 by -164, 5% (www.spar.co.zw).

1.2 Statement of the Problem

Growth of grocery retail sector in Zimbabwe would lead to employment and tax for the country. However the retail sector has been facing profitability problems hence threats to sustainability. The sector is still performing below the 4% expected performance beside massive diversification expansion strategy. Therefore it is the purpose of the study to analyse the impact of diversification expansion strategies on profitability in retail sector in Zimbabwe.



1.3 Research Objective

To determine the impact of diversification expansion strategy on profitability in retail sector in Zimbabwe.

2.0 EXPANSION STRATEGY

The main ideas of expansion strategies came from the strategy guru Glueck (1976) when he came up with four strategies that determine organization boundary which are stabilization, expansion, retrenchment and a combination. Expansion strategy involves redefining business by adding its scope and efforts (Pasteur et al 2014, Strickland et al 2012). Expansion strategy is associated with success emanating from the business renewal. There are many alternatives in expansion strategy. It involves diversification. However Pasteur et al (2014) grouped expansion methods into intensification and diversification. For the sake of the study, diversification expansion strategies were discussed in detail.

2.1 Diversification Expansion strategy

Diversification expansion strategy refers to entering into new products or services, new market segments with new innovations, technology and skills (Pasteur et al, 2014; Pearce and Robinson, 2013). Diversification is grouped into related or unrelated diversification (Strickland et al, 2012). Related diversification is associated with sharing of resources that build competences by improving the brand name, skills, capacity of distribution or marketing resulting in economies of scale and scope to maximize profits. However it can have coordination and communication problems. Unrelated diversification is when each business unit has its own type or different business or products engaged in (Rothaermel, 2013). It is usually associated with high return on investment, redefining of business, risk reduction through a portfolio of products, tax benefits, easy access to liquid assets, and curb against takeovers. However the researcher holds the opinion that unrelated diversification is normally associated with high investments requirements which need good planning so as to get the required returns. A slight mistake can result in serious financial problems for the firm and can send the organization to its knees. Unrelated and related diversification is further broken into four ways which firms diversify and these are vertically integrated (consisting of backward and forward integration), horizontal, concentric and conglomerate diversification (Rothaermel, 2013; Dorsey & Boland, 2009, Strickland et al 2012, Ireland et al 2013, Pearce & Robinson 2013 and Pasteur et al, 2014)

2.2 Types of Diversification Expansion Strategies

Businesses can expand through many methods as indicated under Glueck's (1976) strategic options. These fall into intensification and diversification. For the purpose of this study the following diversification expansion strategies were discussed; adding shops in new geographic areas or segments, acquisitions and strategic alliances (Dorsey and Boland, 2009; Goetz et al, 2014; Johnson et al, 2011; Yesilyurt, 2012; Shi et al,

2012; Sherman et al, 2011; Dickson & Weaver, 2011; Zhao, 2014; Mowla, 2012; and Jabar et al, 2014). The main reason for these diversification expansion strategies is to increase market presence, fight competition and improve performance (Dilshad, 2013, Dorsey & Boland 2009; Twarowska & Karol, 2013; Geiersbach, 2010, Ovcina, 2010, Sping, 2011; Chen et al, 2009; Pitels & Argitis, 2009 and Rothaermel, 2013). These strategies like any other strategies highly relies on suited culture, flexible decision making, matched rewarding system, and fair distribution of resources (Strickland et al, 2012; Ireland et al, 2013). Some scholars justified this type of expansion into national and international diversification (Pitels and Argitis, 2009; Hoffman et al, 2014; Rothaermel, 2013). However for organisations to enjoy good performance results there is need to do massive research and promotions with good management of costs.

2.3 Relationship between Expansion Strategies and profitability

According to Johnson et al (2011), criteria for evaluating strategy comprise suitability, acceptability and feasibility. Suitability looks at the strategies if they will be addressing key opportunities as well as the organizational constraints being faced. For a strategy to be acceptable it should win risk, return and shareholder value analysis. Under return analysis main focus as discussed by these authors was on return on assets. Ireland et al (2013) echo the same sentiments but further elaborated that return on assets is usually best to be evaluated for bigger old expanding firms than new ventures. However Pearce and Robinson (2013) postulated profitability as the main goal of businesses and it is the main measure for shareholders' wealthy. Feasibility checks if the proposed strategy would work and be financed. These writers further stated that it is essential to bridge a ground of understanding for a strategy and financial returns so as to have success. The cost-benefit is also essential in evaluating strategies. Most scholars have established an inverted u-shape relationship between unrelated expansion and performance (Rothaermel, 2013). The writer is of the opinion that evaluation of strategies is mainly focused on the strategic process.

2.3.1 Relationship between Geographic Expansion and Profitability

Business that fails to find new markets for its products will not be able to increase profits and sales (Mugo et al, 2012; Pitelis and Argitis, 2009). These new markets are associated with uncertainty and costs that may lead to high risk. The main issues to be evaluated when geographically expanding in retail sector is to assess location efficiency, healthy and safety regulations, manpower costs, rentals, advertising and promotional costs and costs involving information systems. Braguinsky (2013) did not find much evidence to support the fact that increase into geographical areas will lead to profitability. Comparing profitability and geographic expansion



involves looking at both national and international expansion (Gaskin et al, 2013; Baldwin & Yan, 2012, Dorsey & Boland, 2009; Rothaermel, 2013). The researcher is of the opinion that the main activities at implementation should be evaluated. It constitute all expenses pertaining rentals, buildings, delivering transport costs to new sites, advertising and promotion, human resources and information systems.

2.3.2 Relationship between Acquisitions and Profitability

Most writers discussed acquisitions and profitability in general without looking at each type. Dilshad (2013) postulated two theories of acquisitions that determine profitability levels. These theories are neoclassical theories and behavioural theories. The neoclassical theories postulate managers as rational hence focus on maximizing shareholders' wealthy (Dilshad, 2013). The behavioural theory sees managers as irrational hence not taking shareholders' interest into consideration but instead maximize their returns. This is echoing the same sentiments with Johnson et al (2011) and Braguinsky et al (2013) where they termed behavioural theory as managers' hubris. Ireland et al (2013) clarified problems of acquisitions that will reduce realization of profits as integration problems, lack or inadequately evaluating the entity, over reliance on debt, lack of synergy, over diversifying, overly focused of management to the acquisitions more than performance, and business can become too large to manage. From his study of banks in Europe, Dilshad (2013) further discovered that abnormal returns of acquisitions to shareholders were short lived for acquirers. He further found a zero cumulative abnormal returns at the end. Acquisitions for banks in Nigeria were found to be more profitable (Abdul-Raman, 2012; Olaleken, 2012). The researcher is of the opinion that acquisitions financial efficiency depends mainly on management efficiency which might greatly affect performance of an organisation. Wang and Moini (2012) found in their study that success of acquisitions depends mainly on cost efficiencies than revenue growth. Braguinsky et al (2013) found in their study that after acquisitions, companies in the Cotton Spinning industry improved productivity and profitability.

Acquisitions make organizations that are able to utilize assets, make access of those assets and make use of them. Lasserie and Macmillan (2012) postulated that acquisitions result in value creation. Strickland et al (2012) echo the same sentiments with Lasserie and Macmillan's (2012) on value addition explanation but further added that costs in acquisitions are mainly reduced through eradication of duplicate facilities in dispersed geographical places, supplier and bargaining power will be increased, increase in product differentiation enhances brand awareness and company image. They further stated that acquisitions that normally fail are as a result of less cost savings than expected, taking longer to realize gains for the acquisition or may never materialize, conflicting corporate culture between acquirer and acquired, different management styles for the two organizations, and management decision making mistakes on

activities planning. Yesilyurt (2012) asserted that there are two types of synergies that result from acquisitions which are financial and operating synergies. Financial synergies are when internal finance costs are reduced rather than production. This incur when a firm gets a tax shield as mentioned earlier by Lasserie and Macmillan (2012). The researcher is of the opinion that acquisition strategies might have a negative impact on profitability.

2.3.3 Relationship between Strategic Alliances and Profitability

Isoraite (2009) postulated the main objective for companies to enter into strategic alliance is to gain entrance to innovations hence reduce costs. If costs are reduced obviously profitability get boosted hence improvement in return on assets. There are three theories of strategic alliances; entrepreneurship and innovation theory, resources based view theory and social network theory (Zhao 2014). Under entrepreneurship and innovation theory organizations join forces to improve capabilities (Zeng et al, 2010; Franco and Hasse, 2013). Under the resource based view theory organizations combine both tangible (for example equipment and manpower) and intangible (for example knowledge and organizational learning) resources in order to have competitive advantage that leads to high performance (Bruton et al, 2010; Nieto and Santamaria, 2010). Firms will develop valuable and inimitable strategic resources that lead to sustainable profitability. Social network theory proposes that organizations create networks in terms of governance, structures and processes for value creation from the network (Zhao, 2014). Organisations can easily control environments and also access resources hence form competitive strength. It brings either firm with complementary or supplementary capabilities together. Sping (2011) found a curvilinear relationship between numbers of alliances entered by an organization with the company's performance. The turning point was found to be at least six (6) alliances. When an organization increases number of alliances to around six, thereafter above this number it starts to have inefficiencies decreasing performance forming a curvilinear relationship. The solution to this problem is to have a dedicated management for the alliance.

According to Lasserie and Macmillan (2012), for strategic alliances to maximize profits they should have knowledge of the strategic context of which involves looking at; the competitive drivers of the industry with the challenges that they face, establish the scope of the strategic alliance and the value that is obtained. There are three types of strategic alliances which are non- equity, equity and joint ventures (Rothaermel et al, 2013). These are intended for coalition, learning and the co-specialisation (Johnson et al, 2011; Lasserie and Macmillan, 2012). They all determine how profitable the business would be. All non-equity alliances have the disadvantage of having weak ties among the firms resulting in lack of trust and commitment (Ireland et al, 2013; Pearce and Robinson, 2013; Rothaermel,



2013). Equity alliances produces better commitment and trust compared to non-equity alliances. Furthermore equity alliance can result in better performance in terms of revenues and profits (Rothaermel 2013, Isoraite 2009). Joint ventures offer stronger commitment and trust that results in maximization of revenues and profits (Rothaermel, 2013; Mowla, 2012; Ovcina 2010). However they have the disadvantage of requiring large investment funds. They are associated with long negotiations. In case of the venture not properly working, it takes time to disjoint and the process is very costly. It leads to higher sunk costs than equity alliances. Knowledge sharing can lead to stealing partners' competencies. Conflict of culture is too high in these type of alliances. The writer is of the opinion that organizations can join forces and be under two or all types of alliances explained so as to achieve their objective hence maximize profits. However, organisations can end up being stuck in the middle if the alliance is not handled properly. There is debate and controversy among different scholars as discussed above. It is the purpose of the study to find out the level of impact that diversification strategy has on profitability in the retail sector in Zimbabwe for the period under study.

3.0 METHODOLOGY

The study used positivism research approach. Quantitative method was utilized to achieve explanatory design which was deductive in nature. Sample size of 30 participants

constituting 30% of the target population was used. Self-administered questionnaire and structured interviews were the research instruments used. Regression and correlation analysis was used to test results.

4.0 FINDINGS

A total of 30 questionnaire were distributed and 28 were returned giving a response rate of 93.33%. Detailed presentation and analysis of findings is done below.

4.1 Relationship between geographic expansion and profitability

The research intended to find how new shops added in new geographical areas were performing in terms of their profits, operating costs and return on assets. It further looked at the problems that were being experienced in shops added in new geographical areas which had an impact on profitability performance of an organisation.

4.1.1 Profitability performance of new shops added in new areas

This research sought to find the performance of shops added in new geographical areas in relation to profits after tax and interest, operating costs and return on assets. The following table 4.1.1 illustrates responses obtained.

Table 4.1.1: Relationship between added shops in new areas and profitability

	Strongly Disagree 1	Disagree 2	Neither Agree or Disagree 3	Agree 4	Strongly Agree 5
a)Increased profits after tax and interest	5 (18%)	8 (29%)	0 (0%)	5 (18%)	10 (36%)
b)Decreased Operating costs	20 (72%)	4 (14%)	0 (0%)	2 (7%)	2 (7%)
c) Increased return on assets	16 (57%)	8 (29%)	0 (0%)	2 (7%)	2 (7%)

Source: Research Survey 2015

The above table 4.1.1 shows that respondents had shared or divided opinions on the views about profits in added shops in new geographical areas. 47% of respondents were postulating that shops added in new geographical areas were not leading to increase in profits while 54% postulated that they led to increase in profits. This might be indicating Braguinsky's (2013) views who found not much evidence that support the fact that increase into geographical areas will lead to profitability. However most respondents showed that these shops were producing high operating costs (86% disagree while 14% agree for low operating costs) and reducing returns on assets (86% disagree for increased return on assets while 14% agree). This contradicts with Johnson et al (2011) and Dorsey and Boland (2009) who postulated that geographical expansion was highly associated with low operating costs and high return on assets due to high

profitability through increased customer convenience, competitive advantage and economies of scale.

High operating costs in shops added in new geographical areas was supported in interviews. Operating costs that were significant in geographical expansion were shop rentals, advertising and promotional costs, building repairs and maintenance, human resources costs and information systems cost. This is in agreement with Goetz et al (2014) who postulated that geographic expansion is associated with high costs hence require attention. Divisions or branches were not well involved in the strategic planning. They are provided with sales targets and cost targets were not communicated and planned for. This was in agreement with Pearce and Robinson (2013) and Johnson et al (2011) who postulated that failure to plan and provide specific targets affect a strategy's performance.



There were high costs despite the fact that these shops were conveniently located to customers and other stakeholders as discovered through interviews. From the interview it was revealed national geographic expansion was mainly used by these retailers while one organisation indicated that they had gone internationally. The one that was internationally diversified indicated that their new shops were not producing satisfying profits. This is in agreement with Rothaermel (2013) who

postulated that firms that go internationally face high risk which reduces profits.

4.1.2 Problems in shops added in new geographical areas

The research sought to find problems that were being experienced in shops added in new geographical areas that had an impact to profitability performance. The following table 4.1.2 illustrates the results.

Table 4.1.2: Problems in shops added in new geographical areas

	Strongly Disagree 1	Disagree 2	Neither Agree or Disagree 3	Agree 4	Strongly Agree 5
a) There was improvement in management efficiency	6 (22%)	14 (50%)	0 (0%)	6 (21%)	2 (%)
b) Values, beliefs and norms are good for the strategy	10 (36%)	9 (32%)	0 (0%)	3 (11%)	6 (21%)
c) Debt level is low	6 (21%)	6 (21%)	0 (0%)	10 (36%)	6 (21%)
d) There is decision making flexibility	12 (43%)	9 (32%)	0 (0%)	5 (18%)	2 (7%)
e) There is fair distribution of resources	10 (36%)	4 (14%)	0 (0%)	10 (36%)	4 (14%)
f) Rewarding system is matched with the strategy	12 (42%)	10 (36%)	0 (0%)	3 (11%)	3 (11%)

Source: Research Survey 2015

Table 4.1.2 above reveals that 72% disagreed that there was management efficiencies while 28% agreed. 68% disagreed that there is good culture in their organizations while 32% agreed for good culture for the strategy. This might be led by lack of skills and team work. 75% postulated for inflexible decision making while 25% argued that there was flexible decision making. 78% of the population disagree that their reward system were matched to the strategy while 22% agreed. Shops added in new shops had problems of management inefficiencies, culture conflicts, inflexible decision making and rewards not matched to the strategies. This is in agreement with Strickland et al (2012) who postulated that geographical expansion is highly associated with management inefficiencies and inflexible decision making. However above half of top managers agreed that their rewards were matched with the strategy. This might be a motivation to adding more shops

taking views from Johnson et al (2011) and Braguinsky et al (2013) that managers can expand business to get incentives.

4.2 Relationship between Acquisitions and profitability

The research sought to find out the relationship between acquisitions and profitability. It was looking at the three variables which are profits after tax and interest, operating costs and return on assets. Furthermore problems and different interests for acquisitions were thoroughly searched for.

4.2.1 Profitability performance of acquisitions

The research sought to find how acquisitions were performing in terms of profits after tax and interest, operating costs and return on assets. Table 4.2.1 below illustrates the results obtained.

Table 4.2.1: Relationship between acquisitions and profitability

	Strongly Disagree 1	Disagree 2	Neither Agree or Disagree 3	Agree 4	Strongly Agree 5
a) Increased profits after tax and interest	10 (36%)	4 (14%)	0 (0%)	0 (0%)	14 (50%)
b) Decreased Operating costs	11 (39%)	9 (32%)	0 (0%)	1 (4%)	7 (25%)
c) Increased return on assets	10 (36%)	9 (32%)	0 (0%)	3 (11%)	6 (21%)



Source: Research Questionnaire

Table 4.2.1 above shows that respondents had divided opinions on profits after tax and interest. 50% associated acquisitions with high profits while 50% did not associate acquisitions with increased profits. This is contradicting Abdul-Ramon and Ayorinde (2012) and Olaleken (2012) who found acquisitions more profitable and not to be doubted as shown by the distribution of respondents above. Respondents that disagreed for low operating costs in acquisitions were 71% while 29% agreed for low costs. Furthermore 68% disagreed for increased return on assets while 32% agreed. Respondents found acquisitions associated with higher costs and low return on assets. This contradicts with their views on profits after tax and interest. This might be the fact that economies of scale are not manifesting to full capacity in their organisations. This contradicts Lasserie and Macmillan (2012) who found acquisitions having cost reduction advantages due to pooling, sharing resources and assets resulting in profits maximization.

Interviews revealed operating costs that were significant in the retail sector and the last question in the questionnaire. These operating costs were advertising and promotional costs, building repairs and maintenance, human resources and information systems costs. Acquisitions were mainly for up market demanding a lot in terms of service quality. It was revealed that these organisations were regularly engaging

contract employees that raised training and development costs. This reveals that these acquisitions were not properly evaluated as postulated by Strickland et al (2012) and Ireland et al (2013) that there should be proper evaluation for acquisitions to succeed. The evaluation stage under the strategic process was not properly or adequately done.

Horizontal acquisitions were mainly used in the sector. These retailers like Pick ‘n’ Pay might be under a diversified organisation but the author probed for acquisitions that were made by the division itself. The horizontal acquisitions were highly associated with advertising and promotions, human resources and information technology operating costs. This is contradicting Yesilyurt (2012) who found acquisitions with financial synergies that lead to costs reduction. Furthermore this contradicts with Strickland et al (2012) who found vertical acquisitions highly associated with high operating costs than horizontal acquisitions due to operational synergies that occur in horizontal acquisitions.

4.2.2 Problems in acquisitions

The research probed to find problems that were being experienced in acquisitions. Tables 4.2.2 below illustrate the results.

Table 4.2.2: Problems in acquisitions

	Strongly Disagree 1	Disagree 2	Neither Agree or Disagree 3	Agree 4	Strongly Agree 5
a) There is management efficiency	20 (71%)	5 (18%)	0 (0%)	1 (4%)	2 (7%)
b) Values, beliefs and norms are good	17 (60%)	8 (29%)	0 (0%)	1 (4%)	2 (7%)
c) Debt level is low	3 (11%)	9 (32%)	0 (0%)	6 (21%)	10 (36%)
d) Evaluation of activities is well done	4 (14%)	10 (36%)	0 (0%)	6 (21%)	8 (29%)
e) There is decision making flexibility	10 (36%)	8 (28%)	0 (0%)	5 (18%)	5 (18%)
f) There is fair distribution of resources	9 (32%)	6 (21%)	0 (0%)	1 (4%)	12 (43%)
g) Organisation activities are well Integrated	4 (14%)	10 (36%)	0 (0%)	8 (29%)	6 (21%)
h) There is no duplication of positions and facilities	8 (29%)	9 (32%)	0 (0%)	6 (21%)	5 (18%)

Source: Research Survey 2015

Results depicted in the table above showed those that disagree with prevalence of management efficiencies, good culture, flexible decision making and no duplication of positions and facilities in acquisitions were as; 89%, 89%, 65% and 61% respectively. Those that agreed for management efficiencies, good culture, flexible decision making, and duplication of facilities were 11%, 11%, 35% and 39% respectively. From this data it shows that these acquisitions were highly experiencing management inefficiencies, culture problems, inflexible decision

making, inadequate evaluation of activities, unfair distribution of resources, and duplication of positions and facilities that increased costs eroding profits for organizations. This is in agreement with Ireland et al (2013) who found that 60% acquisitions were producing disappointing results due to failure to evaluate the target adequately, failure to have synergy among the entities, over diversifying, managers paying too much attention on acquisitions and organisation becoming too large to manage. Furthermore this also agrees with Shi et al (2012) who



asserted that duplication of positions and facilities in the organisation usually reduce realization of full benefits of economies of scale. However the researcher had the view that these acquisitions had large amounts of debt but results revealed that these acquisitions did not have large debts. This might be of help to their profits in agreement with Lasserie and Macmillan (2012).

These findings of lack of management efficiency is contradicting Strickland et al (2012) who found General Electric and Toyota's success on building management team that was

deep and talented for efficiency. Furthermore Strickland et al (2012) found success of Royal Dutch Shell highly relying on well suited values, norms and beliefs. This provides a reason why most respondents were associating acquisitions high operating costs and divided opinions on profits.

4.2.3 Motives for Acquisitions

The research sought to find motives that push for engagement of acquisitions. These motives might affect profitability in a certain way. Table 4.3.3 below illustrates results obtained.

Table 4.2.3: Motives for acquisitions

	Strongly Disagree 1	Disagree 2	Neither Agree or Disagree 3	Agree 4	Strongly Agree 5
a)I am entitled to incentives when an acquisition is implemented	10 (36%)	4 (14%)	0 (0%)	5 (18%)	9 (32%)
b)Personal reputation increases with introduction of acquisitions	10 (36%)	9 (32%)	0 (0%)	9 (32%)	0 (0%)
c) Acquisitions improves my personal career development	10 (36%)	9 (32%)	0 (0%)	1 (4%)	8 (28%)

Source: Research Questionnaire

Table 4.2.3 above shows that 50% were agreeing that they were getting incentives for acquisitions implementation while 50% disagree that they were getting incentives. Among those that agree 32% strongly agree and these were top managers while 18% were head of departments. Furthermore 68% were disagreeing that their reputations increased through acquisitions while 32% agreed. Moreso 68% disagreed that acquisitions improved their career development. Among those that agreed for increase in personal reputation and career development were mainly top managers. This might be the motive behind acquisitions and they can evaluate these acquisitions for their own benefit. This is echoing the same sentiments with Johnson et al (2011) and Branguinsky et al (2013) under the behavioural theory of acquisitions which says managers would engage in acquisitions to maximize their personal ambitions. This would

nullify the neoclassical theory of maximizing shareholders' wealthy as postulated by Dilshad (2013).

4.3 Relationship between strategic alliances and profitability

The research intended to probe respondents about their views on the performance of strategic alliance. It further probed for the problems that are usually experienced in strategic alliances that have an impact on profitability.

4.3.1 Profitability performance of strategic alliances

The research sought to find how strategic alliances or partnership business was performing in terms of profits after tax and interest, operating costs and return on assets. Table 4.3.1 below illustrates the results.

Table 4.3.1: Relationship between Strategic Alliances and profitability

	Strongly Disagree 1	Disagree 2	Neither Agree or Disagree 3	Agree 4	Strongly Agree 5
a)Increased profits after tax and interest	2 (7%)	12 (43%)	0 (0%)	2 (7%)	12 (43%)
b)Decreased Operating costs	15 (53%)	7 (25%)	0 (0%)	5 (18%)	1 (4%)
c) Increased return on assets	5 (18%)	13 (47%)	0 (0%)	4 (14%)	6 (21%)

Source: Research Survey 2015

There were 50% respondents that disagreed while 50% agreed for increased profits after tax and interest in strategic alliances. 78% respondents revealed that they disagreed while

22% agreed in decrease of operating costs in strategic alliances. Again 65% disagreed while 35% agreed with increased return on assets for strategic alliances or partnership business. This is



contradicting Uddin and Akhter (2011) who found strategic alliances more competitive to produce results. However this problem might be associated with the different types of strategic alliances that each organisation is engaged in as discovered by Rothaermel (2013). To justify high operational costs interviews carried revealed contract service fees, advertising and promotional costs, human resources costs and information systems costs. However the study established that standardizing costs were just fair and not as significant as was being thought by the researcher. This is contradicting Strickland et al (2012) who found strategic alliances associated with low costs.

The research further probed on the types of strategic alliances that these firms were engaged in through interviews. These retailers were mainly using outsourcing followed by equity alliances then a few franchising. Most retailers were found to be outsourcing cleaning, merchandising and guarding or security services in their organizations. This resulted in high outsourcing charges as revealed in the operational costs explained earlier. This is in agreement with views from Isoraite

(2009) and Rothaermel (2013) that an organisation can outsource activities that are not core to its business so that it concentrates on its core competences. Non-equity alliances are mostly used in the sector. There are only three types of strategic alliances in use but respondents had mixed views on profits after tax and interest performance in strategic alliances. This is might be justifying Sping's (2011) ideas who found a curvilinear relationship between number of alliances entered and profits. The alliances entered in these organizations are still below those six strategic alliances discovered by Sping (2011) that lead to a curvilinear relationship but these retailers already have mixed views on performance of their alliances.

4.3.2 Problems in strategic alliances

The research sought to find problems that were manifesting in partnership or strategic alliances that affect performance of those entities. These problems lead to decrease in profitability. Table 4.3.2 below illustrates results obtained.

Table 4.3.2: Problems in strategic alliances

	Strongly Disagree 1	Disagree 2	Neither Agree or Disagree 3	Agree 4	Strongly Agree 5
a) There is management efficiency	3 (11%)	10 (36%)	0 (0%)	2 (7%)	13 (46%)
b) Values, beliefs and norms are good	8 (29%)	12 (43%)	0 (0%)	4 (14%)	4 (14%)
c) Debt level is low	6 (21%)	7 (25%)	0 (0%)	5 (18%)	10 (36%)
d) Evaluation of activities is well done	2 (7%)	10 (36%)	0 (0%)	10 (36%)	6 (21%)
e) There is decision making flexibility	20 (71%)	4 (14%)	1 (4%)	3 (11%)	0 (0%)
f) There is fair distribution of resources	9 (32%)	11 (39%)	0 (0%)	3 (11%)	5 (18%)
g) Organisation activities are well integration	6 (21%)	10 (36%)	0 (0%)	8 (29%)	4 (14%)
h) There is trust and commitment of parties	9 (32%)	15 (54%)	0 (0%)	0 (0%)	4 (14%)
i) There is dedication of all parties	8 (28%)	10 (36%)	0 (0%)	0 (0%)	4 (36%)

Source: Research Survey 2015

Table 4.3.2 above shows 72% disagreed while 28% agreed for good culture in strategic alliances. Furthermore 85% disagreed with flexible decision making while 11% agreed. Moreover fair distribution of resources had 71% disagreements, 29% agreements while trust and commitment had 86% disagreements and 14% agreements. This reveals that these strategic alliances' performances were highly affected by conflict of culture, inflexible decision making, unfair distribution of resources, lack of trust and commitment, and to some extent lack of dedication among partners with lack of integration of activities. This is in agreement with Ovcina (2010) who asserted that success of strategic alliances relies on

efficiency and integration abilities. These retailers were mainly engaged with non-equity alliances. Non-equity alliances were found to have weak ties among the firms resulting in lack of trust and commitment (Rothaermel, 2013; Isoraite, 2009; Mowla, 2012). These results are in agreement with Ireland et al (2013) and Pearce and Robinson (2013) who found strategic alliances with some control problems that affect revenues and profits.

4.4 Testing of hypothesis for diversification expansion strategies

The research sought to test the hypothesis below:



HO: There is no relationship between diversification expansion strategies employed in retail sector and profitability in Zimbabwe

H1: There is a relationship between diversification expansion strategies and profitability in retail sector in Zimbabwe

Test of this hypothesis was done using regression and correlation analysis.

4.4.1 Addition of shops Regression and Correlation Analysis

This test was on addition of shops through assets value and profits after interest and tax. The principle behind this test being that as organizations engage in adding shops in new geographical areas, acquisitions and strategic alliances they will be increasing their assets. Assets formed the independent variable (X) representing addition of shops through new shops opened in new geographical areas, acquisitions and strategic alliances while profit volumes formed the dependent variable (Y) as shown in table 4.4.1 below.

Table 4.4.1: Independent and dependent variables for addition of shops analysis

Year	Assets Value (US\$million)	Profits after tax and interest (US\$million)
2011	155	(3)
2012	186	10
2013	224	19
2014	242	6
Total	807	32

Source: OK, TM-Pick 'n' Pay and Spar Annual Financial Reports (2011-2014)

4.4.1.1 Regression showing linear relationship between assets and profitability

Linear equation describing the relationships among variables:

$$Y = a + bx$$

Results of test produced $Y = -20.7 + 0.14X$ linear relationship

4.4.1.2 Pearson's Correlation coefficient for increase in assets

Pearson's Correlation coefficient (rp) showing strength of the relationship between assets and profits:

$$r_p = \frac{n \sum xy - \sum x \sum y}{\sqrt{[(n \sum^2 - (\sum x)^2) X (n \sum y^2 - (\sum y)^2)]}}$$

$$r_p = 0.606719903$$

Interpretation: Therefore using Pearson correlation this shows that there exists a strong positive linear relationship between assets added through expansion strategies and corresponding profits. This means that increase in assets lead to increase in profits.

4.4.1.3 Coefficient of determination for increase in assets and Interpretation

$$r_p^2 = 0.606719903^2 \times 100\%$$

$$r_p^2 = 36.81\%$$

Interpretation: 37% of the differences in profit volumes were caused by number or amount of assets in retail sector. 63% of the differences in profit volumes were caused by some other factors.

Therefore: Reject null hypothesis that states that there is no relationship between diversification expansion strategies and profitability. Accept alternative hypothesis that states that there is a relationship between diversification expansion strategies and profitability. There is a strong positive linear relationship between adding shops or diversification expansion strategies and profitability of 0.606719903. Moreover addition of assets led to 37% differences in profit volumes while 63% of the differences in profit volumes were caused by some other external factors. Further research was recommended to find the impact of intensification strategies on profitability that these retailers were using. Furthermore researches for the other strategies that are being used by different sectors can be also done.



5.0 CONCLUSION

The study concluded that there was a strong positive linear relationship between diversification expansion strategy and profitability of 0.606719903. This means increase in assets through diversification leads to increase in profits. The study further concluded that addition of shops was leading to differences in profits by 37%. However there were some other factors affecting profitability by 63% besides diversification expansion strategy. Retailers need to address problems and issues in their diversification expansion strategy so as to enjoy profitability from the strategy.

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ANALYZING & PREDICTING STUDENTS' PERFORMANCES USING MACHINE LEARNING

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ABSTRACT

Literacy is very critical to economic development as well as individual and community well-being. Effective literacy skills open the doors to more educational & employment opportunities. Moreover, the economic success of any country highly depends on making higher education more affordable and that considers one of the main concerns for any government. Thus, this Machine Learning project is to classify and predict the future academic grades and leadership scores of the students. The ability to predict student performance in education is very significant in educational environments. This will help teachers and professors in school and universities consolidate the student on improving and developing each student's curriculum record. The main intention is to identify and support the students to score better marks for their betterment.

KEYWORDS—Prediction, Performance, Education, Marks, Machine Learning, Linear Regression Algorithm, Dataset, Evaluation, Data Preparation, feature selection, Libraries, Results.

I. INTRODUCTION

Machine Learning can be used to predict the performance of the students and identifying the risk as early as possible, so appropriate actions can be taken to enhance their performance. ML techniques would help students to improve their performance based on predicted grades and would enable instructors to identify such individuals who might need assistance in the courses.

Our primary rationale behind making this project is to ease the preparations of students by predicting their academic future outcome based on their previous results. ML techniques would help students to improve their performance based on predicted grades and other crucial factors and it would enable instructors to identify such individuals who might need assistance in the courses.

Machine learning techniques can be used to forecast the performance of the students and identifying the at risk as early as possible so appropriate actions can be taken to enhance their performance. The aim is to help the students to avoid his/her predicted poor result using ML, were we are trying to find out student's current status and further predict his/her future results.

- System can help a teacher about the students like which student needs what kind of help.
- Train the student by finding out the student's weakness & strengths for final examinations.
- Predict the performance of students to derive various correlations of student's performance

It is difficult to analyse the exam manually, most of the time results are not precise as the calculated ones and evaluations are also done manually i.e., time consuming. Result processing after summation of exam takes time as it's done manually. So, we introduce an examination portal system, which is computerized.

System is an emerging field and is very crucial to schools and universities in helping their students and professor to develop performance and grades while keeping in mind other personality factors like interests, attributes and opinions (IAO) which affect their daily lifestyle. Using that information, we can analyze the performance, which will help for both students and mentors.

II. METHODOLOGY

Predictive model for predicting students' performance using Machine Learning (Asaad Masood - 2019) Algorithms used: Decision Tree, Logistic Model Tree (LMT), Association Rules Mining. Data Set used 1021 Records from examination Database. Advantages: Analysis of Factor influencing student performance, Real time intelligent & accurate decision-making Disadvantages: Dataset used is relationally old.

Machine Learning algorithm for student performance prediction (H.M. Rafi Hasan-2019) Algorithms used: Support Vector Clustering (SVC), Decision Tree, K-Nearest Neighbor (KNN). Data Set used 1170 Students Record from University Database. Advantages: Learning about each student, the method can identify



weaknesses & suggests ways to improve. Disadvantages: Less accuracy, Non-academic attributes are not considered.

Student Performance Assessment and Prediction System using Machine Learning (Mehil Shah-2019) Algorithms used: Support Vector Clustering (SVC), Decision Tree, K-Nearest Neighbor (KNN) Random Forest Model. Data Set used Portuguese data set using 33 different attributes modeled under binary/five-level classification and regression tasks. Advantages: Considers wide range of non-academic attributes like travel time, father's or mother's job, etc. Disadvantages: Less accuracy Neural network, Accuracy rate of all algorithm used is considerably low

Student marks prediction using Matrix factorization (Thai Nghe et al - 2011)

Algorithms used: Factorization Matrix (FM), Stochastic Gradient Descent (SGD), Logistic Regression, Personalized Multi-Linear Regression (PMLR). Dataset of 171 students uses 2 different attributes performance of Algebra & Bridge to Algebra courses Advantages: Explores a completely different way of approaching the problem by checking the ability to solve the tasks when interacting with the tutoring system. Disadvantages: Comparatively smaller data set making predictions a bit unreliable.

Student marks prediction using Factorization Machine (Mack Sweeney-2016)

Algorithms used: Collaborative Filtering (CF), Sequential Coordinate-wise Descent (SCD). Data Set used 1021 Records from examination Database. Advantages: Minimal prediction error, accurately predict grades for both new and returning students taking both new and existing courses. Disadvantages: Requires additional info on the courses from historical transcript & instructions, Algorithms used are hard to understand.

Predicting student performance: an application of data mining methods with an educational web-based system (Behrouz Minaei-Bidgoli) Algorithm used Genetic Algorithms have been shown to be an effective tool to use in data mining and pattern recognition. Dataset used students' final grades based on their web-use features, which are extracted from the homework data. We design, Implement & evaluate a series of pattern classifiers with many parameters in order to compare the performance on a dataset from LON-CAPA. Advantages: This paper presents on This paper presents on approach to classifying students in order to predict their final grade based on features extracted from logged on to in an education web-based system. Disadvantage: The time overhead for evaluation is therefore a critical issue.

Predicting and Interpreting Student Performance Using Ensemble Models and Shapley Additive Explanations (HAYAT SAHLAOU) Algorithm used is a simple grid search algorithm provided by scikit to estimate the optimal parameters of our model. Data Set used three nominal intervals depending on the student's average grade (high performer, average performer, and low performer). Advantages: Deals with students' observed records that

represent the training set and matching student historical data that represent features with their label that represents the actual performance. Disadvantage: Student performance value could be numeric in the case of a regression problem or categorical in the case of a classification problem.

Early Prediction for At-Risk Students in an Introductory Programming Course Based on Student Self-Efficacy (Mona M. Jamjoom, Eatedal A. Alabdulkareem). Algorithm used Decision Tree, Bayesian classifier, artificial neural network (ANN), SVM, and kNN algorithm. Data set used dataset was derived from students of the CS department of the College of Computer and Information Sciences (CCIS) at Princess Nourah bint Abdulrahman University (PNU). Advantages: The experiments of this study yielded good results in term of accurate prediction for student performance in the final test. Disadvantage: predicting who would quit the course was difficult, as there was an increase in the dropout rate amongst students who attained high score.

In the above section we discussed how Machine Learning can be used to predict the performance of the students and identifying the risk as early as possible so appropriate actions can be taken to enhance their performance. This paper is aimed to groom the student by finding out the dependencies for examinations. The details are given below.

Software used Tech: Python, Machine Learning. Libraries: NumPy, pandas, matplotlib, seaborn, scikit-learn. Implementation: Google Colab, Jupyter Notebook. Website: HTML, CSS, JavaScript, Flask.

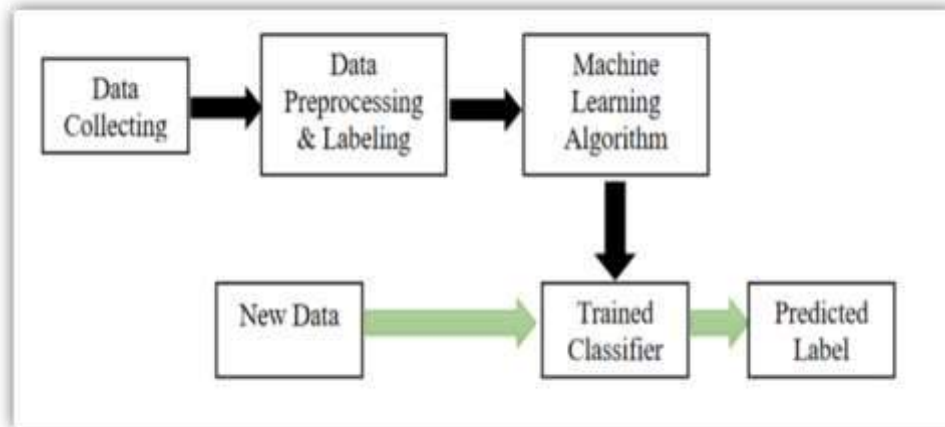
Hardware used Processor: i3 4th Generation or higher, 4GB RAM, 1GB Storage.

Dataset used

This data approaches student's achievement in secondary education of two Portuguese schools. The data includes student grades, social and school-related features), demographic and was collected by using school reports and questionnaires. Pair of datasets are provided including the performance in only two distinct subjects: Math's (mat) and Portuguese language (por). In [Cortez and Silva, 2008], the two data sets were modeled under a binary/five-level classification and regression tasks. Important note: the target attribute G3 has a strong correlation with attributes G2 and G1.

This occurs cause the G3 attribute is the final year grade (issued at 3rd period), while G1 & G2 corresponds to the 1st and 2nd period grades. It's more difficult to predict G3 without G2 and G1, therefore such prediction is much more useful.

The entire dataset was extensively analyzed and features (attributes) were tested against the label (final attribute) using Pearson's Correlation Coefficient, Chi-Squared Test and ANOVA Test, the dataset was splinted in 2 parts to avoid overfitting for training, testing and validating sets, we split the dataset into 75:25 for training to testing sets ratio. From this, 75% of the dataset is used for training sets & 25% of the dataset is used as testing sets.

**Fig.1: (DFD) Dataflow Diagram**

To get the right predictions, we must construct the data set and transform the data correctly.

- The first step is collecting the data from the data sources. In our case, the data has been collected using a survey given to the students and the students' grade book.
- The second step is pre-processing the data in order to get a normalized dataset and then labelling the data rows.
- In the third step, the result of the second step, the training and testing dataset, is fed to the Machine Learning algorithm.
- The Machine Learning Algorithm builds a model using the training data and tests the model using the test data.
- Finally, the Machine Learning Algorithm produces a trained model or a trained classifier that can take as an input a new data row and predicts its label.

Input Data

We use dataset containing attribute of 396 Portuguese students were using the features available from dataset and define classification algorithms to identify whether the student performs good in final exam to evaluate different machine learning models on to the dataset.

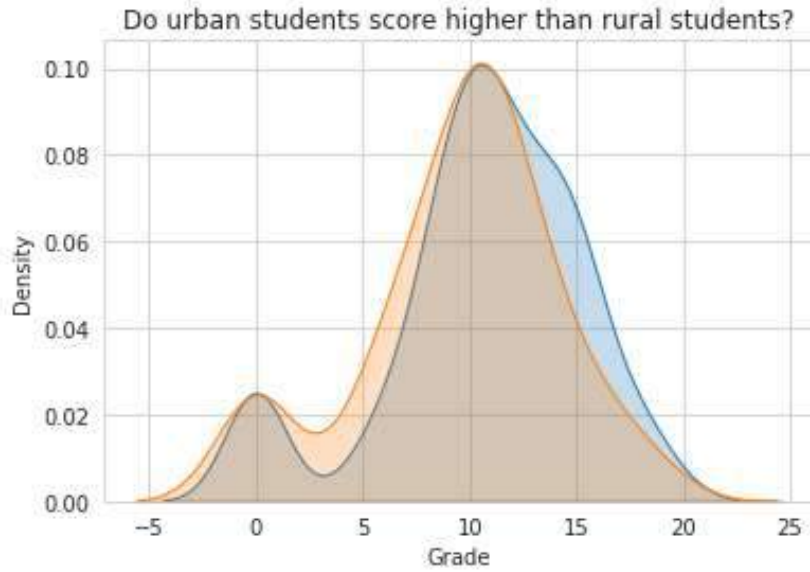
Attribute Information

school - student's school (binary: 'GP' - Gabriel Pereira or 'MS' - Mousinho Silveira), **sex** - student's sex (binary: 'F' - female/'M' - male), **age** - student's age (numeric: from 15- 22), **address** - student's home address type (binary: 'U' - urban or 'R' - rural), **famsize** - family size (binary: 'LE3' - less or equal to 3 or 'GT3' - greater than 3), **Pstatus** - parent's status (binary: 'T' - living together or 'A' - apart), **Medu** - mother's education (numeric: 0 - none, 1 - primary education (4th grade), 2 - " 5th to 9th grade, 3 - " secondary education or 4 - " higher education), **Fedu** - father's education (numeric: 0 - none, 1 - primary education (4th grade), 2 - " 5th to 9th grade, 3 - "

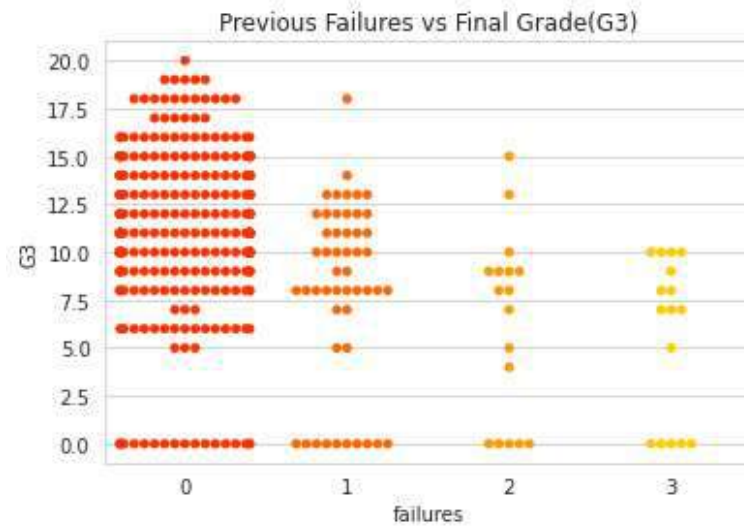
secondary education or 4 - " higher education), **Mjob** - mother's job (nominal: 'teacher', 'health' care related, civil 'services' (e.g. administrative or police), 'at home' or 'other'), **Fjob** - father's job (nominal: 'teacher', 'health' care related, civil 'services' (e.g. administrative or police), 'at home' or 'other'), **reason** - reason to choose this school (nominal: close to 'home', school 'reputation', 'course' preference or 'other'), **guardian** - student's guardian (nominal: 'mother', 'father' or 'other'), **travel time** - home to school travel time (numeric: 1 - <15 min., 2 - 15 to 30 min., 3 - 30 min. to 1 hour, or 4 - >1 hour), **study time** - weekly study time (numeric: 1 - <2 hours, 2 - 2 to 5 hours, 3 - 5 to 10 hours, or 4 - >10 hours), **failures** - number of past class failures (numeric: n if $1 \leq n < 3$, else 4), **schools** - extra educational support (binary: yes or no) (binary: yes or no), **famsup** - family educational support (binary: yes or no), **paid** - extra paid classes within the course subject (Math or Portuguese) (binary: yes or no), **activities** - extra-curricular activities (binary: yes or no), **nursery** - attended nursery school (binary: yes or no), **higher** - wants to take higher education (binary: yes or no), **internet** - Internet access at home (binary: yes or no), **romantic** - with a romantic relationship (binary: yes or no), **famrel** - quality of family relationships (numeric: from 1 - very bad to 5 - excellent), **freetime** - free time after school (numeric: from 1 - very low to 5 - very high), **goout** - going out with friends (numeric: from 1 - very low to 5 - very high), **Dalc** - workday alcohol consumption (numeric: from 1 - very low to 5 - very high), **Walc** - weekend alcohol consumption (numeric: from 1 - very low to 5 - very high), **health** - current health status (numeric: from 1 - very bad to 5 - very good), **absences** - number of school absences (numeric: from 0 to 93),

IV.MODELING AND ANALYSIS

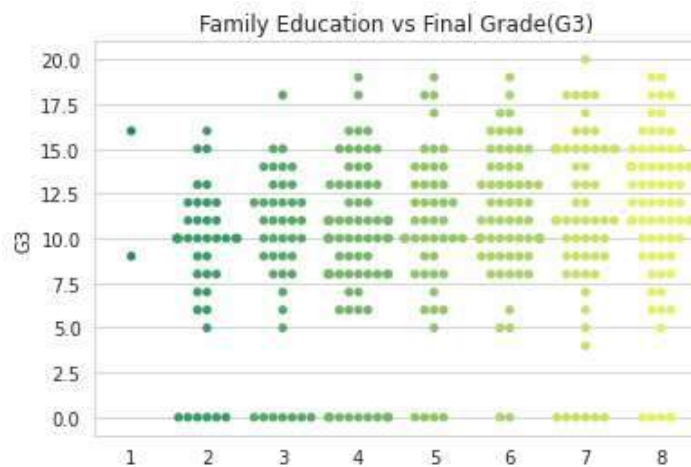
- It was found that the students' location does not matter as students from both urban and rural areas almost scored identically. [attribute: address] (FIG.2)



- Students with less previous failures usually scored higher. [attribute: failures] (FIG.3)

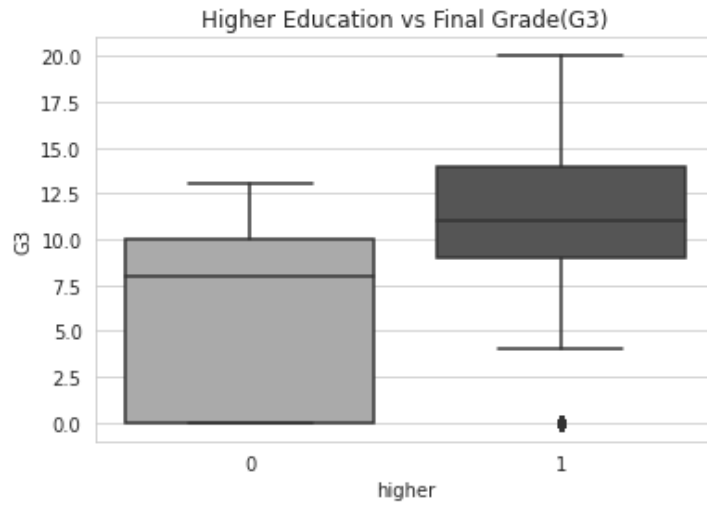


- Student coming from Educated Families scored higher. [attribute: Fedu + Medu] (FIG.4)

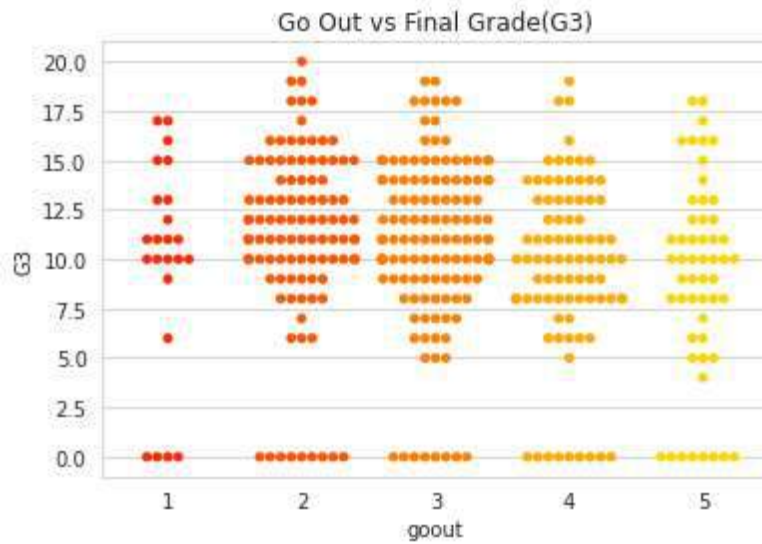




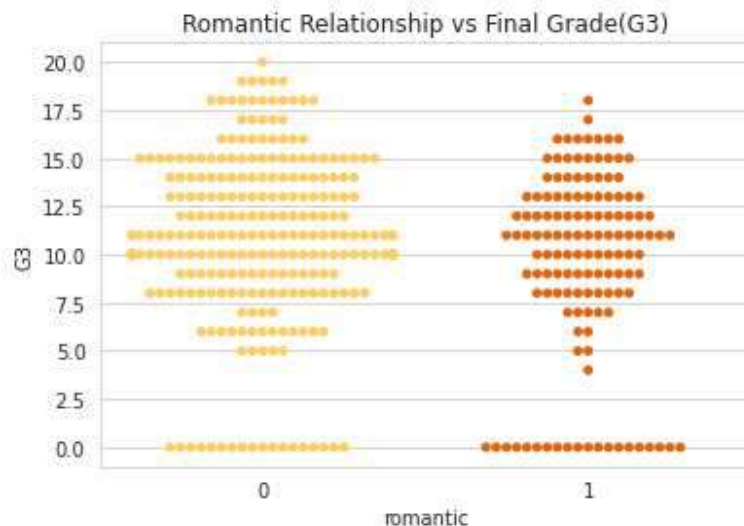
- Students wishing to pursue Higher Education had better grades than those who didn't wish to go for Higher Education. [attribute: higher] (FIG.5)



- Students who hangout or engage in social outings a lot usually scored lesser. [attribute: goout] (FIG.6)



- Students who were not involved in any romantic relationship scored higher grades. [attribute: romantic] (FIG.7)



Dataset Information:

1. The gender distribution is very even as number of female students were 208 while the rest 187 were male.
2. Approximately, 77.72% students come from urban region and 22.28% from rural region.

Fig.8: (Dataset) Set of Attributes

Machine Learning Algorithms used:

Linear Regression: Linear Regression is a machine learning algorithm i.e. based on supervised learning. It performs regression task. A regression models a target prediction value based on independent variables provided. It is mostly used to find out the relationship between variables and forecasting.

Random Forest: Support Vector Machine (SVM) is a supervised machine learning algorithm used for both classification and regression. The objective of SVM algorithm is simple i.e. to find a hyperplane in an N-dimensional space that distinctly classify the data points.

SVM: Random forests or random decision forests is an ensemble learning method for classification, regression and other tasks that operates by constructing a multitude of decision trees at training time. For classification tasks, the output of the random forest is the class selected by most trees.

Gradient Boosting: It is a machine learning technique used in regression and classification tasks, among others. It gives a prediction model in the form of an ensemble of weak prediction models, which are typically decision trees.

Extra Trees: It is an ensemble machine learning algorithm that combines the predictions from many decision trees. It is related to the widely used random forest algorithm. It can often achieve as-good or better performance than the random forest algorithm, although it uses a simpler algorithm to construct the decision trees used as members of the ensemble.

Bayesian Regression: allows a natural mechanism to survive insufficient data or poorly distributed data by formulating linear regression using probability distributors rather than point estimates. The output or response 'y' is assumed to drawn from a probability distribution rather than estimated as a single value.

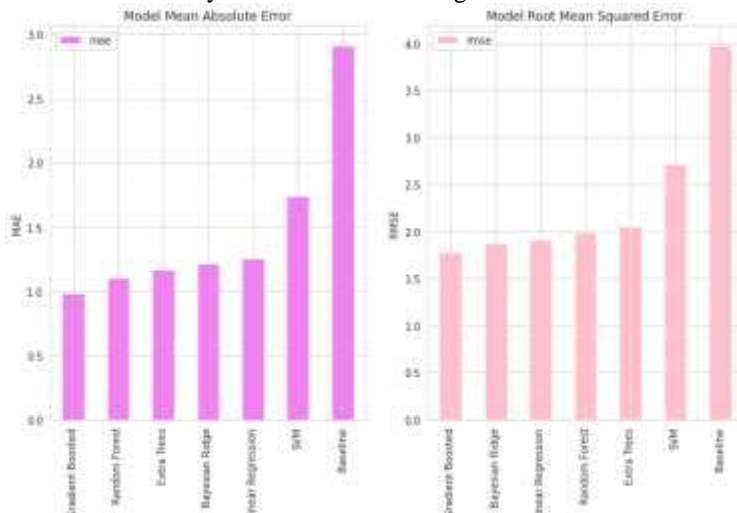


Fig.9: Popular Supervised Learning Algorithms Compared



ALGORITHMS	MAE	RMSE
Gradient Boosted	0.983401	1.779369
Random Forest	1.109453	2.019044
Extra Trees	1.112205	2.031504
Bayesian Ridge	1.216506	1.874521
Linear Regression	1.252096	1.912315
SVM	1.740928	2.711474

Table.1: Mean Absolute Error & Root Mean Squared Error Statistics for all the mentioned algorithms

V. RESULTS AND DISCUSSION

After all the analysis and testing, 8 features used for the purpose of predictions were:

- Travel time: The time required to reach the school/college to home.
- Study time: Number of Hours spent on studying by a student in a week.
- Past failures: Number of backlogs/Arrears in past.
- Higher education: If the student wishes to pursue higher education.

- Health: State of physical, mental & social wellbeing of the student.
- Absences: Number of classes/Lectures missed by a student
- G1 and G2 (first and second period grades).

The following findings are considered to judge our proposed system some major attributes are considered out of the total 33 attributes.

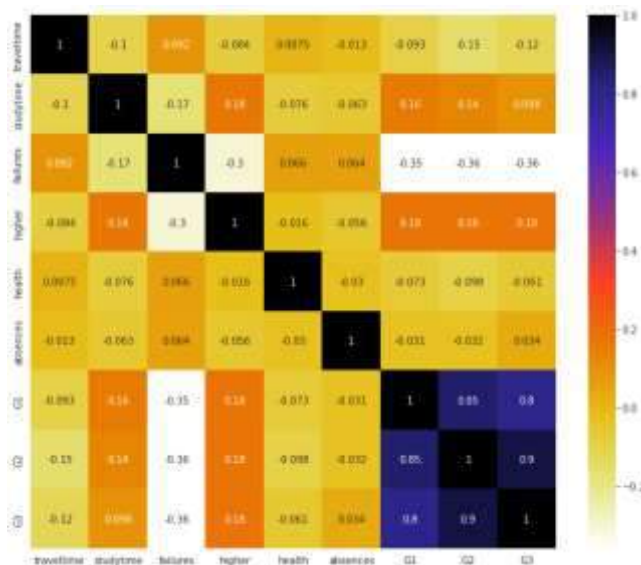


Fig.10: Heatmap showing correlation between all the mentioned features (attributes) and the label (target attribute)

Mean Absolute Error: MAE is the absolute difference between the target value and the value predicted by the model.

MAE is a linear score which means all the individual differences are weighted equally.

$$MAE = \frac{1}{n} \sum |y - \hat{y}|$$

Annotations:
 - $\frac{1}{n}$: Divide by the total number of data points
 - \sum : Sum of
 - $|y - \hat{y}|$: The absolute value of the residual
 - y : Actual output value
 - \hat{y} : Predicted output value



Root Mean Squared Error: RMSE is the most widely used metric for regression tasks and is the square root of the

averaged squared difference between the target value and the value predicted by the model.

$$RMSE = \sqrt{\frac{\sum_{i=1}^N (\text{Predicted}_i - \text{Actual}_i)^2}{N}}$$

VI. CONCLUSION

We proposed a novel method for predicting students' future performance given their past performances & other real-life attributes. We believe our project will be able to help students in preparing for their next exams by letting them help in estimating their score. In general, it will aware the student about their performance.

The analysis of student's dropout during the very early stages of their levels is very interesting, as there are still many opportunities to research about helpful & predictive tools to enable the prevention mechanisms. In this sense, a good approach to research would really be to apply the same predictive techniques used for the academic performances to this case.

Mean Absolute Error & Root Mean Squared Error was minimum in the Gradient Boosted Algorithm which means that Gradient Boosted Algorithm is likely to give best accuracy with the selected attributes.

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BREAST CANCER DETECTION USING DEEP LEARNING

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ABSTRACT

Deep learning (DL) technologies are becoming a buzzword these days, especially for breast histopathology image tasks, such as diagnosing, due to the high performance obtained in image classification. Among deep learning types, Convolutional Neural Networks (CNN) are the most common types of DL models utilized for medical image diagnosis and analysis.

However, CNN suffers from high computation cost to be implemented and may require to adapt huge number of parameters. Thus, and in order to address this issue; several pre-trained models have been established with the predefined network architecture. In this study, a transfer learning model based on Visual Geometry Group with 16-layer deep model architecture (VGG16) is utilized to extract high-level features from the Break His benchmark histopathological images dataset.

Then, multiple machine learning models (classifiers) are used to handle different Breast Cancer (BC) histopathological image classification tasks mainly: binary and multiclass with eight-class classifications. The experimental results on the public BreakHis benchmark dataset demonstrate that the proposed models are better than the previous works on the same dataset. Besides, the results show that the proposed models are able to outperform recent classical machine learning algorithms.

I. INTRODUCTION

Breast cancer remains one of the most severe public health concerns, and it is the leading cause of cancer-related deaths in women around the world. For example, in Jordan, breast cancer constitutes 19.7% of all diagnosed chance. Therefore, the early diagnosis of this disease is vital to avoid its progression consequences and reduce its morbidity rates in women.

Breast cancer cells include numerous entities with distinctive clinical and histological attributes, this indicates that this disease is a heterogeneous one. Figure 1 shows two rows of images; the top row shows benign cells images while the bottom row show malignant cells ones. Unfortunately, this malignancy happens from the development of unusual breast cells and might conquer the close healthy tissues. Clinical diagnosis of breast cancer is composed of numerous techniques. The first technique is clinical screening, which is performed by employing radiology images, e.g. Magnetic Resonance Imaging (MRI), Mammography and others. However, these non-invasive imaging may not be able to determine the cancerous area efficiently.

Thus, to analyze the malignancy professionally, biopsy images are used with different stained to produce histopathology images. However, manual investigation of the histopathology images is tedious, time-consuming, and based on physician skills. Thus, manual diagnosing is subjective. To this end, Computer-Aided Diagnosis (CAD) plays a significant role in assisting pathologists in examining the histopathology images and finding the suspected area. Typically, it increases the diagnostic performance of BC by

reducing the inter-and intrapathologist variation in making a final decision

II. AIM & OBJECTIVES

- The main aim of this module is to provide earlier warning to the users and it is also cost and time saving.
- In this system image pre-processing and image segmentation are implemented to obtain the diagnosis result.
- The extracted features can be used for classification of disease stages. this technique helps the radiologists and the doctors by providing more information and taking correcting decision for breast cancer patient in short time with accuracy.
- Therefore, this method is less costly, less time consuming and easy to implement.

III. LITERATURE SURVEY

[International Conference on Advances in Computing, Communication Control and Networking (ICACCCN2018)]

Topic: Breast Cancer Diagnosis Using Deep Learning Algorithm.

System Used: In this paper we proposed the deep learning method convolutional neural network that mostly used for classification of images dataset. After the implementation this method we have achieved 99.67% accuracy. In this paper we used only 12 features for diagnosis of cancer. In future we will try on images dataset with Convolution Neural Network and will try to achieve best accuracy. Our work proved that Deep



Learning neural network algorithm also effective for human vital data analyzation and we can do pre-diagnosis without any special medical knowledge.

[3rd International Conference and Workshops on Recent Advances and Innovations in Engineering, 22-25 November 2018 (IEEE Conference Record # 43534)]

Topic: Breast Cancer Detection From Histopathological Images Using Deep Learning.

System Used: As we know that deep learning method convolutional neural network mostly used for image dataset classification that why we used convolutional neural network in this paper. After the implementation this paper we have achieved 98% accuracy. As we mention this paper worked on only 12 features only. In future we will try with new features and also try with the real images dataset so that we can achieved best result and accuracy for diagnosis the cancer. In future we will also try this method on different type in cancer not only for breast cancer.

[2018 International Conference on Computational Techniques, Electronics and Mechanical Systems (CTEMS)]

Topic: Breast Cancer Detection Using Machine Learning Algorithms.

System Used: The most frequently occurring type of across cancer is breast cancer. There is a chance of twelve percent for a women picked randomly to be diagnosed with the disease[10]. Thus, early detection of breast cancer can save a lot of valuable life. The proposed model in this paper presents a comparative study of different machine learning algorithms, for the detection of breast cancer. Performance comparison of the machine learning algorithms techniques has been carried out using the Wisconsin Diagnosis Breast Cancer data set. It has been observed that each of the algorithm had an accuracy of more than 94%, to determine benign tumor or malignant tumor. From Table 6, it is found that kNN is the most effective in detection of the breast cancer as it had the best accuracy, precision and F1 score over the other algorithms. Thus supervised machine learning techniques will be very supportive in early diagnosis and prognosis of a cancer type in cancer research.

[Proceedings of the International Conference on Smart Electronics and Communication (ICOSEC 2020) IEEE Xplore Part Number: CFP20V90-ART; ISBN: 978-1-7281-5461-9]

Topic: Breast Malignant Detection using Deep Learning Model

System Used: This paper projected a deep learning technique convolutional neural system that diagnosis breast cancer data. This experiment has resolved the dataset imbalance, skewness, and insufficient data of the dataset. And also, the hyperparameters to train the model to achieve the optimal accuracy is discussed. In addition to that, the proposed model is compared with existing machine learning models by including Logistic regression, K- Nearest Neighbors, and decision tree algorithms in terms of performance metrics including accuracy score, precision score, recall score, and f1-score. The proposed model provides better performance in terms of accuracy score (97.94), recall score (98.6) and F1-score(97.94) compared to other machine learning models.

[International Conference and Workshops on Recent Advances and Innovations in Engineering (IEEE) March-2019]

Topic: Breast Cancer Detection Based on Deep Learning Technique.

System Used: In this paper, deep learning technique using VGG16 and ResNet50 network have been implemented for normal and abnormal breast cancer detection. The classification methods were evaluated using three performance evaluations which are precision, recall, and accuracy rate. The best result of classification accuracy was VGG16 with 94%. For future work, the abnormal images can be classified to malignant and benign tumor. That help a lot in term of conducting the next procedure for the patients.

IV. EXISTING SYSTEM

First the quality of the CADs depends on the extracted features, while acquiring representative features from the image is very complex issue.

Second using acquiring features may not be suitable for inter and intra-class variation in the histopathological images.

Third most of the extracted features are based on class label information they can be lying to biased results.

The conventional CADs that was based on the extracted handcrafted features, DL plays a significant in multiple classification tasks and can achieve high performance and extract high-level features from histopathology images automatically.

V. PROPOSED SYSTEM

The experimental results on the public BreakHis benchmark dataset demonstrate that the proposed models are better than the previous works on the same dataset. Besides, the results show that the proposed models are able to outperform recent classical machine learning algorithms.

The nature of breast histopathological images carry many textures, shape, and histological structure such as nuclei, cytoplasm. Thus, the proposed method utilizes VGG16 to extract deep representative features of the input histopathological images.

The experiments means the number of negative samples that were correctly classified divided by all negative samples. The high specificity in this study implies that the proposed method able to predict the true negative cases accurately.

VI. CONCLUSION

Extracting high-level features from breast histopathological images assists in improving the effectiveness of the diagnostic process. Thus, the main objective of this study is to utilize VGG16, a pre-trained model from CCN deep learning, to extract the high-level features from breast images. To do that, we removed the last fully connected layers in VGG16. Then, the obtained features were classified using a set of heterogeneity classifiers. Extensive experiments on Breaches dataset (public dataset) were carried out, and a set of performance metrics was calculated for performance evaluation (on test data portion). The experimental results



outperformed various techniques in the state-of-the-art. This is demonstrate the effectiveness of the extracted features using VGG16 with polynomial and RBF SVMs classifiers. In the future, further investigation for an ensemble of different classifiers and pre-trained models to deliver high performance for this complex domain will be addressed

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EFFECTIVENESS OF STP ON KNOWLEDGE REGARDING PREVENTIVE MEASURES OF COVID-19 AMONG THE FIRST YEAR B.SC. NURSING STUDENTS AT SELECTED NURSING COLLEGE, COIMBATORE

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ABSTRACT

Introduction In late December 2019, Chinese health authorities reported an outbreak of pneumonia of unknown origin in Wuhan, Hubei Province. A few days later, the genome of a novel coronavirus was released and made publicly available to the scientific community. This novel coronavirus was provisionally named 2019-nCoV, now SARS-CoV-2 according to the Coronavirus Study Group of the International Committee on Taxonomy of Viruses. SARS-CoV-2 belongs to the Coronaviridae family, Beta coronavirus genus, subgenus Sarbecovirus. Since its discovery, the virus has spread globally, causing thousands of deaths and having an enormous impact on our health systems and economies.

Aim effectiveness of STP of knowledge regarding prevention of COVID-19 First year B.Sc. Nursing student in Cherraan's college of nursing at Coimbatore.

Methods The study was conducted through a quantitative research approach. The design of the study used in the research was quasi experimental one group pre-test and post-test research design. The duration of the study was two weeks, non-probability convenience sampling was used and sample size was 50 students. **Sample** The study population was First year B.Sc. nursing students, who are studying in Cherraan's college of nursing at Coimbatore. Pre-test was conducted with a structured questionnaire, after pre-test STP was administered through PPT for 30 minutes. After the 7th day the post test was conducted with the same questionnaire for the same First year B.Sc. Nursing student.

Result The pre-test mean level of knowledge score was 12.88 with SD of 1.41. After the intervention, the post-test mean level of knowledge score was 13.9 with SD of 0.94. The mean difference between the pre-test and post-test was -1.02. Paired 't' test was employed and the calculated 't' was 1.01 which indicates the significant difference between pre-test and post-test level of knowledge score at 0.05 levels. Hence, this finding shows that the STP has a significant effect in increasing the level of knowledge among the First year B.Sc. nursing student regarding prevention of COVID-19.

Discussion Hypotheses was not proved. The chi-square test shows that there is statistically significant at $P < 0.05$ the level of significance and there was significant no association between the pre-test level of knowledge with selected demographic variables among First year B.Sc. nursing students.

KEY WORDS: STP -Structured Teaching Program, Effectiveness, COVID-19,

INTRODUCTION

The Free dictionary by Farlex stated that coronavirus is a group of morphologically similar, ether-sensitive viruses, probably RNA, causing infectious bronchitis in birds, hepatitis in mice, gastroenteritis in swine, and respiratory infections in humans.

World Health Organization, (2020) declared the recent outbreak of coronavirus disease (COVID-19) a global public health emergency and the first pandemic caused by a novel coronavirus.



Drosten et al., (2003) said that COVID-19 is a new strain of the virus that belongs to the same family of the pathogen that causes the severe acute respiratory syndrome (SARS) that has not been previously recognized in humans.

Gorbalenya et al., (2020) reported that first case of this disease in Wuhan in China in December 2019, after which it quickly spread to all Chinese provinces followed by an outbreak in other parts of the country. Initially, outbreak cases were linked to a wholesale animal market in Wuhan from where COVID-19 from an unknown animal source is suspected to cross-species barriers to infect humans. Further human to human transmission led to an exponential growth in the number of cases. Within 2 months, a steep rise in the reported cases of COVID-19 all over the world has heightened global concern forcing the countries to take urgent aggressive actions to combat its transmission. COVID-19 is now the biggest challenge and the topmost priority to address for the countries throughout the world. The virus is known as 'Severe Acute Respiratory Syndrome Coronavirus 2' and is abbreviated as SARS-CoV-2 because its RNA genome is about 82% identical to the SARS coronavirus.

Geneva., (2019) declared that the word COVID-19 stands for Coronavirus Disease 2019. Coronaviruses are a group of microorganisms belonging to the Corona viridae family. It infects both animals and humans. Most human coronavirus infections can cause mild common cold-like symptoms and others may cause serious illnesses like SARS (severe acute respiratory syndrome) and MERS (Middle East Respiratory Syndrome).

Statement of the study

Effectiveness of STP on knowledge regarding preventive measures of COVID-19 among the first year B.Sc. Nursing Students at selected nursing college, Coimbatore.

Objectives of study

- To assess the pre-test knowledge of COVID-19.
- To evaluate the effectiveness of STP on preventive measures of the COVID-19 among the first BSc Nursing Students at selected nursing college, Coimbatore.
- To find out the association between knowledge scores with selected demographic variables.

Hypotheses

- **H1** There is significant improvement between pre and post level of knowledge regarding prevention of COVID-19 among the First B.Sc Nursing Students at selected nursing college, Coimbatore.
- **H2** There is significant association between the pre-test level of knowledge regarding prevention of COVID-19 with selected demographic variables among the First B.Sc Nursing Students at selected nursing college.

Assumption

The study assumes that

- STP is an accepted teaching strategy.
- Nursing student fraternity may have some knowledge regarding COVID-19.

Variables

a) Independent variables

In this study the independent variable was a structured teaching program (STP) on knowledge regarding preventive measures of COVID-19.

b) Dependent variables

In this study the dependent variable was knowledge among the first BSc Nursing students at selected nursing colleges regarding prevention of COVID-19.

Delimitation:

- Students who are willing to participate in the study.
- Students who are able to read and write English

Projected outcome

This study involves the knowledge regarding prevention of COVID-19 among the first B.Sc Nursing Students at selected nursing colleges that helped the frequent effect of the COVID-19. It is very important that student have adequate knowledge regarding prevention of COVID-19. If STP has a positive effect. It can be practiced by all the student.

RESEARCH METHODOLOGY

Denise F. Polit (2013) Research methodology involves the system procedure by which the researcher starts from the identification for the problem to its final conclusion. It involves steps, procedure and strategies for gathering and analysing data in a research investigation.

**Research Approach**

The research approach for this study was Quantitative research approach.

Research design

The research design for this study adopted was Quasi - experimental one group pre-test and post-test research design for this study.

GROUP	PRE-TEST	STP	POST TEST
Among first year B.Sc nursing students	O1	X	O2

O1 - Assess the level of pre-test knowledge regarding prevention of COVID-19

X - STP regarding prevention of COVID-19.

O2 - Assess the level of post-test knowledge regarding prevention of COVID-19

Research variables**a) Independent variables**

In this study STP on knowledge regarding prevention of COVID-19 was the independent variables.

b) Dependent variables

In this study the dependent variable is knowledge of first year B.Sc. nursing students regarding prevention of COVID-19 is the independence variable.

Setting of the study

The setting was chosen on the basis of the availability of samples. The study was conducted at First year B.Sc. nursing student in Cherraa's college of nursing at Coimbatore. The First year B.Sc. nursing student with the strength of 50 students were undergoing testing the level of knowledge regarding the prevention of COVID-19

Population

The population for the present study was 50 first year B.Sc. nursing students.

a) Target population

The target population for the study comprised of first year B.Sc. nursing students studying in Cherraa's college of nursing at Coimbatore.

b) Accessible population

The accessible population of the study comprised first year B.Sc. nursing students studying in Cherraa's college of nursing at Coimbatore and who were in access at time of data collection

Sample

First year B.Sc. nursing students studying in Cherraa's college of nursing at Coimbatore.

Sample size

The sample size for the study comprised of 50 first year B.Sc. nursing students studying in Cherraa's college of nursing at Coimbatore.

Sampling technique

In this study, the sample technique chosen was the non-probability convenience sampling technique.

Criteria for sample selection

Sample criteria involve the cases that meet some predetermined criteria importance. The criteria for sample selection are mainly depicted under two headings, which comprises the inclusion and exclusion criteria.

Inclusion Criteria

- First year B.Sc. nursing students studying in Cherraa's college of nursing at Coimbatore.
- Students who were present during the time of data collection.
- Who given consent to participate in this study.

Exclusion Criteria

- The students who were not able to understand and speak English language.

**Development and descriptive of the tool****Development of the tool**

A Structural questionnaire was developed on the basis of objective of the study. Tool was developed after exclusive review of literature from various text books, journals, internet search and discussion and guidance from the expert in the field of nursing, and medical expert. The tool was developed in English.

Descriptive of the tool

The tool of the study has two sections.

SECTION A Demographic variables of First year B.Sc. nursing students

Consist background variables such as age, educational status, occupational status of parents, monthly income of the family, pet animals, source of knowledge and area of living condition.

SECTION B Structural questionnaire

Questionnaire regarding knowledge on prevention of COVID 19 among first year B.Sc. nursing students. It comprised of 16 multiple choice question. Each correct answer was given a score of one and each wrong answer a score of 0. Total possible score was 16. The level of knowledge was categorized as follows.

- 1-4 inadequate knowledge
- 5- 8 Moderately adequate knowledge
- 9-16 Adequate knowledge

Description of intervention of the study

The STP was developed based on the objectives, review of literature, sample size and experts' opinion. The STP was titled as prevention of COVID 19 infections among first year B.Sc. nursing students It consists of introduction, definition, causes, symptoms, management, prevention measures and home remedies for prevention of COVID 19 infections. The STP was developed in English. PPT were used in STP.

Ethical consideration

The study was approved by the institutional research Chairman and Ethical committee which was held at Cherraaan's college of Nursing. An Ethical clearance was obtained from college and consent was obtained from the first year B.Sc. nursing students in Cherraaan's college of nursing at Coimbatore.

Confidentiality

The researcher-maintained confidentiality of the data provided by the study.

validity and reliability of the tool**Content validity**

The content validity of the tool was established by experts comprised of five nursing expertise and medical experts. The experts were requested to give their opinion and suggestion regarding the relevance of the tool for further modification to improve the clarity and content of items and modification was done accordingly. The tool was finalized by the investigator Reliability

Reliability

Reality of structured questionnaire was elicited by using test-retest method. The "r" value was computed by Karls Pearson's correlation coefficient formula and it was found to be $r=0.95$ which indicated that the tool was absolutely reliable.

Data collection procedure**Method of data collection**

Prior to the collection of data, written permission was obtained from the principal in charge in Cherraaan's college of nursing at Coimbatore. Investigators personally visited each respondent. introduced our self to the students and explained the purpose of the study and ascertained the willingness of the students and they were assured anonymity and confidentiality of the information provided by them

Pre-test was conducted for the students by administering structured questionnaire to assess the knowledge on Prevention of COVID-19 among students. The data was collected from 50 students. Each students took 30 minutes to fill the questionnaire, after the pre-test, STP on selected aspects of prevention of COVID-19 infections was administered to the students through verbal explanation and explaining with flash cards on prevention of COVID-19 for the period of 30 minutes.

Evaluation of STP was conducted by post-test, after 7 days of implementation of STP. Post-test was taken from the students by using the same structured questionnaire.

**Intervention protocol**

Place: Cherraan's college of nursing

Intervention tool: STP

Discussion duration: 30 Minutes

Frequency: One time teaching

AV aids: PPT

Descriptive statistics

Frequency and percentage distribution was used to assess the demographic variables of students.

Frequency and percentage distribution was used to assess the pre-test level of knowledge regarding prevention of COVID-19 among students.

Frequency and percentage distribution was used to assess the post-test level of knowledge regarding prevention of COVID-19 among students.

Mean and standard deviation was used to compare the pre and post-test level of knowledge regarding prevention of COVID-19 among students.

Inferential statistics

- Paired "t" test used to compare the pre and post-test level of knowledge regarding prevention of COVID-19 among students.
- Chi square test was used to associate the pre and post-test level of knowledge score and their selected demographic variables.

DATA ANALYSIS AND INTERPRETATION

This chapter deals with the quantitative analysis and interpretation of collected data from 50 students. The data collected was organized, tabulated and analysed according to the objectives. The findings based on the descriptive and inferential statistical analysis are presented under the following sections.

Presentation of data

The findings of the study were grouped and analysed under the following section:

- **Section A:** Description of demographic variables of students.
- **Section B:** Assessment of pre-test level of knowledge regarding prevention of COVID-19 among students.
- **Section C:** Effectiveness of STP on level of knowledge regarding prevention of COVID-19 among students.
- **Section D:** Association between pre-test level of knowledge regarding prevention of COVID-19 among students with selected demographic variables.

Section A: Description of demographic variables of students who are studying in Cherraan's college of nursing.

Table 4.1 Frequency and percentage description of demographic variables of students who are studying in Cherraan's college of nursing. (N=50)

SL.NO	Demographic Variables	Frequency	%
1.	Number of family members	1	0
		2	1
		3	6
		Over 4	43
2.	Age	15-25 Years	50
		25-30 Years	0
		30-45 Years	0
		45-55 Years	0
3.	Educational qualification	Graduate	5
		Under graduate	4
		Illiterate	0
		Study	41
4.	Industry	Self-employee	1
		Private employee	3
		Government	0
		Student	46
5.	Monthly family income	Less than 10,000	25
		10,001-20,000	13

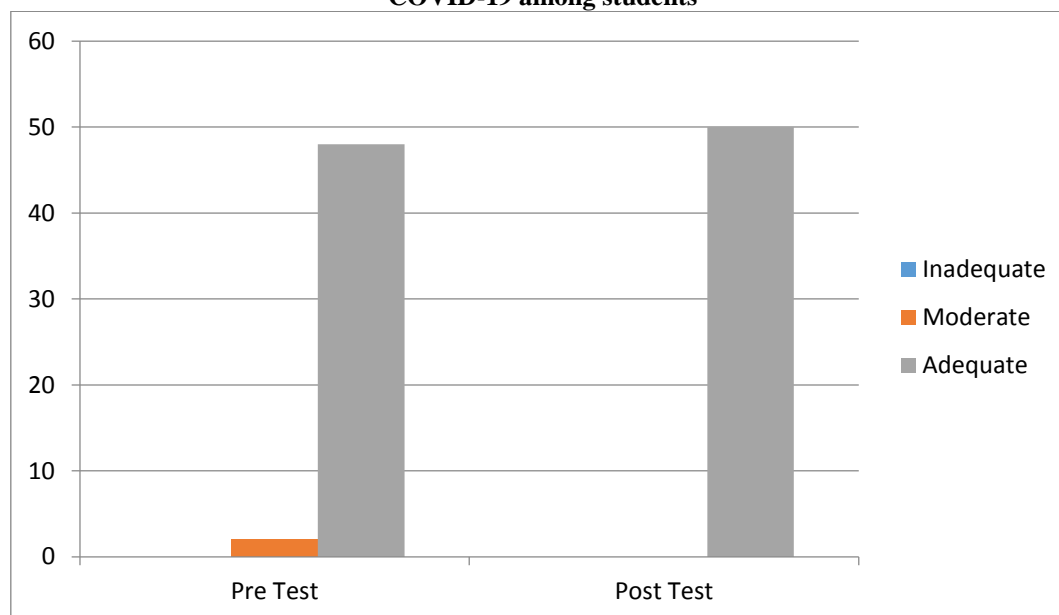


		Over 20,001	12	24
6.	Family type	Separate family	39	78
		Joint family	11	22
7.	Living status	The area where the crowd is high	0	0
		Crowded area	5	10
		Normal living area	45	90
8.	Health care services available	Primary health centre	15	30
		Sub-centre	5	10
		Hospital	30	60
9.	Do you have pet animals?	Yes	18	36
		No	32	64
10.	Previous exposure to source of information regarding COVID-19	Newspaper/Magazine/Posters	6	12
		Radio/TV/Internet	31	62
		Family/Friends/Relatives	11	22
		Health services	2	4

The above table 4.1 shows that in the study group, majority of them 50 (100%) were in the group of 15-25 years, 43 (86%) had over 4 family members, 5 (10%) were graduate, 25 (50%) had Rs. Less than 10,000 as the monthly income of their family, 39 (78%) were living in separate family, 45 (90%) were living in normal living area, 30 (60%) had hospital as their health care service, 32 (64%) had no pet animals and 31 (62%) was exposed to source of information regarding COVID-19 through Radio//TV/Internet.

Section B : Assessment of pre-test level of knowledge regarding prevention of COVID-19 among students

Figure 4.1 Frequency and prevention distribution of pre-test and post-test level of knowledge regarding prevention of COVID-19 among students

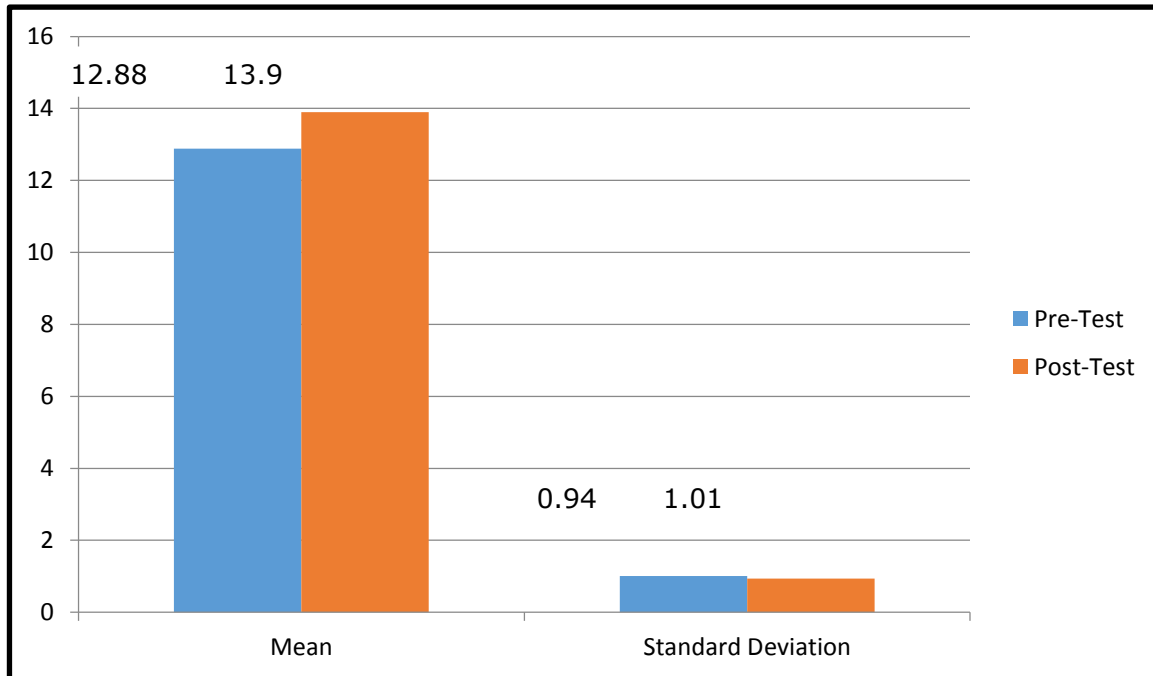


The above figure shows that in the pre-test, majority 48 (96%) of students had adequate knowledge, 2 (4%) had moderate knowledge and in the post test, majority 50 (100%) of students had adequate knowledge.



Section C Effectiveness of STP on level of knowledge regarding prevention of COVID-19 among students.

Figure 4.2 Comparison of pre-test and post-test level of knowledge scores regarding prevention of COVID-19 among students



The above Figure 4.3 shows that the pre-test mean level of knowledge score was 12.88 with SD of 0.94. After the intervention, the post-test mean level of knowledge score was 13.9 with SD of 1.01. The mean difference between the pre-test and post-test was -1.02. Paired t test was employed and the calculated t value was 1.01 which indicates the significant difference between pre-test and post-test level of knowledge score at 0.05 level. Hence, this finding shows that the STP has a significance effect in increasing the level of knowledge among knowledge regarding prevention of COVID-19

Section D: Association between pre-test level of knowledge regarding prevention of COVID-19 among students with selected demographic variables

Table 4.2 Association between pre-test level of knowledge regarding prevention of COVID-19 among students with selected demographic variables.

N=50

SI NO	Demographic variables		Level of knowledge						Total	Chi square test
			Inadequate		Moderate		Adequate			
			n	%	n	%	n	%		
1.	Family member	1	0	0	0	0	0	0	$X^2 = 0$ df=6 NS	
		2	0	0	0	0	1	2		
		3	0	0	0	0	6	12		
		Over 4	0	0	0	0	43	86		
2.	Age	15-25 Years	0	0	0	0	50	50	$X^2 = 0$ df=6 NS	
		25-30 Years	0	0	0	0	0	0		
		30-45 Years	0	0	0	0	0	0		
		45-55 Years	0	0	0	0	0	0		
3.	Educational	Graduate	0	0	0	0	5	10	$X^2 = 0$ df=6 NS	
		Under graduate	0	0	0	0	4	8		
		Illiterate	0	0	0	0	0	0		



	qualification	Study	0	0	0	0	41	82	41	
4.	Industry	Self-employee	0	0	0	0	1	2	1	$X^2 = 0$ df=6 NS
		Private employee	0	0	0	0	3	6	3	
		Government	0	0	0	0	0	0	0	
		Student	0	0	0	0	46	92	46	
5.	Monthly family income	Less than 10,000	0	0	0	0	25	50	25	$X^2 = 0$ df=4 NS
		10,001-20,000	0	0	0	0	13	26	13	
		Over 20,001	0	0	0	0	12	24	12	
6.	Family type	Separate family	0	0	0	0	39	78	39	$X^2 = 0$ df=2 NS
		Joint family	0	0	0	0	11	22	11	
7.	Living status	The area where the crowd is high	0	0	0	0	0	0	0	$X^2 = 0$ df=4 NS
		Crowded area	0	0	0	0	5	10	5	
		Normal living area	0	0	0	0	45	90	45	
8.	There are health services	Primary health care	0	0	0	0	15	30	15	$X^2 = 0$ df=4 NS
		Sub-center	0	0	0	0	5	10	5	
		Hospital	0	0	0	0	30	60	30	
9.	Do you have pet in your home?	Yes	0	0	0	0	18	36	18	$X^2 = 0$ df=2 NS
		No	0	0	0	0	32	64	32	
10.	Previous exposure to source of information regarding COVID-19	Newspaper/Magazine /Posters	0	0	0	0	6	12	6	$X^2 = 0$ df=6 NS
		Radio/TV/Internet	0	0	0	0	31	62	31	
		Family/Friends/Relatives	0	0	0	0	11	22	11	
		Health services	0	0	0	0	2	4	2	

S*: Significant at $p < 0.05$ level; **NS:** Non significant; X^2 : Chi-square value

The above table 4.2 shows that at a Chi square value, Family members $X^2 = 0$ ($p < 0.05$), Age $X^2 = 0$ ($p < 0.05$), educational qualification $X^2 = 0$ ($p < 0.05$), industry $X^2 = 0$ ($p < 0.05$), Monthly family income $X^2 = 0$ ($p < 0.05$), Family type $X^2 = 0$ ($p < 0.05$), living status $X^2 = 0$ ($p < 0.05$), there are health services $X^2 = 0$ ($p < 0.05$), do you have pet in your home $X^2 = 0$ ($p < 0.05$), previous exposure to source of information regarding COVID-19 has negative association.

DISCUSSION

This chapter discusses the main findings from the result of the present study. For this study the data was obtained regarding knowledge on COVID-19 in Cherran's college of nursing students at Coimbatore. The research has undertaken the study entitles assess the knowledge regarding COVID-19 and it's prevention among first year B.Sc nursing students in Cherran's college of nursing at Coimbatore

The purpose of the study was to assess the STP on knowledge regarding prevention of COVID-19 among first year B.Sc nursing students in Cherran's college of nursing at Coimbatore. The people for the study was 50 students. STP was given nearly 30 minutes. Two week after STP post test was conducted to evaluate the effectiveness of teaching program.

The result of the study was based on the statistical analysis. The effectiveness of STP was assessed by using paired 't' test. Chi-square was used to find the association between the level of knowledge with selected demographic and obstetrical variables. The result were formulated according to the started objectives.

Objectives of the study

- To assess the pre test knowledge of the COVID-19.
- To evaluate the effectiveness of the STP on preventive measures of the COVID-19 among the first year B.Sc nursing students in Cherran's college of nursing at Coimbatore.
- To find out the association between knowledge scores with selected demographic variables.

**The finding of the study based on the objectives are****The first objective was to assess the pre test knowledge of the COVID-19.**

The Percentage distribution of students according to demographic variables, majority of them 50 (100%) were in the group of 15-25 years, 43 (86%) had over 4 family members, 5 (10%) were graduate, 25 (50%) had Rs. Less than 10,000 as the monthly income of their family, 39 (78%) were living in separate family, 45 (90%) were living in normal living area, 30 (60%) had hospital as their health care service, 32 (64%) had no pet animals and 31 (62%) was exposed to source of information regarding COVID-19 through Radio//TV/Internet.

The second objective was to evaluate the effectiveness of the STP on preventive measures of the COVID-19 among first year B.Sc nursing students at selected nursing college, Coimbatore

Comparison of pre test mean level of knowledge score was 12.88 with SD of 1.41. After the intervention, the post test mean level of knowledge score was 13.9 with SD of 0.94. The mean different between the pre test and post test was - 1.02. Paired 't' test was employed and the calculated 't' was 1.01 which indicate the significant difference between pre test and post test level of knowledge score at 0.01 levels. Hence, this findings shows that the STP has a significant effect in increasing the level of knowledge among the students regarding prevention of COVID-19.

The third objective was to find out the association between knowledge scores with selected demographic variables.

The result shows that Family members $X^2 = 0$ ($p < 0.05$), Age $X^2 = 0$ ($p < 0.05$), educational qualification $X^2 = 0$ ($p < 0.05$), industry $X^2 = 0$ ($p < 0.05$), Monthly family income $X^2 = 0$ ($p < 0.05$), Family type $X^2 = 0$ ($p < 0.05$), living status $X^2 = 0$ ($p < 0.05$), there are health services $X^2 = 0$ ($p < 0.05$), do you have pet in your home $X^2 = 0$ ($p < 0.05$), previous exposure to source of information regarding COVID-19 has negative association.

Hypotheses

H1 There is significant improvement between pre and post level of knowledge regarding prevention of COVID-19 among students.

From the findings of the present study it was concluded that the STP on prevention of COVID-19 improves the knowledge of students who participated in the study. Thus the hypothesis was not proved statistically.

H2 There be significant association between the pre test level of knowledge regarding prevention of COVID-19 with selected demographic variables among students.

There was statistical no association between of pre test level of knowledge regarding prevention of COVID-19 among students with their selected demographic variables such as family member, age, educational qualification, monthly income of the family, area of living condition.

SUMMARY OF FINDING, CONCLUSION, NURSING IMPLICATION, NURSING ADMINISTRATION, NURSING EDUCATION, NURSING RESEARCH AND RECOMMEDATIONS

This chapter deals with summary of the finding conclusion, nursing implication, nursing administration, nursing education, nursing research and recommendation of the study.

Summary of the finding

The primary aim of the present study was to assess the effectiveness of structural teaching program on knowledge regarding prevention of COVID-19 among first year B.Sc nursing students in Cherraan's college of nursing at Coimbatore.

Objectives of the study

- To assess the pre test knowledge of the COVID-19.
- To evaluate the effectiveness of the STP on preventive measures of the COVID-19 among the first year B.Sc nursing students in Cherraan's college of nursing at Coimbatore.
- To find out the association between knowledge scores with selected demographic variables.

Hypotheses of the study

- H1 There is significant improvement between pre and post level of knowledge regarding prevention of COVID-19 among students.
- H2 There be significant association between the pre test level of knowledge regarding prevention of COVID-19 with selected demographic variables among students.

Methods of the study

- Quasi experimental research design was adopted for this study. There are 50 first year B.Sc nursing students in Cherraan's college of nursing at Coimbatore and non probability convenience sampling technique was used to collect the data. The data was collected with the help of structured questionnaire to assess level of the knowledge regarding prevention of COVID-19 which consist of 16 questionnaires and demographic variable of village people.



- For conducting pilot study, the investigator administered structured questionnaire to assess the level of knowledge level of village people at selected college in Coimbatore.
- The final study was conducted in the month of February to March 2022. By Non probability convenience sampling technique the data was collected from 50 village people. Pre test was conducted for the students by administering structured questionnaire to assess the knowledge on prevention of COVID-19 among village people. After the pre test, STP on selected aspects of prevention of COVID-19 was preformed to the village people through verbal explanation and explaining with flash cards on prevention of COVID-19 for the period of 30 minutes. Evaluation of STP was conducted by post test, after 1 days of implementation of STP a post test was conducted from the same people by using the same structured questionnaire.

Significant of findings are as follows

- Percentage distribution of students according to demographic variables, majority of them 50 (100%) were in the group of 15-25 years, 43 (86%) had over 4 family members, 5 (10%) were graduate, 25 (50%) had Rs. Less than 10,000 as the monthly income of their family, 39 (78%) were living in separate family, 45 (90%) were living in normal living area, 30 (60%) had hospital as their health care service, 32 (64%) had no pet animals and 31 (62%) was exposed to source of information regarding COVID-19 through Radio//TV/Internet.
- In the pre-test, majority 48 (96%) of students had adequate knowledge, 2 (4%) had moderate knowledge.
- In the pre-test, majority 50 (100%) of village people had adequate knowledge.
- Chi square value, Family members $X^2=0$ ($p<0.05$), Age $X^2=0$ ($p<0.05$), educational qualification $X^2=0$ ($p<0.05$), industry $X^2=0$ ($p<0.05$), Monthly family income $X^2=0$ ($p<0.05$), Family type $X^2=0$ ($p<0.05$), living status $X^2=0$ ($p<0.05$), there are health services $X^2=0$ ($p<0.05$), do you have pet in your home $X^2=0$ ($p<0.05$), previous exposure to source of information regarding COVID-19 has negative association.

Conclusion

It was found that the main conclusion of the present study status that in the pre-test, most of the people had adequate knowledge at COVID-19. After STP was highly effective. The study result shows that there is significant association between the level of knowledge with their selected demographic variables such as educational qualification of peoples, monthly income of the family, area of living condition, does your child get frequent COVID-19. These the variables calculated by chi square test at $p<0.05$. therefore, the investigator was proved the hypothesis is accepted for this study.

Nursing implication

The present study has got implications in the field of nursing, nursing administration, nursing research and nursing service. The nurse as a health care provider should be able to make significant contributions to maintain adequate knowledge regarding prevention of COVID -19

Nursing administration

- Nurse administration should motivation the subordinates to participate in various programs and improve their knowledge and practice, with regard to prevention of COVID -19.
- Nurse administration can organize seminars on prevention of COVID-19.
- Nurse administration can motivation the nurses to organize health camps program to urban and rural people at least twice in a month, to motivate the students on prevention COVID-19.
- Nurse administration can create awareness among students regarding prevention of COVID-19.
- Nurse administration can encourage the nurses to conduct the health awareness program and regular health visits to the urban and rural students to insist to prevention COVID-19.

Nursing education

- Health education should be imparted regularly based on evidence based on evidence-based practice in all nursing curriculum.
- The faculty members in nursing education can motivate the student to arrange health program to general population regarding prevention of COVID-19.
- Nursing curriculum should prepare nurses motivate the people to improve the knowledge, practice and attitude regarding prevention of COVID-19.

Nursing research

- Every nurse should be proficient and confident enough to provide care on students. The deficiencies in the knowledge among nurse can result in poor quality of life of patients, the funding of the present study can from a basis for the future research. Nurses must be motivation to conduct research related to the enhancement of knowledge on prevention of COVID-19.



Recommendations

Based on the research finding the recommendations are as follows.

- Similar study can be conducted for a large sample and different setting.
- Studies may be conducted to evaluate the effective nurse of STP versus other methods of teaching on prevention of COVID-19.
- A similar study may be conducted on a large student for wider generalization.
- A study can be conducted among different group of people.
- Similar study can be conducted by using experimental and control group.
- Educational program on prevention of COVID-19 can be conducted for the students.

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CONCEPTS OF SPECTACLE ART THAT EXISTED IN THE XIV-XV CENTURIES

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ANNOTATION

This article analyzes the concepts of the performing arts in the XIV-XV centuries and their scope and interpretation. Examples of spectacles used in the works of Hussein Voiz Kashifi and Zayniddin Wasifi, who lived and worked during this period, are also cited as examples.

KEYWORDS: *campaign, people of words, great people, people of games, praise, praise, mutayiba, elegant.*

There are very few written sources on the art of spectacle in our country before the XIII century, but there is no doubt that the centuries-old traditions of the ancient comedy theater continued in Bukhara, Khorezm, Ghazni cities. For example, in 1025, by the decree of Mahmud Ghaznavi, a luxurious palace was built in Termez. This castle is called **Gardizi** - "a palace of entertainment and joy." Music, dancers and actors also took part in the festivities [1, p. 211].

The Spanish ambassador to Samarkand, Ryui Ganzales de Clavijo, who was in Samarkand in 1404–1406, said that in addition to the local population, there were Christians, Greeks, Iranians, Turks and Arabs, as well as hundreds of thousands of scholars from different

countries. artists, craftsmen and architects were brought to Samarkand in detail. In conclusion, we can say that by this time, as a result of the intervention of artists of different nationalities, the performing arts have become more developed. In 1404, when Amir Temur returned from a trip to India, historian Sharafuddin Ali Yazdi described the festivities at Konigil in his Zafarnoma, in which he described the games of the bazaars in the guise of animals. "Ul latif yerda rango-rang chodirlar va oq uylar va shomiyonalar tikib, bihishtek orasta bo'ldi. Va shahardagi ustodlar har jamoat bir turluk hunar ko'rsatib, ta'biyalar yasadilarkim, aql hayron edi" [2, p.142]. In this case, the historian uses the word "feast" in relation to the place of performance:



Yana bir bazmgohi soz etti,
Ki firdavs eshikini boz etti [2,
p.142].

Another important source of information about the art of spectacles of the XIV-XV centuries is the work of Hussein Waz Kashifi "Futuvatnomai sultoni". Chapter 6 of this book is dedicated to the creators and spectators of the campaign. It defines the word maraka as follows: It is known that the original lexical meaning of the word maraka is the battlefield... and in the term (figuratively) people gather and different individuals come up and say a topic that demonstrates their ability, their craft. The reason they call such a place a campaign is that each wrestler demonstrates his fighting skills on the battlefield, and as the rest of the soldiers and others around him watch... here, too, someone demonstrates their abilities and talents, and the rest. they watch it... If the people of the campaign ask how many categories there will be, say three categories. The first is the people of words, the second is the people of power, that is, those who demonstrate power, and the third is the people of various games and players"[3, p. 88].

Kashifi also divides the people who compose the campaign into three categories: the first category - the

Madhhabs, the Ghazalkhans, and the Saqqas (Arabic) (meshkobchi, water-sharing). The second category is the Khosa (Arabic) goy (pharmacists) and the bisotan (Persian) dosage (exhibitors). The third category is storytellers and legends.

A natural question arises? Why are there beards and beards among the spectators? In the 15th century, there were also special theaters. The festival was attended by a large number of people. In this regard, there is a demand for their services. Of course, there were generous people in the audience who did this job willingly.

Those who perform prose works, short sayings, phrases and descriptions (qasidahan) with prose are called khans (beautiful readers), and those who read a mixture of prose and verse. murassa'(a.) khan (word master).

In the annotated dictionary of Navoi's works and in the "Farhangi zaboni tojiki" the murassa is decorated with precious stones, the gorra is interpreted as pride, deception [4, p. 666]. It is no coincidence that Koshigi calls masters of eloquence murassakhan and garrahon. It's not an easy task to be able to embellish, to show off, to captivate the audience with your skills. Performing skills also play an



important role in the performance of such masters of speech. When necessary, they brought their speeches close to people's hearts, went to the point of crying in order to express solidarity with them, to share their grief and suffering, and used their gestures and actions appropriately. This made their speech effective and emotional.

Great people, that is, spectators: wrestlers (gushtigir), stone players (sangir), mud carriers (novandoz), basket lifters, dorboz (rasanboz), gurzi lifters, zo They are divided into several trades: bravery (lifting a person), breaking a stone, breaking a bone, crawling, throwing stones, lifting a millstone, fighting with an elephant).

Chapter 4 of the play describes the **spectators**: kosaboz, lobatboz, huqqaboz [3, 92].

We do not find the word dorboz in Navoi's works, but in this work of Kashifi we see that dorboz is used along with the word rasanboz. Rasan (a.) - means a rope. The term "rasanboz" was also used to describe the Dorboz because they performed with a rope.

The word **Maraka** in the annotated dictionary of Navoi's works is a battlefield; jang; muhoriba; meeting is a ritual. Everyone is

addicted to drugs, the tone of his campaign in his heart [5, II, p. 274].

Bor ahli jahong'a shohu sarvar
bo'lg'an,

Din ma'rakasida gardu safdar
bo'lg'an.

≈ **tuz** – gather, fight:

In the end, I decided that the crown of the kingdom would be placed between two hungry lions, and if anyone took it, his head would be in the middle of the crown. Chun organized this campaign [5, II, p. 274].

In the Annotated Dictionary of the Uzbek Language: Maraka [a. - war, assembly] 1 **religion**. A collection of mourning ceremonies and each of them. *Gulsimbibi said she was ready to go to the grave after her daughter's entire campaign. Oybek, selected works. Sabir Odil was the head of the grandfather's party. R. Faizi, spring has come to the desert.*

2 Weddings, shows and. sh. k. ceremony "It simply came to our notice then. H.Shams, Enemy.

3 Battlefield; jang. Maraka - Mardniki. Proverb.

4 a general movement to carry out work of a mobile political or economic significance; "The company has been talking about Olimjon since the beginning of the harvest campaign." H. Nazir, Wings. "After that, they discussed the



kolkhoz campaign." H.Shams, Enemy [6, II, 566-p].

Maddoh - in the explanatory dictionary of the language of Navoi's works - 1. Praiseworthy, descriptive. 2. gado.

The root of the word matter is matter, 1. elongation, elongation; attendance 2. It means to say a sound out loud. From this it is clear that praise is a continuation of praise, of praise, of praise. The following words are also derived from the word matter:

Maddohlig'// **maddohliq** - praise, description.

Madih – praise, hymn.

Madoyih – praise, hymns.

Madh – praise, description.

Madhsoz – praiseworthy

Madhoroylig' – flattery (5, II, 197-b)

In the explanatory dictionary of the Uzbek language Maddoh [a. - praiser; praise be to God] 1 ayn. A person who gathers in the markets and on the streets and makes a living by preaching and preaching religiously.... *maddah, people are preaching*. P. Tursin, Teacher.

2 *portable*. Praiseworthy, praiseworthy; flattering [6, p. 521].

In our language today, the word master, the descriptive, has lost its flattering and flattering meaning.

In the work "Badoye'ul-vaqoe" by the great writer and poet of his time, Zayniddin Vosifi, who contemporaries with Hussein Waz Kashifi and Alisher Navoi, we find a number of words about the art of spectacle:

Mutoyiba: "The description of the meeting of Amir Alisher and Hoja Majididdin Muhammad and the mention of the jokes of the nobles in the garden of Purza to the munshi of Mawlana Abulvose" [7, p. 96].

Narrator, muqallid: "Hafiz Giyosiddin Dehdor... I am a narrator also. I read the stories of Amir Hamza, Abomuslim and Dorob. When the masters of the world hear it, they put silence in their mouths. I am a muqallid also! .. Amir Hamza began the story. Then he recited a poem he had recited and the audience fainted. When he finished, he read the story of Abu Muslim - he enchanted everyone. At the end of the meeting, Dorothy read the story. The gardener and his servant were standing there. He imitated them, made everyone laugh, and made some people laugh so much that they laughed" [7, p. 113].

Go'shtigirlik (wrestler): "In remembrance of the virtues and perfection of other **go'shtigir** of Pahlavon Muhammad Abusaid and Sultan Hussein Mirza." In this chapter



of the work, Pahlavon Muhammad Abusaid and Pahlavon Muhammad Moloni and Pahlavon Ali Rustai and Darveshmuhammad wrestled with the permission of Sultan Husayn Bashkaro. the events of the drying up of a special Garden Zogan pool to make a picnic area.

We also see that the word "elegant" is used many times in the play: "Nahangsiyrat hariflar va ajdahosifat zariflar g'animgining ayovsiz dengizi va shashining xunxor majlisiga tushib qolishingiz mumkin... Bundayin ajoyib **maraka** va haybatli jangga siz aslo tushmagansiz" [7, 98-b].

From this information we can see that in the XIV-XVI centuries in our country the attention to the art of spectacle was high, but we can see a vivid picture of the performing arts of this period.

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IMPLEMENTATION OF LUCAS MATHEMATICAL MODEL TO CHECK THE GIVEN NUMBER IS PRIME OR NOT. FURTHER COMPARISON BETWEEN LUCAS METHODOLOGY OF STORING PRIME NUMBERS ON SECONDARY STORAGE DEVICE WITH STORING THE NUMBERS ON PRIMARY STORAGE DEVICE. - A CASE STUDY

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ABSTRACT

In computer science efficiency of a program solely depends on time factor of processing statement or statement block. Further the amount of memory it is being used for processing also matters in calculating the space complexity of the program.

All computer languages support sequencing, selection and iteration and file handling methods. The syntax and semantics in a language differs because of construction compiler or an interpreter is different in nature.

This manuscript specifically examines the execution of checking the given number fall under category of prime number or not using Lucas Mathematical Model. A Lucas prime sequence generated and stored on secondary storage device to check the prime number and further comparing with the normal approach of checking a prime number. In addition to this time complexity and space complexity of Lucas prime sequence is examined. The purpose is to provide a alternative methodology for checking the prime numbers.

KEYWORDS: *Lucas Mathematical Model (LMM), Lucas Numbers(ln), Lucas Sequence(ls), Prime Numbers (pn), Fibonacci numbers(fn), Runtime Complexity (rc), Big O(n), Big Theta $\Theta(n)$, Big Omega $\Omega(n)$, Generalised approach (ga)*

1. INTRODUCTION

The Lucas numbers (ln) are series of an integer sequence. This methodology was conceptualised by a mathematician Francois Edouard Anatole Lucas. Lucas numbers and Fibonacci numbers are closely related to each other in term of their sequence.

The Lucas sequence(ls) and Fibonacci sequence(fs) have the same function adding the previous two terms but have different starting terms. This produces a sequence where the ratios of successive terms approach the golden ratio, and in fact the terms themselves are rounding of integer powers of the golden ratio. The sequence also has a variety of relationships with the Fibonacci numbers, like the fact that adding any two Fibonacci numbers two terms apart in the Fibonacci sequence results in the Lucas number in between [1].

2. RELATED WORK

Many mathematics research scholars have done extensive research and have changed the way we use Lucas series for checking prime or not. The Lucas series is not only used for checking prime numbers but also mathematicians used for finding the next world's largest prime number. There

are various softwares running on a server to find the next world's largest prime number which are running all over the world by millions of systems.

3. METHODOLOGY

The Lucas Mathematical Model (LMM) approach is used for checking a prime number, The Lucas numbers (ln) will be generated up to the required number of terms and stored in the secondary storage device in the form of text file, to store Lucas number in text file a python program is written and later it will be used thorough another python program meaning the program uses the text file as an input and check whether the given number entered thorough keyboard is prime or not.

To generate Lucas numbers(ln) the system ran the program for one days (24 hours) and it has generated the Lucas series (ls) which has a total input of 10^6-1 is stored in a file. It is observed that for input of 10^6-1 , it has taken 1GB of space in the secondary storage device.

Further to check the efficiency of Lucas Mathematical Model (LMM) approach with the normal methodology of checking the prime numbers and examining the length of the input.



The various programming languages has the capability to generate Lucas number(ln) and store it in a file (permanently on secondary storage device). During the course of research, it was decided to use python programming language due to its large collection of library modules and the availability of online support.

ALGORITHM FOR STORING LUCAS NUMBERS ON SECONDARY STORAGE DEVICE

```
STEP 01: START
STEP 02: OPEN LUCAS FILE
STEP 03: READ LUCAS AS LUCAS1
STEP 04: LUCAS1=LIST (LUCAS)
STEP 05: A=1
STEP 06: B=3
STEP 07: WRITE A IN LUCAS FILE
STEP 08: WRITE B IN LUCAS FILE
STEP 09: INPUT N
STEP 10: FOR I IN RANGE (9*N):
STEP 11:     P=A+B
STEP 12:     WRITE P IN LUCAS FILE
STEP 13:     A=B
STEP 14:     B=P
STEP 15: CLOSE LUCAS FILE
STEP 16: STOP
```

PYTHON PROGRAM TO GENERATE THE LUCAS NUMBER AND STORING IN SECONDARY STORAGE DEVICE IN THE FORM OF TEXT FILE

```
lucas=open('lucas.txt','r+')
lucas1=lucas.readlines()
lucas1=list(lucas1)
a=1
b=3
n=int(input('Enter no of digits'))
lucas.write(str(a)+' ')
lucas.write(str(b)+' ')
for i in range(int('9'*5)):
    p=a+b
    lucas.write(str(p)+' ')
    a=b
    b=p
lucas.close()
```

ALGORITHM TO FIND A PRIME NUMBER IN A LUCAS FILE

```
STEP 01: START
STEP 02: OPEN LUCAS FILE IN R
MODE
STEP 03:READ THE NUMBERS
STEP 04:SPLIT THE NUMBERS
STEP 05: READ SEARCHING PRIME NO
STEP 06: CHECK THE NO 2 OR 3 OR 5
```

```
STEP 07: PRINT "IT IS PRIME NO"
STEP 08: ELSE CHECK NO MOD 2 OR
        NO MOD 3 OR NO MOD 5= 0
STEP 09:PRINT "IT IS NOT PRIME
        NO"
STEP 10: ELSE FIND LENGHT OF NO
AND STORE IN S VARIABLE
STEP 11:CHECK S<6
STEP 12: IF TRUE THEN CHECK IN
LUCAS FILE
STEP 13: SEARCH FOR THE POSITION
OF NUMBER IN LUCAS FILE
AND APPLYING MODULAS OPERATOR TO CHECK
FOR A PRIME IF IT IS TRUE PRINT PRIME
ELSE PRINT NOT A PRIME.
STEP 14: THE SAME SET OF OPERATIONS
(STEP 02 TO STEP 13) WILL BE CARRIED FOR
FINDING TEN DIGIT NO
STEP 15: STOP
```

PYTHON PROGRAM TO CHECK PRIME OR NOT

```
r=open('lucas.txt','r+')
lucas=r.read()
lucas=lucas.split()
x=int(input('Enter the number:'))
if(x==2 or x==3 or x==5):
    print(x,'is a prime number')
elif (x%2==0 or x%3==0 or x%5==0):
    print(x,'is not a prime no')
else:
    s=len(str(x))
    if (s<6):
        if (((int(lucas[x-1])-1))%x==0):
            print(x,'is a prime number')
        else:
            print(x,'is not a prime number')
    elif(s<11):
        r.close()
        r=open('lucas1.txt','r+')
        lucas=r.read()
        lucas=lucas.split()
        s=(x-(int('9'*5)+1))
        if (((int(lucas[s-1])-1))%x==0):
            print(x,'is a prime no')
        else:
            print(x,'is not a prime number')
        r.close()
    else:
        print('lucas is not generated')
```



4. COMPLEXITY OF ALGORITHM

In computer science, analysis of algorithms is a very crucial part. It is important to find the most efficient algorithm for solving a problem. It is possible to have many algorithms to solve a problem, but the challenge here is to choose the most efficient one.[2]

There are multiple ways to design an algorithm, or considering which one to implement in an application. When thinking through this, it's crucial to consider the algorithm's **time complexity** and **space complexity**. [3]

5. SPACE COMPLEXITY

The space complexity of an algorithm is the amount of space (or memory) taken by the algorithm to run as a function of its input length, n . Space complexity includes both auxiliary space and space used by the input. [3]

Auxiliary space is the temporary or extra space used by the algorithm while it is being executed. Space complexity of an algorithm is commonly expressed using **Big $O(n)$** notation. [3]

The Space complexity is ignored in this research paper, since the space complexity of particular problem is not considered so important.

6. TIME COMPLEXITY

The time complexity of an algorithm is the amount of time taken by the algorithm to complete its process as a function of its input length, n . The time complexity of an algorithm is commonly expressed using asymptotic notations: [3]

Big $O - O(n)$

Big Theta - $\Theta(n)$

Big Omega - $\Omega(n)$

It's valuable for a programmer to learn how to compare performances of different algorithms and choose the best time-space complexity to solve a particular problem in the most efficient way possible. [3]

Big O notation is used in Computer Science to portrait the performance or complexity of an algorithm.

Big O specifically defines the worst-case scenario of an algorithm, and can be used to describe the execution time required or the space used (e.g. in memory or on disk) by an algorithm. here O stands for order of growth.

Big Theta (Θ) is used to represent the average case scenario of an algorithm and can be used to describe the execution time required or the space used (e.g. in memory or on disk) by an algorithm.

Big Omega (Ω) is used to represent the best-case scenario of an algorithm and can be used to describe the execution time required or the space used (e.g., in memory or on disk) by an algorithm.

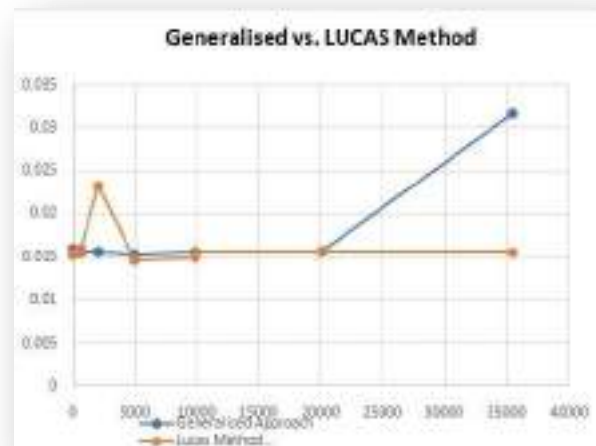
These three methods are the most common and very popular methods of design and analysis of an algorithm which are used for finding the efficiency of the program.

7. RUNTIME COMPLEXITY OF CHECKING A PRIME NUMBER

Input	Generalized approach	Lucas Mathematical Model(LMM)
7	0.016026497	0.015622139
97	0.015621662	0.015602868
643	0.015629292	0.015621185
2111	0.015626907	0.01562047
5003	0.015336752	0.016032696
9871	0.015622616	0.015021901
10007	0.015590906	0.015621424
20147	0.015659809	0.015634537
35507	0.031657457	0.015586376

Graphical Representation of Runtime complexity of both the methods

8. GENERALISED APPROACH - rc



In the normal approach the program checks for the given number prime or not. The time complexity of the algorithm for worst case is denoted as:

Big $O(n)$

9. LUCAS METHOD (LMM) - rc

The time complexity of the LUCAS Method is calculated as

Big $O(14)$

10. CONCLUSION

The Lucas mathematical methodology has the greater efficiency for checking prime when comparing with general approach. Further it is also observed that generating prime series and storing in a file is one time process and it is



time consuming but once the file is prepared the performance of the code is much higher than the normal approach. In addition to this it is also observed that the execution of expression also depends on the hardware configuration.

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DIMENSIONS OF COMMUNICATION PRACTICES OF NON- GOVERNMENT ORGANIZATIONS TO COMMUNITY STAKEHOLDERS

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ABSTRACT

The study aimed to determine the dimensions of communication practices of non-government organization to community stakeholders and to develop a framework utilizing Exploratory Factor Analysis (EFA) technique. The sampling procedure used in the study was purposive sampling. The study was conducted in Davao City with 150 participants as sample respondents. A questionnaire was created and used as the research instrument in gathering the data and was checked by an examiner for content validity. Rotated component matrix discarded 1 item out of 30 and categorized the remaining 29 items into 4 dimensions. Results revealed that there are four dimensions of communication practices of non-government organizations to community stakeholders based on the Eigen values of not less than 0.4. These are application of participatory communication approach, utilization of digital media tools and strategies, used of traditional communication channels and organizing events and Public communication. Also, communication practices framework was established, and communication interventions were proposed to minimize communication problems in the implementation process of NGOs.

KEYWORDS: *Communication Practices, Non-Government Organizations, Exploratory Factor Analysis*

INTRODUCTION

Communication practices are important for any Non-Governmental Organization (NGO) in the effort to engage and stimulate effect. However, one of the problems faced by most NGOs, according to Asian Development Bank (2013), is the lack of strategic preparation that has contributed to inadequate communication practices that ultimately discourage the stakeholders from engaging in their services. That is why, it is imperative for any NGO to design strategies for their partners to transform them into a proactive group through the use of effective communication practices (Theaker, 2001).

Moreover, in a report on NGO-GO relations in the Philippines written by Serrano (2010), he argued that NGOs were more active in government interaction. In comparison, Rood (2005) cited in his research on Sustainable Peace in Mindanao: The Role of Civil Society, a void in dialogue and cooperation between local government and NGOs' challenges in Mindanao. It confirms the study by Acioly and Payot (2005) that there is a limited cooperation between NGOs and local governments that would result in inadequate communication practices between NGOs and the public. It leaves them vulnerable to donors' whims and makes it impossible over time to assess their effects. Another is that some NGOs lack strategic plans that should allow them to have ownership of their mission, principles and activities, according to the Civil Society Index: A Philippine Assessment Report by Caucus of Development NGO Networks (2011).

Another challenge for every NGO is most of their beneficiaries are Indigenous People and unschooled which means, there is a challenge to develop communication practices that is culturally and socially accepted or appropriate for the specific community Rood (2005).

In light of this, the research recognizes the need to consider the dimensions of communication practices of non- government organizations to community stakeholders. In the execution of NGO systems, these dimensions of communication practices are often found essential when developing communication plans as also cited by Serrano (2010).



METHODOLOGY

This study employed a quantitative research method. It is the systematic empirical investigation of observable phenomena via statistical, mathematical, computational techniques or numerical analysis of data collected through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using computational techniques.

Data Collection Method

This study utilized a research-made survey questionnaire. The survey questionnaire consisted of 50 items that are based on literature review. The items in the questionnaire describe the communication practices of non-government organizations to community stakeholders. To interpret the responses, the following scale was used:

Scale	Interval	Level	Interpretation
5	4.50-5.00	Very High	The item stated is always manifested.
4	3.50-4.49	High	The item stated is often manifested.
3	2.50-3.49	Moderate	The item stated is sometimes manifested.
2	1.50-2.49	Low	The item stated is seldom manifested.
1	1.00-1.49	Very Low	The item stated is never manifested.

Data Analysis

The study utilized Exploratory Factor Analysis (EFA). It is a statistical technique that is used to reduce data to a smaller set of summary variables and to explore the underlying theoretical structure of the phenomena. It is used to identify the structure of the relationship between the variable and the respondent. Keiser Meyer-Olkin measure of sampling adequacy was used to test the magnitude of partial correlations among variables. Bartlett's test of sphericity was also utilized to test whether the correlation matrix is identity matrix or not.

Procedure of the Study

This study began with the conceptualization of the problem and formulation of the statement of the problem. Then, the literature and studies relevant to the problem identified were reviewed to define the research problem and variables in the study. This was then followed by the formulation of survey questionnaire. After the survey questionnaire was finalized, the questionnaires were administered to the respondents. All the answers of the respondents were kept confidential and the results were for research purposes only.

After retrieving the questionnaires, the responses were tabulated, analyzed and interpreted using the appropriate statistical tools. Lastly, conclusions were drawn then the results of the study were evaluated.

RESULTS AND DISCUSSION

This presents the dimensions that best represents the communication practices of Non-Government Organization (NGO) to community stakeholders. Data obtained through a survey questionnaire and analyzed using Exploratory Factor Analysis (EFA).

KMO and Bartlett's Test. Table 1 shows the Keiser Meyer Olkin Measure of Sampling Adequacy and Bartlett's test of sphericity. The Keiser Meyer Olkin measure of .744 implies that the samples are in high correlations and it allows factor analysis that fits for data. As shown, the Bartlett's test of Sphericity yields a value of 2249.133 and a level of significance smaller than .001. This signifies that it allows the data proceed factoring the underlying structures of communication practices of Non-Government Organizations to community stakeholders. Moreover, the Bartlett's test of Sphericity implies to reject the null hypothesis and there are dimensions of communication practices of Non- Government Organizations to community stakeholders.

Table 1. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.744
Bartlett's Test of Sphericity	Approx. Chi-Square	2249.133
	Df	435
	Sig.	.000



Total Variance Explained. Presented in Table 2 are the numbers of dimensions that were extracted using the Exploratory Factor Analysis (EFA). The initial Eigen values were associated with specified dimensions, the percentage of total variance and the cumulative percentage of each dimension. After utilizing the criterion factors, 6 components were obtained. The initial Eigen value of 1 or greater are the 6 dimensions that define the communication practices of non-government organizations to community stakeholders.

Table 2. Total Variance Explained

Component	Initial Eigenvalues			Initial Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.192	23.973	23.973	7.192	23.973	23.973	6.206	20.687	20.687
2	5.360	17.867	41.840	5.360	17.867	41.840	4.617	15.391	36.078
3	2.371	7.902	49.742	2.371	7.902	49.742	2.747	9.155	45.234
4	1.387	4.625	54.367	1.387	4.625	54.367	2.453	8.175	53.409
5	1.235	4.117	58.484	1.235	4.117	58.484	1.463	4.876	58.285
6	1.056	3.521	62.005	1.056	3.521	62.005	1.116	3.720	62.005

Rotated Component Matrix with 29 attributes. As presented, there are 30 items categorized into 4 dimensions. However, there is 1 item that is not included in the categorization of 4 dimensions. With that, only 29 items are considered in the categorization into 4 dimensions. It is based on the standard rule of Exploratory Factor Analysis (EFA) in which the variable with Eigen values less than .4 is not included in the factoring and items that do not belong to any groups are automatically deleted.

Rotated Component Matrix with group attributes. The 30 items in the survey questionnaire were subjected to factor analysis component using varimax rotation or rotated component matrix, a statistical technique used to identify small numbers of factors that explain most of the variance observed in a much larger number of manifest variables (Norusis, 2003). Based on the technique used, there are four dimensions have been identified with their respective indicators. These dimensions are presented in tables and these correspond the communication practices of non- government organizations to community stakeholders.

**Table 3. Rotated Component Matrix**

	Component					
	1	2	3	4	5	6
I44	.637					
I35	.629					
I34	.622					
I43	.605					
I48	.787					
I46	.774					
I38	.771					
I47	.763					
I45	.730					
I42	.692					
I24		.725				
I12		.721				
I4		.711				
I20		.705				
I17		.698				
I22		.679				
I7		.676				
I33		.622				
I19		.572				
I25			.745			
I23			.699			
I28			.682	.419		
I21			.617			
I13				.798		
I32				.721		
I31				.692		
I1						
I20					.778	
I5						.558
I6				.425		.462

Extraction Method: Principal Component Analysis Rotation Method: Varimax with Kaiser Normalization
a. Rotation converged in 8 interactions.

Dimensions of Communication Practices of Non-Government Organizations to Community Stakeholders

The following are the dimensions that determine the communication practices of non-government organizations to community stakeholders:

Utilization of Digital Media Tools and Strategies. As signified in Table 4, exploratory factor analysis revealed the first dimension that determines the communication practices of NGOs to community stakeholders as follows: The organization's website has online help, tips, and links on its programs and services with the loading's .837; The organization uses Facebook for publicity and informing the community stakeholders with the loading's .829; The organization seeks help to social media influencers in promoting their programs and services with the loading's .822; The organization uses video and digital poster in promoting their services and projects with the loading's .805.

Moreover, the organization uses YouTube for publicity and informing the community stakeholders with the loading's

.797; The organization has an official website with the loading's .774; The organization uses Instagram for publicity and informing the community stakeholders with the loading's .771; The organization uses Twitter for publicity and informing the community stakeholders with the loading's .763; The organization uses emails to update stakeholders with the loading's .730; And the organization has application software for fast and easy transactions with the loading's .652.

These findings corroborate the idea of Cole (2014) that digital media strategies allow non-government organization to build awareness of their mission, grow their influence, and empower their stakeholders to spread their message in a higher level of efficiency the reason why, most NGOs have adopted digital media tools and strategies. In fact, according to Mansfield (2012) the emergence of social media has revolutionized how the NGOs communicate with their target audience. Hence, according to Kavada (2009) the development of digital technologies and social media marks a fundamental shift in our view of the Internet from a relatively static page that transmits information one-way, to a platform for collaboration, coordination and interaction.

On the other hand, utilization of digital media tools and strategies of NGOs, by nature, help them to meet their networking objectives (Kaplan and Haenlein, 2010). This was supported by Sharman (2010) which stated that an NGO



which can produce a digital media strategy with clearly identifiable, predetermined and actual outcomes can sustain longer and establish much wider networks.

Moreover, according to Mansfield (2012), NGOs have adopted to the rapid changes brought by social media. It has become an essential component of every NGO effort to establish both public voices and credibility. These NGOs heavily utilize popular platforms such as Facebook, Twitter, Youtube, and Instagram to reach out communities, prospect clients and even volunteers (socialreport.com). According to Rask et al. (2014) some online functions performed by NGOs are informing the public about the organization and its mission, as well as interacting with donors and volunteers, marketing, branding, and awareness-raising, promoting image and fundraising, mobilization to participate, promoting news and accomplishments and providing a space for interaction.

Table 4. Factor Structured using Rotated Component Matrix for Dimension 1: Utilization of Digital Tools and Strategies

Item Number	Item	Factor Score	Dimension
44	The organization's website has online help, tips, and links on its programs and services.	.837	Utilization of Digital Media Tools and Strategies
36	The organization uses Facebook for publicity and informing the community stakeholders.	.829	
34	The organization seeks help to social media influencers in promoting their programs and services.	.822	
43	The organization uses video and digital poster in promoting their services and projects.	.805	
49	The organization uses YouTube for publicity and informing the community stakeholders.	.797	
46	The organization has an official website.	.774	
39	The organization uses Instagram for publicity and informing the community stakeholders.	.771	
47	The organization uses Twitter for publicity and informing the community stakeholders.	.763	
45	The organization uses emails to update stakeholders.	.730	
42	The organization has application software for fast and easy transactions.	.652	

Used of Traditional Communication Channels. As indicated in Table 5, exploratory factor analysis revealed the second dimension with the following indicators: The organization has a regular program in local radio station with the loading score of .735; Representatives from the organization conduct a house to house visit to the community locals with the loading score of .721; The organization distributes leaflets and brochures which contain information that calls the community's consciousness with the loading score of .711; The organization has a regular TV program on local TV like NGO programs and services with the loading score of .705; The organization conducts a regular radio guesting for public understanding about its services and programs with the loading score of .698; The organization is pro- actively calling their client or stakeholders. With the loading score of .679; The organization has official mobile phone number to update the community stakeholders to their programs and services with the loading score of .676; The organization has tarpaulins/billboard on matters related to NGO's services and advocacies easily seen around the



community with the loading score of .620; And The organization has an annual journal, which contains the NGO's accomplishments for the year with the loading score of .572.

The findings show that despite the availability of new technologies, NGOs are still confined with traditional communication channels and have nevertheless remained important to their operation. According to Roser-Renouf and Maibach (2018) traditional communication channels include the use of television, radio, print, telephone and face-to-face communication. These channels have been integral to every NGO operating in a developing country according to Hajnal (2002) especially that most of the beneficiaries are illiterate and indigenous people who may not have the sense of understanding new technologies and so the NGO must be careful to preserve traditional communication channels. This was supported by Rood (2005), that most of the beneficiaries of NGOs are indigenous people and unschooled which means, traditional communication channels are helpful tools to employ effective communication practices that will prioritize culturally and socially accepted or appropriate methods for the specific community.

Table 4. Factor Structured using Rotated Component Matrix for Dimension 1: Utilization of Digital Tools and Strategies

Item Number	Item	Factor Score	Dimension
44	The organization's website has online help, tips, and links on its programs and services.	.837	Utilization of Digital Media Tools and Strategies
36	The organization uses Facebook for publicity and informing the community stakeholders.	.829	
34	The organization seeks help to social media influencers in promoting their programs and services.	.822	
43	The organization uses video and digital poster in promoting their services and projects.	.805	
49	The organization uses YouTube for publicity and informing the community stakeholders.	.797	
46	The organization has an official website.	.774	
39	The organization uses Instagram for publicity and informing the community stakeholders.	.771	
47	The organization uses Twitter for publicity and informing the community stakeholders.	.763	
45	The organization uses emails to update stakeholders.	.730	
42	The organization has application software for fast and easy transactions.	.652	

Application of Participatory Communication Approach. As indicated in Table 3, exploratory factor analysis revealed the first dimension with the following indicators: The organization conducts focus group discussions or interviews to the community locals for the improvement of their programs and services with the load score of .745; The organization provides opportunity for feedback with the load score of .698; The organization tap the government sectors to maintain engagement and face-to-face contact with the community stakeholders with the load score of .652; And the organization uses community stakeholders' stories to educate and influence with the load score of .617.

This finding affirms with Mefalopulos and Tufta (2009) that NGOs have been particularly active in applying participatory communication approach in providing and implementing interventions. Accordingly, Participatory Communication is an approach based on dialogue, which allows the sharing of information, perceptions and opinions among the various stakeholders and thereby facilitates their empowerment. Therefore, according to Mwanyalo and Mberia (2017) participatory communication approach should be applied in every intervention to consider the attitudes, needs, and behavior of the beneficiaries at all stages of a project cycle in order for the initiatives to be effectively sustained.

Although, participatory communication approach has also become an essential requirement for every development plan to strengthen the communication capabilities at the process of monitoring and adjustment of information flow and at summative level for reflection and consensus (Harris, 2000). Moreover, according to Gumacio-Dagron (2001) NGOs should be human centered and that participatory communication approach should be applied to develop the most contextual and culturally sensitive interventions.

**Table 6. Factor Structured using Rotated Component Matrix for Dimension 3: Application of Participatory Communication Approach**

Item Number	Item	Factor Score	Dimension
25	The organization conducts focus group discussions or interviews to the community locals for the improvement of their programs and services.	.745	Application of Participatory Communication Approach
23	The organization provides opportunity for feedback.	.698	
26	The organization uses community stakeholders' stories to educate and influence.	.652	
21	The organization tap the government sectors to maintain engagement and face-to-face contact with the community stakeholders.	.617	

Organizing Events and Public Communication. As indicated in Table 6, exploratory factor analysis revealed the fourth dimension that determines the communication practices of NGOs to community stakeholders as follows: The organization conducts conferences and seminars with the loading's .768; The organization conducts workshops for stakeholders with the loading's .731; And the organization conducts workshops for stakeholders with the loading's .600.

According to Milic (2011) organizing events and public communication are significant for every NGO since, the work of these organizations requires constant familiarizing of the target audience and the media with the problems of the society which they are dealing with. Moreover, based on Upasana (2016) it is very important and motivating for many stakeholders to participate in the various events provided by NGOs to communicate and exchange experiences, knowledge, but also realizations of a series of contacts and mobility of people. Events and public communication refer to outreach program, workshops, conference and seminars conducted by NGOs and partner institutions (Milic, 2011). These initiatives according to Jelinek (2006) have been used by NGOs to help raise awareness or raise funds for a cause.

Table 7. Factor Structured using Rotated Component Matrix for Dimension 4: Organizing Events and Public Communication

Item Number	Item	Factor Score	Dimension
13	The organization conducts conferences and seminars.	.768	Organizing Events and Public Communication
32	The members of the organization initiate various outreach activities.	.731	
31	The organization conducts workshops for stakeholders	.600	

NGOs' Communication Practices Study Framework

Presented in Figure 2 is the framework developed based on the findings. The researcher found out that the dimensions of communication practices of non-government organizations to community stakeholders are utilization of digital media tools and strategies, used of traditional communication channels, application of participatory communication approach, and organizing events and public communication.

These findings corresponded to World Health Organization's (WHO) strategic communication framework which is characterized by an integrated approach that combines techniques in advocacy, communication and social mobilization. Which clearly reflects the application of participatory communication approach. In fact, it primary focused on persuasion rather than a pure information dissemination. It also gives importance to the principle of accessibility by making the information available in all platforms or channels this includes utilization of digital tools and strategies and traditional

communication channels.

Accordingly, the framework categorized three main channels: Mass Media, Event Organizing and Community and Interpersonal. These channels can be best used when identifying the target audience and considering their communication needs.

It also affirmed with the United Nations Development Program's (2009) strategic communication framework which focused on strengthening the ties and participation of the people and other organizations by keeping the media informed and implementing inclusive projects. Apart from that, one of its goals is to utilize existing media tools or channels to further expand outreach programs and to disseminate results, messages and activities.

In general, the communication practices framework focused on the participatory element which is considered an essential principle in implementing development projects. It will determine the kind of communication practices applicable to the community and appropriate communication materials to be used for the specific context. This clearly shows interdependency of each dimension which means it would greatly affect the NGO's operation and how it achieves its goals. Thus, how NGOs make use of these dimensions makes them distinct and effective in realizing their goals.



Figure 2. Communication Practices Framework of Non-Government Organization to Community Stakeholders Revealing the Extracted Four Dimensions

Communication Interventions

Communication Interventions are methods used by different NGOs to augment challenges by planning how their stakeholders receive relevant information. Through different interventions, NGOs can identify the best available messaging pathways, by considering audience's access to different channels and its preferences. Moreover, this is also a way to preliminary assess the community's state to target behavioral change by producing appropriate materials. Based on the findings, these are the communication interventions that would help NGOs to effectively implement projects and minimize communication problems.

Intervention 1. Needs assessment is method that includes audience and situation analysis for the target community to preliminary identify the problems, primary audience and assess the situation. This will help in determining effective methods and communication materials tailor fitted to the needs of the community. This is also a way to prevent communication barriers from emerging in the course of information dissemination and project implementation. The process should focus on the community's concerns and needs.

Intervention 2. Monitoring and evaluation of communication practices and materials is an important part of the project implementation. It is to assess the effectiveness of communication against its objectives and goals. Effective monitoring and evaluation of communication practices and materials will help organizations know whether the delivered information has achieved its purpose. This process can be in the form of survey, focus group discussion or key informant interview. It will help NGOs to develop better communication practices in the future by utilizing appropriate communication materials in a certain cultural context and will make the NGOs' program sustainable.



Intervention 3. Participatory communication approach creates a balance inclusiveness with time, resources, interests and knowledge of individuals and groups related to the intended transformation. It is an important approach for the target audience affected by the change to have the opportunity to participate in the entire decision-making process defining their needed change. After their inputs are taken into account, however, they do not need to be directly involved in decisions, especially technical ones, that might go beyond their specific interest or knowledge.

Intervention 4. Centralization of communication system will allow the communication to be contextualized into subjects and projects, and can even be broken down into sub-sections so that each conversation is tracked and maintained efficiently, especially in organizing events and public communication. This will allow organization in the flow of events and will define the kind of audience you will have. The best way to implement this intervention is to create a strategic plan for the implementation of events or projects.

Key Result Areas	Identified Dimension of Communication Practices	Interventions	Activities
Communication materials and methods.	Utilization of Digital Media Tools and Strategies	Needs Assessment to identify appropriate communication tools to be used tailor fitted to the needs of the community.	- Focus Group Discussion (FGD) - Key Informant Interview (KII) - Workshops
Monitoring and evaluation of communication methods used.	Used of Traditional Communication Channels	Monitoring and Evaluation upon the implementation of the communication channels used.	- Survey - Key Informant Interview (KII) - Focus Group Discussion (FGD)
Participatory communication approach	Application of Participatory Communication Approach	Inclusivity in the formative and summative process of project implementation and decision-making.	- Focus Group Discussion (FGD) - Workshop - Survey - Brainstorming
Decentralize communication system.	Organizing of Events and Public Communication	Centralize communication system to organize the flow of the event.	- Establish strategic communication plan.

CONCLUSION AND RECOMMENDATION

Conclusion

Based on the findings of the study, the researcher concluded that there are four identified dimensions of communication practices of non-government organizations to community stakeholders namely: Utilization of Digital Tools and Strategies, Used of Traditional Communication Channels, Application of Participatory Communication Approach and Organizing Events and Public Communication. Thus, the alternative hypothesis is accepted that the perceived dimensions determine the communication practices of non-government organizations to community stakeholders. Also, communication practices framework was established, and communication interventions were proposed to minimize communication problems in the implementation process of NGOs.

Recommendation

Based on the findings and conclusions, these recommendations were formulated:

Every Non-Government Organization should always apply participatory communication approach as it is proven vital in every NGO's success and helps in empowering the community. Moreover, the availability of different digital media tools should also be utilized to widen the scope of NGOs in terms of information dissemination and to promote collaboration although, traditional communication channels should not be rejected amidst the convenience given by these new technologies. Traditional communication channels like print, radio and face-to-face communication can be applied especially in most of the far-flung communities where internet is not available and most of the stakeholders are unschooled. Also, in a community of indigenous people these technologies may not have sense for them which may lead to ineffective communication. Hence, application of participatory communication is necessary to come up with culturally sensitive projects and strategies and NGOs should develop some structured standard operating procedures to develop communication practices for community mobilization.



Moreover, this is also highly recommended for government organizations to include the element of participation in implementing their projects to formulate the most context sensitive programs and effective communication materials. Also, NGO communication officers should reflect on the framework in crafting communication plans. With effective plans, community stakeholders will fully understand the existing challenges confronting their communities and to come up with solutions to address these issues. Hence, it should not be ignored at any stage since, they have different but desired systematic effect in the sustainability of NGO efforts and in the behavior of the community.

On the other hand, for future researchers, it is recommended to increase the number of sample size when using exploratory factoring analysis to show greater stability (smaller standard deviations of loadings across repeated samples) and more accurate recovery of the population loadings. When sample size increases, sampling error is reduced, factor analysis solutions become more stable and more reliably produce the factorial structure of the population. Thus, as sample size increases, the confidence in estimate increases, the uncertainty decreases having a greater precision. Also, a study with qualitative approach can be also used to conduct focus group discussion with the practitioners and supplement it in the creation of survey questionnaire to initially extract the factors.

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THE ROLE OF KHALFAS AT THE FUNERAL CEREMONIES OF THE POPULATION OF THE KHOREZM OASIS

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ANNOTATION

Funeral ceremonies in Khorezm are different from other regions. This is mainly held around women. "Three-days", "seven-days", "forty-days" and "one-year" events are held mainly at the funerals with the participation of khalfas.

KEYWORDS: *Khalfa, funeral, "three-days", "seven-days", "forty-days" and "one-year" event, religious khalfa, mourning songs of mourners.*

INTRODUCTION

In Khorezm, the khalfas participate at the mourning ceremonies held for the death of a person (mainly by women - R.G.): There are "three-days", "seven-days", "forty-days", "one-year" events, in which the impressive parts of the epic proses and poetry about the mortality, shortness of human life, the truth of death, the nature of Muslim, the superiority of goodness are recited, the relatives of the deceased are encouraged to be patient.

THE CONTENT OF THE ISSUE

There are also 2 types of khalfas in Khorezm: a khalfa who attends at a wedding and a religious khalfa who attends at a funeral celebration¹. I have been a religious khalfa since 1995, "said Sister Malika. Religious khalfas used to recite poetry at the funeral ceremonies, and for 5 or 6 years or so, on the advice of our government they say to give a speech, not in verse. We read from the magazines "Hidoyat", "Muminalar", "Islam Nuri" newspaper, Friday tests are published. There is information about Islam. Lectures are given at the funeral ceremonies. At the present time, instead of "three days" and "seven days", only "three days" and the funeral are held. We give an hour-long speech on Islam to those who want to donate to their parents. We quote from the hadiths of our Prophet Muhammad (peace and blessings of Allaah be upon him) and inform the participants about the prayers, fasting prayers, the names and prayers of each month. We give information about the differences between halal and haram, family relations, parents, children, based on the Qur'an and Hadiths. The speech may last up to 1 or 1.5 hours, depending on the nature of the ceremony (khudoyi donation, little

¹ Field records. Recorded from Saparova Malika, who was born in Sherbog mahalla of Yangiarik District on October 21, 1951. 2020.

khudoyi, mushkushod)². Throughout the oasis, religious khalfas are educated in specific madrassas or private schools, but work on the basis of the instructions issued by the government.

"Nowadays, the participation of religious khalfas is also significantly reduced, as the funeral ceremonies are held only as "three days" or donations and funerals. Although religious motives and images are dominated by form in such epics, the universal content prevails. In this regard, the epic "BoboRavshan" is widely used. This is not accidental, of course. In the epic, the example of Ali selling himself as a slave and doing good to the poor grandfather Ravshan, the promotion of living only in goodness in this world impacts on the faith of everyone. In the Khorezm oasis, similar rituals associated with death have the appearance of a folk theater. Funerals consist of rituals associated with long-term mourning for the deceased. The women, who had gathered for the funeral ceremony on the day of the funeral, sobbed in a frenzy manner around the "dead". We will be respected by our people and invited to their homes only when we have a deeper understanding of our activities and strengthen our religious knowledge", said the religious khalfas living in Beruni district³.

In Khorezm, khalfas also took part in the funerals and all ceremonies related to it among women. Commemoration and remembrance of the deceased was held in Khorezm Uzbeks and Turkmens three, seven, forty days and then for a year after the day of death⁴. There are also reports about such

² Field records. Recorded from Ibragimova Khadicha khalfa, who lives at 597 Khirli qal'a street of Polvon mahalla. Beruni District of Khorezm region. 2019.

³ Field records. Recorded from Saparova Tursinoy khalfa, who lives at 111 G.Gulom street of Guliston mahalla in Beruni District. 2020.

⁴ Turkistan collection.



ceremonies in Karakalpaks and Kazakhs. In most of these ceremonies, the women sat in a separate room from the men, and the help of the khalfas played a special role in the performance of religious ceremonies there. The khalfas recited the Qur'an among the women gathered for the ceremony. Hence, it is obvious that in addition to singing and dancing, khalfas were also required to have religious knowledge. Especially, the khalfas of ceremonies were different in a certain sense from the khalfas who sang and danced. Because the attendance of khalfas in the ceremony at weddings is not observed in the oasis. In Khorezm Uzbeks, the relatives of the deceased and the khalfas women who attended the mourning ceremonies wore black or blue clothes. One of the khalfas sitting there started crying by telling about the good deeds done by the deceased, his/her best human qualities and the events related to the deceased. Then the relatives, friends and family members of the deceased continued crying. In particular, the relatives of the deceased spread their hair, clapped and sang mourning songs:

Mother

The power of my waist, the light of my eyes.
May your mother die instead of you
Woe is me, my child, (crying)

Wife

As I walk, you were my companion,
Both my support and my conscience.
It is poison what I drink,
Your children are orphans now, woe (crying)

Sisters

Our mountain on which we rest,
Our orchard giving fruit.
My brother left us
My camel has gone, woe ... (crying) saying turn by turn⁵.

The root of this ritual of Khorezm people goes back to a long history. As it is stated in "Shohnoma", the legend by Firdavsi, which is based on the religious beliefs of Zoroastrianism, that the god of goodness, Ahuramazda, created Qayumars to fight Ahriman. Ahriman launches an attack on him, but when he is unable to defeat, he kills Siyomak, the son of Qayumars.

In poetic utterances there are also certain elements such as tone, speech part, rhyme, and rhythm. The shamanic utterances, written by Guljon Porkhon from Hazorasp, consist of a text in a judgmental tone aimed at expelling an evil spirit after its traditional beginning:

Go back to whom that said die!
Go back to the eyes of the envious!

The khalfas also took part in the shamanic ceremonies held around the tombs of the sacred saints. Ethnograph G.P. Snasarev notes that Gullibibi Cemetery was one of the places where such ceremonies were held by women in the past. According to his notes, the sheikh of the cemetery and the disciples were also women, and the treatment was held during the "zikr" (formulaic chanting performed by Sufis, usu. with devotees sitting in a circle and chanting praises to God) with the participation of the khalfa. According to an elderly woman

from Khanka who witnessed the incident, "the "zikr" begins with the bibikhalfa reciting the prayer text. At that moment, the main Sufis crawled in through the doors, lying on the ground, sat down in front of the khalfa, and began to clap their hands in a spiritual frenzy. Immediately the candles, books, and utensils in the middle were removed, and all came close to the center, forming a circle in an upright position, holding hands, walking on one foot, and moving to one side together. The patient sits on the floor with his knees in the middle. Around the patient they recited prayers and utterances together with the khalfa and beat him on the shoulder."

The khalfa is also actively involved in the magic of words and magic movements at the beginning and the end of this ceremony, which reflects the animistic views associated with the cult of the sacred grandmothers. The utterances of the khalfas are mainly in the form of prose and aim at driving the harm, which is believed to settle in the patient's body and cause illness. In this ritual, shaman khalfas use a word and a stick that are believed to have magic. Importantly, each participant in this process supports the word and action of the khalfa and joins her in its place.

Naturally, in the practice of utterances and performance of shamanic khalfas the influence of Islamic beliefs was strong. In some researches it is stated that the Islamic influence on the remnants of shamanism dates back to the XIII century in Central Asia. In our opinion, in Khorezm, where pre-Muslim beliefs were more viable, this influence was weaker than in other regions.

Generally, the khalfas try to advise people with such exemplary stories and tales in celebrations and mourning ceremonies, telling them that the transience of the world, that one should live a meaningful life and try to make a good name for oneself.

CONCLUSION

It can be said as a conclusion that the genre diversity and thematic diversity of the works in the repertoire of khalfas is within the framework of all-Uzbek oral poetics. In their performance and interpretation the centuries-old art traditions particular to the Khorezmian women and the style that combines a unique elegance and a high spirit are reflected.

⁵ Field records. Khorezm region, Khiva city. 2012.



THE CONDITION OF JOJI ILAGAN CAREER CENTER FOUNDATION'S PARTNER COMMUNITY: A HIERARCHICAL REGRESSION ANALYSIS

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ABSTRACT

This study aimed to establish the significant contribution of individual empowerment to the strength of organizational power to predict Barangay development outcomes. Forty-two residents selected through a systematic sampling technique among nine Purok responded to the survey. The data analysis used frequency count, percentage, mean and standard deviation, hierarchical linear regression, and ANOVA. Results showed an overall moderate level of executive power, individual empowerment, and barangay development outcomes. Moreover, the correlation test showed a solid, positive, and significant relationship between organizational power and barangay development outcomes and personal empowerment and barangay development outcomes. Furthermore, organizational power can predict barangay development outcomes by 62.6%. Finally, the hierarchical regression analysis revealed a significant effect of individual empowerment on the correlation between organizational power and barangay development outcomes. Pointedly, the combined impact of organizational power and individual empowerment can significantly explain the variance in the development outcomes in the barangay. This study's findings have leadership implications for the barangays.

KEYWORDS: *intervening effect, individual empowerment, organizational power, barangay, development outcomes, hierarchical regression analysis, Philippines*

INTRODUCTION

The Philippine Statistics Authority reported that the per capita income of 23.7 percent or 26.14 million Filipinos could not meet their basic needs in the first semester of 2021. Also, the subsistence incidence reported in that same semester was 9.9 percent, or about 10.94 million Filipinos. The average monthly estimated food threshold for a family of five was PhP 8,393 against the poverty threshold of PHP 12,082 [1]. This condition deprived many barangay residents of better health facilities and services [2]; [3]; [4], water, and sanitation [5], education [6], and employment opportunities [7].

The issues above are pressing, needing an immediate response from both the public and private sectors. The government has already introduced several programs to help the condition of the poor, like the KALAHI-CIDSS, Sustainable Livelihood Program, and 4Ps [8]; [9]. In addition, the private

sector also responds to the needs of the poor through its Corporate Social Responsibility by becoming socially accountable to the public, enhancing the environment and society [10]. These government and private sector programs have been the subject of much research.

Nevertheless, even with the plentiful research done on development projects, there is still a gap in the literature, especially concerning the condition of Barangay General Malvar, the partner community of the Joji Ilagan Career Center Foundation Inc. (JICCFI) in Davao City. Thus, this study becomes crucial in hinting at the programs and projects JICCFI may introduce to its partner community through its Community Extension Program.



OBJECTIVES

This study intended to determine the significant relationship between organizational power, individual empowerment, and barangay development outcomes. Additionally, it intended to establish the degree of influence that organizational power and individual empowerment have on

barangay development outcomes. Furthermore, the study wanted to examine the significant contribution of individual empowerment in strengthening organizational power to predict barangay development outcomes.

METHODS

This study was a quantitative investigation that utilized a descriptive and correlational technique and hierarchical multiple regression analysis. The survey respondents were 42 residents of the nine Purok of Barangay 7A Población in

General Malvar, selected through a systematic sampling technique and a two-house interval survey in each purok (a division within a barangay).

RESULTS AND DISCUSSION

Table 1
Descriptive Statistics on the Level of Organizational Power, Individual Empowerment and Barangay Development Outcomes

Variable	N	SD	Mean	Level
Organizational Power (OP)	42	0.92	3.36	Moderate
Agency indicator		0.91	3.35	Moderate
Opportunity indicator		0.97	3.37	Moderate
Individual Empowerment (IE)	42	1.15	3.03	Moderate
Existence of choice		1.19	3.06	Moderate
Use of choice		1.19	2.89	Moderate
Achievement of choice		1.25	3.18	Moderate
Barangay Development Outcomes (BDO)	42	0.92	3.26	Moderate
State indicator		1.01	3.30	Moderate
Market indicator		1.02	3.11	Moderate
Society indicator		0.94	3.42	Moderate

Table 1 exhibits the result of the descriptive statistic. Again, the data shows that all variables have moderate levels: organizational power (OP) (M=3.36; SD=0.92), individual empowerment (IE) (M=3.03; SD=1.15), and barangay development outcomes (BDO) (M=3.26; SD=0.92). The mean scores denote that Barangay 7A has good levels of OP, IE, and BDO and that these residents observed or manifested these variables at times only. Notice that a standard deviation always accompanies the mean score. A standard deviation estimates the dispersion of values or data around the sample's mean, describing the sample [11]. In this study, the standard deviation revealed that the data on *individual empowerment* is one standard deviation away from the mean. Its standard score of 1.15 suggests varied responses in the survey and that some of those were not the expected ones [12]. In examining the data under individual empowerment, all indicators have moderate levels with standard deviations greater than 1.0, indicating the

data's diffusion of one standard deviation away from the mean. That is to say, respondents have different responses to the survey depending on their perceptions of the existence of choice, use of choice, and achievement of choice.

Several studies have discussed organizational power, individual empowerment, and development outcomes. For instance, [13] expressed that people understand organizational power differently. Some understood OP as controlling people to attain personal gains, advancing their interests, and managing rewards or punishments. Others understood OP as access to resources to improve choices and make things happen [14]. True, organizational power can accomplish tactical aims [15]. Moreover, organizational power is essential in managing crises [16].

On the other hand, while empowerment is about autonomy, individual empowerment does not mean enjoying such independence alone, working alone. Individual



empowerment denotes taking control of and working out personal circumstances toward realizing a goal for a meaningful life experience. An individual must collaborate and work with others in the group [17]. Empowered individuals should actively participate in community actions as good citizens of the country [18]. Individual empowerment does not promote exclusivity; instead, it advocates collaboration while staying independent. In this way, an individual can develop meaningful social and structural relationships that channel access to communication and social and material resources to attain a quality life [19]; [20]; [21].

Finally, it is every government's goal to achieve development outcomes. These are growth and positive changes in society's socio-demographics, the economy, and the environment. These outcomes are the effects of the intervention [22]. Moreover, people in the government always look for innovative actions to introduce developments within the community. For instance, in the agricultural sector, people in charge always look for creative ways to increase production and ensure that the supply of goods is sufficient [23]. Likewise, governments always have plans and platforms to mitigate the harmful effects of disasters for the constituents' safety [24]. These are just a few examples of development outcomes.

Table 2
Correlation of Organizational Power, Individual Empowerment, and Barangay Development Outcomes

Independent Variable	Barangay Development Outcomes		
	<i>r-value</i>	<i>p-value</i>	<i>Interpretation</i>
Organizational Power (OP)	0.791	0.000	Significant
Individual Empowerment (IE)	0.833	0.000	Significant

Table 2 presents the correlation test between the independent variable and barangay development outcomes. The data shows the significant relationships of the independent and dependent variables, given that the p-value is 0.000. Looking at the specific results, the correlation coefficients indicate a strong, positive, and significant relationship: organizational power ($r=0.791$; $p=0.000$) and individual empowerment ($r=0.833$; $p=0.000$). These figures suggest that barangay development outcomes increase as organizational power increases. The same goes for individual empowerment and barangay development outcomes; as IE increases, BDO also inclines to increase. Therefore, if the barangay wants to increase its development outcomes, it must intensify organizational power through the agency and opportunity indicators and individual empowerment through the existence, use, and achievement of choice.

influence to create, initiate, collaborate, or demand such changes. For instance, governments and economies cooperate with developed and developing countries to diffuse knowledge and development models through policy transfers [25]. Without power, these connections and cooperation become impossible. Moreover, empowerment also highly correlates with development outcomes. For example, empowered women can find significance in their domestic and social roles. For instance, in Nepal, women's empowerment takes the lead role in the Feed the Future Initiative [26]. Likewise, women empowerment brought changes to Pakistan households and communities by partnering with microfinancing institutions in poverty mitigation initiatives [27]. These examples show the tandem movements of organizational power and individual empowerment with development outcomes.

Research proved that change comes with power. A person or an organization with power has the authority and

Table 3
Hierarchical Regression (Model Difference)

Predictive Variables	Barangay Development Outcomes				
	R^2	Coefficient B	R Square Change	Sig. F Change	Interpretation
Organizational Power	0.626	0.427	0.626	0.000	Significant
Organizational Power + Individual Empowerment	0.798	0.440	0.172	0.000	Significant



Table 3 displays the hierarchical linear regression model. The data shows the degree of influence that organizational power and individual empowerment have on barangay development outcomes. The table shows two models: first, the organizational power and Barangay development outcomes model, and second, the individual empowerment variable as an addition to the model.

The first model shows that organizational power significantly influences barangay development outcomes by 62.6% ($R^2=0.626$). The second model shows the combination of organizational power and individual empowerment. It illustrates that adding individual empowerment to organizational power

CONCLUSION

The descriptive statistics showed overall moderate levels of organizational power (OP), individual empowerment (IE), and barangay development outcomes (BDO). The results denote that while the average levels convey a good story of these variables, there is still more room for improvements in these areas of growth in Barangay 7A or elsewhere. Moreover, the moderate levels of OP, IE, and BDO indicate a form of segmentation among the residents, lacking unified organizational goals. On the other hand, the significant relationships between OP and BDO and IE and BDO indicate that barangay development outcomes change with the change in organizational power (OP) and individual empowerment (IE). This result suggests the importance of cohesion and cooperation among the barangay residents. Everyone should actively participate in governance as a responsible citizen and community member for BDO to occur.

Additionally, organizational power and individual empowerment have a significant combined effect on barangay development outcomes. Also, the strength of individual

(first model) yielded a coefficient of 0.798, suggesting that combining these two variables could influence the barangay development outcomes by 79.8%. Moreover, the R square change signifies the contributive influence of individual empowerment on the barangay development outcomes. The hierarchical linear equation shows a model difference of 0.172 from the first model to the second model, suggesting that individual empowerment can influence barangay development outcomes by 17.2%. The unstandardized beta coefficient of 0.440 reveals that the combination of organizational power and individual empowerment has a more significant impact on the development outcomes of the barangays.

empowerment in influencing development outcomes calls for collaboration and support from each community member towards achieving community development goals. Therefore, the study concludes that barangay leaders need to revisit their scorecards in governance and development aspects. In addition, barangay leaders can collaborate with the private sector to realize its development goals.

In this respect, the Joji Ilagan Career Center Foundation, Inc. (JICCFI) can work together with Barangay 7A through its Community Extension Services. JICCFI can do this with a renewed approach. For instance, the school can conduct seminar workshops with the Barangay 7A officials and functionaries on leadership and project management. These workshops will enable and equip barangay leaders to become strategic planners and developers for the growth and advancement of their barangay. In addition, Joji Ilagan Career Center Foundation Incorporated may also provide technical and vocational training for residents of Barangay 7A to prepare them for employment opportunities toward economic stability.

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CONDUCTING ACTIONS ON CONTROLLING THE SPREAD OF QUARANTINE PEST TYPES IN THE AGROBIOCENOSIS OF KARAKALPAKSTAN

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INTRODUCTION

Due to the fact that the Republic of Karakalpakstan is situated in the northern part of Uzbekistan, where the climate is sharp and the territory is extra-arid, changes of ecological factors in recent years, in the first place bringing into the decrease of the amount of plant types, yields of agricultural crops, which are being sown in the biotopes. As a result, rapid change of pest types of agricultural crops, which appear in biocenosis, was being observed. While the process of extinction of some types is appeared, there is an opportunity for rapid appearance of types, which did not exist in the past and coming into the ranks of the main pests. It is required to indicate these types of pests as inner and outer quarantine object and carrying out controlling actions in order to prevent them from spreading.

Although these types of pests are appearing in the region in recent years, it can be stated as an example potato moth, which is damaging potato and tomato moth, which is the main pest of potato.

Nowadays, it is an actual problem to create scientific basics of controlling actions which influence in maximum degree by defining biological peculiarities, developing dynamics, damaging degree in order to carry out effective controlling actions of the types which are spread in the agrobiocenosis.

USED WAYS AND METHODS

Morphological characteristics, bioecology of types of potato and tomato moths, which are appearing in the agrobiocenosis of Karakalpakstan, were determined with the help of B.P.Adashkevish's (1983) method, spreading areas, dynamics and conducting actions of control – Sh.T.Xujaev etc., (2004), degree of damage – V.I.Tanskiy (1988). Biological effectiveness of preparations was done with the help of the formula Abbot (Gar, 1963). Methodical ways of B.A.Dospekhov (1985) were used in doing mathematical and statistical analysis in conducting field and industry experiments.

RESULTS OF THE RESEARCH

As a result of observations carried out for creating actions of control vegetable and potato pests, which were being sown in the agrobiocenosis of Karakalpakstan, it was determined that in recent years tomato moth and potato moth are spreading and damaging. Both types of the pest were taken into account as the object of quarantine in the Republic, and controlling actions are being conducted. Although, these kinds of actions were conducted, spreading areas are widening and in recent years damaging degree is increasing.

Both types of the pest were studies as the objects of quarantine, and morphological characteristics of spread types, developing bioecology were taken into consideration.

From these, tomato moth (*Tuta absoluta*), which spread in the area, is included into the group of butterflies (*Lepidoptera*) family Gelechiidae, however, it is taken into account after 2015 in spreading areas as the main pest of tomato, controlling actions are being conducted mainly in the chemical method in last years.

The main morphological characteristics of the pest are body length of the butterfly is 5-7 mm, when they open wings – 8-10 mm, brown or silver, differs with the existing of silver-grey coins and black spots on front wings, it has moustaches like thread.

Eggs oval-cylindrical-shaped light-siliceous yellow or white-yellow, 0.36 mm, width 0.22 mm. When the larvae hatch, they are light yellow in color, the body is 0.5 mm long, the head is dark, at the age of 2-4 years it changes to a bright red or yellowish-green color, and at the last age it reaches to 8-9 mm. Fully nourished pests turn into pupae in silk in the soil. To date, in our references they overwinter in the mature, egg, pupae phases, the pistil lives 10–15 days, the paternity 6–7 days, laying more eggs on the leaves of tomatoes, the average on the stems and less on the fruit. The larvae hatch after 4-7 days from an average of 250-300 eggs laid by their pistils, live an average of 8 days and become pupae after 4 ages. Under favorable conditions, they reproduce generation 8-10 times a year, and the worms damage quickly by eating in the places where they hatch.



The second type of quarantine pest, which spread in the area, potato moth (*Phthorimaea operculella* Zell.) belongs to the group of butterflies (*Lepidoptera*) and the family of winged moths (*Gelechiidae*), and it was first defined in the potato fields and storage rooms in biotopes of Khorezm and Karakalpakstan in 2009 (Khodjaev, 2015; Turenliyazov, etc., 2018).

The adult of the potato moth can be distinguished from other species by the sign of a butterfly, which is white, ash-like, and gathered its wings to the shoulder when it is standing quiet. The front wing is 12-15 mm, decorated with dark and black stripes on the upper sides. The paternal wing is smaller than that of the pistil (2.0–2.5 mm), the length of the last member of the abdomen, covering 1/3 of the length of the abdomen, and the end of the abdomen covered with thick feathers. The color is yellow, gray, with gray-white markings on the underside. The paternal butterfly is easily differed from the pistil butterfly by two white or gray feathers at the end of the abdomen.

The eggs are oval, some are slightly concave on one side, 0.35-0.45 mm wide, 0.8 mm long, white when laid, the shell is flat, one side is reticulate. Over time, the color of the

egg changes into dark, and there is a characteristic sign that the worms are fully visible inside before they hatch. The larvae are 1.2 mm long, colorless or pale red, liver-shaped as they continue to eat, and can be distinguished from other species by their dark heads. At the adult age its length is 10-13 mm, width 1.5 mm, the color is yellowish-red or greenish-gray, the chest is dark, yellowish, the shields are very small and dark brown. When the worms are fully nourished, they fall into the waste or soil and become pupae inside the cocoon, which is woven from the outside. The cocoon is 10 mm long and 4 mm wide, with a silvery yellow color.

The pest overwinters in the phase of adult worms or pupae, it is active when the air temperature is in the range of +10°C to +36°C, reproduces 5-6 times during the growing season, one generation fully develops in 22-30 days, 2-4 months in winter. The pistil lays average 150-200 eggs in 6-19 days. The pest is a fast-growing creature in the open during the growing season, and at other times in storage rooms.

To determine the biological usefulness of pesticides against potato and tomato worms, preparations were used based on field methods (Table 1).

Table 1
Biological effectiveness of using chemical preparations in controlling tomato and potato moths
The Republic of Karakalpakstan, 2019-2021

Names of preparations	Amount, l/ha	Number before treating, number on 1 plant	Biological effectiveness,%		
			1	7	14
For controlling tomato moth on tomato					
Karate-zeon 5% k.s	0,2	2,5	62,1	77,6	90,7
Kinmaks 5% k.e.	0,2	2,9	60,7	82,8	93,9
Konphidor 20% k.e.	0,05	2,1	63,9	82,2	94,5
Sherpa 25% k.e.	0,16	1,6	64,5	84,5	96,4
Control(not treated)	-	1,8	-	-	-
For controlling potato moth on potato					
Karate-zeon 5% k.s	0,2	4,3	73,2	80,9	96,2
Kinmaks 5% k.e.	0,2	3,6	83,7	94,9	97,7
Konphidor 20% k.e.	0,05	3,1	65,3	82,3	94,7
Sherpa 25% k.e.	0,16	2,8	65,1	80,4	97,1
Control(not treated)	-	4,2	-	-	-

As a result, the biological effectiveness of the selected preparations for pests reached 60.7-83.7% on the first day after application, 77.6-94.9% on the 7th day and 96.54-97.7% on the 14th day, and it indicates that the method has excellent biological usefulness. As a result, a scientific basis has been created for the possibility of proposing the application of such a method in industry.

CONCLUSION

Among the quarantine pests considered in the agrobiocenosis of Karakalpakstan, the widespread development of tomato moth and potato moth was found to contain abiotic, biotic factors that are conducive to maximum damage. In order to prevent the spread of pests, it is necessary to destroy them with chemicals in the same way as in the winter and from the beginning of the growing season.

Extensive scientific research is required to determine the main bioecological developmental characteristics of the pest.

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OPTIMIZATION OF TREATMENT OF VITAMIN D-DEFICIENT RICKETS IN CHILDREN

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ANNOTATION

Rickets is not only a pediatric, but also a medical and social problem, as it has serious consequences that cause a high incidence of children. Vitamin D - deficiency rickets is a disease of children caused by vitamin D deficiency in the body, occurring with metabolic disorders, both phosphorus-calcium and lipid, affecting primarily the bone and nervous systems. Improper treatment and prevention of rickets contribute to the disruption of the formation of the skeletal system, a decrease in motor activity, immune defense, a delay in neuropsychic and physical development, and the development of frequent acute respiratory diseases. The examined patients revealed significant changes in the composition of higher fatty acids and the depth of changes in the composition of higher fatty acids depended on the severity of rickets. The revealed violations of the composition of higher fatty acids were corrected with the help of vegetable (apricot) oil and aevit. The results of the use of corrective therapy with apricot oil and aevit for the treatment of children with rickets are presented. The effectiveness of this method of treatment of children with rickets is shown.

KEY WORDS: *Vitamin D - deficient rickets, corrective therapy, fatty acids, efficacy, treatment.*

INTRODUCTION

Vitamin D - deficiency rickets is a disease of infants and young children (usually from 2 months to 1 year), caused by vitamin D deficiency in the body, proceeding with metabolic disorders, affecting primarily the bone and nervous systems. Rickets is not only a pediatric, but also a medical and social problem, as it has serious consequences that cause a high incidence of children [1-7]. Inadequate treatment and prevention of rickets contribute to the disruption of the formation of the skeletal system, a decrease in motor activity, immune protection, a delay in neuropsychic and physical development, and the development of frequent acute respiratory diseases [8-19].

PURPOSE OF THE STUDY

To correct some indicators of lipid metabolism in rickets in children by the combined use of apricot oil and aevit.

MATERIAL AND RESEARCH METHODS

Studies were conducted in 67 patients with vitamin D-deficient rickets and 10 practically healthy children who made up the control group. In the examined patients, the composition of higher fatty acids in the blood serum was determined by gas-liquid chromatography [14]. Separated methyl esters of fatty acids were identified using the "witnesses" method and the method based on the structural group components "sorbent-sorbate" [7]. As a result of identification, the following fatty acids were found in the blood serum: C (16: 0) - palmitic, C (16: 1) - palmitoleic, C (18: 0) - stearic, C (18: 1) - oleic, C (18 : 2) - linoleic, C (18: 3) - linolenic and C (20: 4) - arachidonic. The content of fatty acids was determined by the method of internal normalization [8,9].

RESEARCH RESULTS AND DISCUSSION

The results obtained for determining the content of higher fatty acids in the blood serum of children with rickets compared with the data of healthy children are presented in Table 1.



Table 1
Composition and content of fatty acids in blood serum in children with rickets

Fatty acids	Control	Examination	P<
C (16:0)	28.17±1.37	30.87±1.53	0.01
C (16:1)	2.70±0.22	1.38±0.64	0.05
C (18:0)	26.13±1.32	28.03±1.04	0.01
C (18:1)	0.90±0.13	0.66±0.6	0.01
C (18:2)	33.32±2.51	29.73±2.34	0.05
C (18:3)	2.41±0.45	2.58±0.50	0.01
C (20:4)	3.56±0.60	2.68±0.60	0.01

Note: P is the significance of the difference between the indicators in the group of patients and healthy people

As can be seen from the data presented in children with vitamin D-deficient rickets, the content of such fatty acids as palmitic, stearic and linoleic increases, while palmitoleic, oleic, linolenic and arachidonic acids decrease, i.e. there are violations of the studied indicators of lipid metabolism, which proves the violation of lipid metabolism in rickets. This dictates the need for correction of lipid metabolism in this pathology with the inclusion of vegetable oils.

To select vegetable oil, we evaluated the digestibility of vegetable oils by the body by the lipase activity of blood serum. The conducted studies showed that the lipase activity of the blood serum in the control group (15 children) was 10.2±3.6 μmol/(l•min). When cottonseed oil was used in the diet, it was equal to - 10.5±4.1 μmol/(l•min) (n=15), no significant change was observed in this group. When giving zegier oil, it was 16.8±4.2 μmol/(l•min) (n=17), sea buckthorn oil was 18.9±3.7 μmol/(l•min) (n=17), and when children received apricot oil, the lipase activity of blood serum increased significantly and amounted to -20.7±3.9 μmol/(l•min) (n=18). From the data obtained, it can be seen that the use of apricot oil leads to an improvement in lipid digestibility by more than 2 times by increasing the activity of blood serum lipase and thereby improves lipid metabolism [10,11].

On the other hand, apricot seeds of various varieties contain 20.5-57.7% fatty oil, 20.6-28.0% protein, 2.8-3.1% mineral salts (potassium, calcium, magnesium, phosphorus, iron etc.) [2,3].

In this regard, apricot oil was used as a substance that corrects impaired lipid metabolism, since it is rich in polyunsaturated fatty acids, has a pleasant smell and taste, has high biological activity and has a beneficial effect on metabolic processes in the child's body [4,12]. Aevit was used as an antioxidant.

The children were divided into 2 groups. I-group of children (38 patients) with rickets received the traditional method of therapy. The results of the study are presented in table 2.

Group II of the examined children with rickets (29 patients) received apricot oil and aevit against the background of the traditional method of treatment. The results of the study are presented in table 3.

A study was made of the composition of higher fatty acids in the blood serum of children with rickets (group I - 38 sick children with rickets) who are on the traditional method of treatment (table 2) and group II (29 sick children with rickets) - with a combination of the traditional method of treatment using modified therapy (table 3).

Table 2

Composition and content of fatty acids in blood serum in children with rickets those on the traditional method of treatment fatty

Fatty acids	Control	Conventional method	P<
C (16:0)	28.17±1.37	28.96±1.28	0.01
C (16:1)	2.70±0.22	1.62, ±0.43	0.01
C (18:0)	26.13±1.32	27.67±0.82	0.20
C (18:1)	0.90±0.13	0.76±0.10	0.20
C (18:2)	33.32±2.51	30.74±2.10	0.50
C (18:3)	2.41±0.45	2.11±0.45	0.05
C (20:4)	3.56±0.60	2.10±0.51	0.05

Note: P is the significance of the difference between the indicators in the group of patients and healthy people

In the examined children with rickets who received traditional treatment, there was a wide range of fluctuations in the studied parameters of lipid metabolism.

Lipid imbalance is probably due to the fact that the effect of specific therapy in the body is primarily aimed at correcting phosphorus-calcium metabolism, so there was no normalization of lipid metabolism.



Table 3

Composition and content of fatty acids (in%) in blood serum depending on the method of treatment

Fatty acids	Control	Conventional treatment	P<	Modified method of treatment	P<
C (16:0)	28,17±1,37	28,96±1,28	0,01	28,21±1,31	0,1
C (16:1)	2,70±0,22	1,62, ±0,43	0,01	2,55±0,30	0,1
C (18:0)	26,13±1,32	27,67±0,82	0,20	26,75±0,80	0,1
C (18:1)	0,90±0,13	0,76±0,10	0,20	0,92±0,10	0,1
C (18:2)	33,32±2,51	30,74±2,10	0,50	33,12±1,80	0,1
C (18:3)	2,41±0,45	2,11±0,45	0,05	2,73±0,45	0,1
C (20:4)	3,56±0,60	2,10±0,51	0,05	3,26±0,40	0,1

Note: P - relatively healthy

As can be seen from Table 3, the treatment method performed showed its high efficiency, which is confirmed by the data obtained: C(16:0) - 28.21±1.31%, C(16:1) - 2.55±0.30%, C(18:0) - 26.75±0.80%, C(18:1) - 0.92±0.10%, C(18:2) - 33.12±1.80% ; C(18:3) - 2.73±0.45%; C(20:4) - 3.26±0.40%, i.e. under the influence of the modified treatment, the parameters of the fatty acid composition returned to normal in the majority of patients.

CONCLUSION

1. It was revealed that the traditional method of treating children with rickets does not lead to the restoration of the metabolism of higher fatty acids in the blood serum.

2. To eliminate the dysmetabolism of higher fatty acids in children with rickets, it is recommended to prescribe apricot oil and aevit, which leads to the restoration of lipid metabolism and ensures high efficiency of therapy in children with rickets.

3. The use of apricot oil in rickets in children leads to an improvement in the absorption of lipids by more than 2 times by increasing the activity of blood serum lipase and thereby improves lipid metabolism.

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LINGUO-COGNITIVE BASIS OF ITERATIVE PHENOMENA

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ABSTRACT

The present scientific article is devoted to analysis of iterative phenomena in terms of linguo-cognitive approach. The concept of iterativeness encompasses all lexico-semantic and grammatical means that have the meaning of repetition over a specified period of time. In the process of analyzing the interrelationship of the functional-semantic category of repetition with other functional-semantic categories it turned out that, the result of activation of all means related to the limitation, duration, temporal localization, modality, time delay, taxi and quantity of repetition.

KEY WORDS: *grammatical conceptualization, predicate meaning, iterative, cognitive,*

Grammatical concepts arise as a result of generalization, information about linguistic objects, their properties and use, as well as how connections and relationships between linguistic objects reflect relationships between the realities of the surrounding world [Boldyrev, 2001, p. 45]. In this case, the meaning of the predicate is represented by the verb moves to the main plan. This is because the information given by the predicate is related to human perception. In general, the study of information represented by a predicate is divided into two major types, qualitative and quantitative. This kind of division plays an important role in the grammatical conceptualization of predicate meaning. The second of this group, i.e. quantitative indicators, is known by the term iterative.

Determining the amount of a predicate within an iterative requires certain mental operations. For example, *there is a knock at the door / there are some knocks at the door / Someone is knocking on the door.* The multiplicity of the predicate repetition within an event depends on the telic nature of the verb, creating the meaning of repeating the situation over a period of time. Internal repetition is constructed on the basis of lexically specific conceptual material. The repetition of situations, on the other hand, allows repetition over a limited period of time to be considered as a single situation. Moreover, the conceptual information that the

language encodes is the most essential, and it is the concept that determines the semantics of the linguistic units used to express it [Boldyrev, 2001, p. 67].

In addition, each recurring situation can be considered independently of each other. R. Langacker argues that concepts have a schematic description specific to all classes, such as object, time, space, and event. The expression of a grammatical category does not define the general conceptual content, but it has a conceptual feature that results from its combination with lexical means. Therefore, the units that characterize the repetition of a situation over a period of time not only adapt to the forms and loads, but also acquire a conceptual character under the influence of lexical meaning. Because, iterativeness has a wide range of meanings and the abundance of predicates takes on a whole set of meanings related to the semantic zone, it can be evaluated as a separate concept. The concept of iterativeness encompasses all lexico-semantic and grammatical means that have the meaning of repetition over a specified period of time. Another reason for the conceptualization of iterativeness is that any grammatical category expressed in it acts in connection with lexical means and forms a separate concept or meaning. Differentiation of this concept or meaning is considered a “cognitive operation”. Consider the following examples: *A week after the announcement of*



the two sat on the same bench in the down-town park, while the fluttering leaves of the trees made a dim kinetoscopic picture of them in the moonlight. But Donovan had worn a look of abstracted gloom all day. He was so silent to-night that love's lips could not keep back any longer the questions that love's heart propounded. [O'Henry, 1995, p.187].

In this example, the situation is considered as repeated many times in a short period of time (*the fluttering leaves of the trees*), but in a general sense it describes a specific macro situation over the entire defined time interval. The meaning of repeating a situation is different from the meaning of the usual iterative. In particular, *the fluttering leaves, heart propounded* structures represent different types of quantification.

When talking about the repetition of a situation, it should be noted that the limitation of a single multiplicative situation results in the repetition of a single situation many times, even within an event. This situation was solved by the English linguist B. Named the "slow motion effect" by Komri. In this case, if an iterative state quantum is written on a tape and we imagine that the slow motion of the tape is demonstrated, then a multiplicative verb can be used to describe each single quantum of the motion. On the other hand, different types of sentences also fit the description of the "slow motion effect". This refers to the repetition that occurs when the time required to perform a particular situation. In general, a set of grammatical, lexical-semantic elements in a language that participate in the expression of actions in a particular situation defines an appropriate concept.

L. Talmi argues that the adaptation of a grammatically shaped category in a system of different languages serves as the basis for the conceptual formation of the cognitive level of language. For example: "John wanted time to write or time to serve drink, he could switch from one mode to another like lightning. Like Kate". [Binchy, 2010, p. 7]; "All down the street there were 'Oh's' and 'Ah's,' and the reported fabulous sum paid for the sables was passed from lip to lip, increasing as it went". [O'Henry, 1995, p. 156].

The taxonomic classes introduced by E. Paducheva (object, object and substance, event, process,

activity, state) are referred to by the term ontological category. These metaphors and concepts are based on the metaphorical transformation of one object into another. A metaphor is a change in the main, categorical (taxonomic) meaning of a word. Taxonomy is also important for metonymy.

The study of verbs, including the coverage of lexical-semantic and grammatical aspects of verbs, is carried out mainly in conjunction with the study of syntagmatic features of the verb. In linguistics, it is recognized in many ways that the functional aspect of language affects its structure and development, since language lives and develops in speech. So, the development of language is also related to its functional aspect. The verb, which plays an important role in language functionality, differs from other word groups in its polysemicity, variety in form construction, richness, formation of compounds and their differentiation of meanings, as well as their ability to change meanings. The classification of verbs is important for determining the set of meanings, lexical-semantic and conceptual meanings.

The shorter the time in an iterative situation, the more likely it is that the meaning of repetition will depend on the intra-event type of the predicate set, as well as the single situation. The participation of some linguistic means in the expression of the meaning under consideration can not only determine the period of recurrence of the situation, but also interpret them as a separate recurring situation or as a whole event. For example: "Ikey slunk along the bar and gazed, breath-quickened, at his idol" [O'Henry, 1995, p. 159]; "The stationery shop was closed for business so the twins knocked at the door beside the shop" [Binchy, 2010, p. 47].

In this first example, the adjective "breath-quickened" has been used to describe the semantics of internal repetition, but it can also be used as a stand-alone phenomenon, depending on the context. In the next example, the "twins knocked" is represented an iterative situation involving a quantum of actions within a situation.

In general, iteration means the repetition of a situation over a period of time, despite the analysis of events within a particular event and predicate has a set of values. This meaning implies the perception of a



repetitive situation with a context, pragmatic effect as a single event. For example, if we analyze the statement that I used to play football every day as a child, the protagonist (informant) was engaged in "continuous activity" for a certain period of time. The linguistic combination of "every day" in a sentence indicates that he is repeating an activity (event) of the same order. In general, these events have a special status.

Thus, repetition over a period of time creates an opportunity to perceive the situation individually and reflects personality traits. However, as mentioned above, "procedural meaning" does not tend to differ grammatically, and individual custom meanings are considered to be more linguistically independent.

In terms of meaning, the events that generalize the plates are evaluated as a personality trait. This refers to the fact that the behavior of the participant, which is regularly observed in a particular situation, belongs to a single person and at the same time is repetitive. Just as a context that has the meaning of repetition over a limited period of time, the context of an individual-specific characteristic also represents a sense of iterativity in a progressive form. In this case, the "specific" use of the progressive form is observed in the description of the stages of event development. Compare: "His mother said he should be glad that someone in the family was looking to the practical side of things instead of singing raucous songs and laughing loud laughs" [Binchy, 2010, p.52]; "Everything about him seemed to be moving, he never stood still, even now at the bar he was shifting, moving from foot to foot" [Binchy, 2010, p. 8]. In these examples, the progressive forms "was looking to the practical side of things", "was shifting, moving from foot to foot" meant the repetition of individual actions over time.

Unlike recurrence, which rarely occurs, recreational situations have the potential to merge with other iterative meanings. This is directly related to the iterative value over a limited time interval. If the time interval over which a particular situation is repeated is limited, then a more frequent repetition of that situation is observed, and the shorter the time interval, the greater the number of repetitive quanta. Thus, it serves as a "bridge" between the meaning of recurrence and the events that become habitual. Each stage of the diachronic reality creates "iterative" situations. Actions

in a synchronous state represent multiplicative situations. The above-mentioned "progressive" form in English is carried out in direct connection with the context of the semantics.

Quantitative indications of a predicate are made through linguistic units to the plural meaning found in the context. The semantics of repetition, expressed by linguistic means in context, are in some cases also dependent on the linguistic units in the following sentence. This in turn creates expressiveness as well. For example: At any rate, Ikey toiled and snipped and basted and pressed and patched and sponged all day in the steamy fetor of a tailor-shop. But when work was done Ikey hitched his wagon to such stars as his firmament let shine. [O'Henry, 1995, p. 159]; "How? I've surrendered five times. Each time I surrender Denise and her guy up their demands" [Saul Bellow, 1953, p. 72]. Thus, between the semantics of repetition and lexical means, the semantics of "certain frequency" as well as the semantics of "iterative" through the following sentence were identified. Repetition of situations occurs when additional lexical tools are used to convey meaning.

In the Uzbek language, the quantity of predicates depends not only on the lexical meaning of the verb, but also on the morphological affixes, the semantics of the auxiliary verb. In this case, the lexical meaning interacts with the grammatical sign. If the lexemes that morphologically correspond to the predicates at the individual level do not undergo any change under the influence of the auxiliary verb, they adapt to all aspectual content. For example: "Bidonkhan performed Fergana yallas with a wonderful voice, accompanied by Irmatova, who was overwhelmed with applause" [Said Ahmad, 2014, p. 148]; "Dalajimjit. The early spring, which is like a coin, blows and makes a person feel" [Said Ahmad, 2014, p. 267].

Field modeling the invariance associated with the principle of invariance / variability is considered as a property or set of properties of the system objects under study. It has the ability to linguistically analyze all the changes that occur as a result of the interaction of the original system with reality. There are two types of semantic invariants: 1) the invariance of the units that affect the fact that a particular form covers the whole range of reality or activity; 2) limited invariance of basic



meanings that cover key aspects in the use of grammatical form but do not affect practical use. These invariant species are found in languages with progressive forms, especially English. For example: a) But I was only talking about the old days across there. . . and the kind of things we used to • do. . . [Binchy, 2010, p. 77]; b) As an event planner she was used to handling awkward situations — and this certainly came under the heading of ‘awkward’. [Liz Fielding, 11].

It should be noted that the verb form only was talking in this (a) example illuminated the duration of a certain situation, while the compound in the example (b) was used to handling indicated the duration of repeated situations.

The concept of ‘continuity’ includes two properties: an internal duration determined by the specific properties of the verb and an external duration representing the temporal transition of the situation, the latter occurring in relation to linguistic indicators outside the predicate.

Iterative semantics is formed over time, such as the specific internal repetition of a situation and the periodic repetition that represents its location in a time interval. The representation of iterative semantics with the indefinite frequency semantics of adverbial units is associated with temporal localization and non-localization values. In research, if the adverbial unit plays an important role in expressing a particular situation, it becomes possible to establish a direct relationship between the time of the situation and the time of the speech and to relate the situation to other similar situations. These situations are described without separation over time. For example: Not only to his children and to her, but to the old farmer who would tell the same story twice a day. John could nod and polish a glass and hear it again and again. Kate sometimes got a lump in her throat as she watched his patience and his respect for people, for all kinds of people. [Binchy, 2010, p.34].

In this example, the unit “twice a day” means that a situation is a local recurrence, which is explained by the fact that the situation is localized over time. The time of each individual piece of information expressed is related to the period, not the time of the speech, and contains all the repetitive information. Repetition time is not limited.

In the Uzbek language, the present tense form of the verb and the future tense form differ in the lexical index of time, i.e., the speech expresses the future degree of the situation or the usual repetition from the moment. Past tense relations, on the other hand, are represented by separate grammatical indicators that are closer or longer than the speech situation. For example: a) He (Eshpolvon) with his belt periodically increases the sweat pouring from his neck and face [Said Ahmad, 2014, p. 165]; b) Nizamjan would run from place to place and say what he heard on the radio, trying to share it with his joy [Said Ahmad, 2014, p. 252]. In Example (a), a situation is a situation closer to a communication situation, i.e., a situation related to the communication process. This is expressed in the form of the recent past tense. In the second example, the incomplete verb “would be” has meant iterative situations that occurred much earlier than the speech situation.

In the transient state, the repetition quanta are limited using certain linguistic units. In this case, the iterative situation does not have a clear location over time. For example: The old man was worried. Demonstrating the power of old age, the body of his left leg was often moved and even pulled slightly [Said Ahmad, 2014, p. 56]; The old man drank tea slowly and occasionally said, "Yes, yes, that's right" [Said Ahmad, 2014, p. 44].

A homogeneous sequence of recurring situations is evaluated as a single event. Iteration differs from taxi by this method of expression. The basis of taxi semantics is the sequence of different situations over time or the interdependence of individual consecutive situations. Unlike the taxi event, adverbial units play an important role in the representation of iterative events. The repetitive situations expressed in the main part of the sentence will be relevant at the same time as the situation in the following part of the sentence. In the case of a taxi, the meaning of the event expressed by the main sentence in the following compound sentences is that it occurred earlier than the event understood in the following sentence.

In iteration, adverbial units acted as predicates, attributes, determinants, representing unspecified frequency semantics, and meaning multiplicity over time.



The diverse range of linguistic tools involved in the implementation of iterative meaning in the functional semantic field approach requires an integrated study of this phenomenon. Due to the lack of a grammatical category of aspect in English, the functional-semantic category of aspectuality cannot be considered to have a grammatical core. The lexical meaning of the verb and the syntactic units play an important role in the realization of the repetitive meaning of situations, in particular the semantics of iterativeness. A syntactic unit is considered to be a semantic part of the context that represents an action or state sign and defines a predicate, an attribute. The plural form of the argument that activates iterative semantics plays units that have a clear and indefinite frequency semantic property. Infinitive feature verbs are used with additional linguistic units within the “indefinite frequency” range. It has a wider range of possibilities in the formation of iterative semantics in verbs of limited character.

The actualization of repetitive meaning is accomplished through the random use of additional lexical as well as morphological and grammatical tools. Data on the frequency of use of these tools allow to provide a model of the functional-semantic field of repetition. In this case, in the study of functional-semantic categories, the issue of the interaction of categories that work consistently is considered. In the process of analyzing the interrelationship of the functional-semantic category of repetition with other functional-semantic categories it turned out that, the result of activation of all means related to the limitation, duration, temporal localization, modality, time delay, taxi and quantity of repetition.

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ON THE ISSUE OF METHODS OF FORMING OIKONYMS IN TURKIC LANGUAGES

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ANNOTATION

The article deals with the study of toponyms in Turkic languages, including the issue of the formation of oikonyms. Here analyzed the materials of some Turkic languages. The differences and similarities of a number of methods of forming oikonyms were compared. Some definitions of terms used in the formation of oikonyms in the Turkic languages are given: conversion, word addition, lexical-semantic, syntactic, affixation, morphology.

KEY WORDS: *onomastics, toponym, oikonym, appellation, Turkic languages, word formation, toponym formation, oikonym formation, method, lexical-semantics, conversion.*

INTRODUCTION

Historians, geographers and linguists have long been interested in the meaning of place names and their origins. Basically, the study of land and water terms in the linguistic direction has a special place. They are based on the language of a certain people, its vocabulary, regulations. N.V. Podolskaya's opinion is appropriate: "The researcher can get a lot of language-related information from toponyms, such as words: to know the sound structure, to determine the morphological structure, to reconstruct the original meaning. Obviously, such information is present in every toponym. However, they are clearly visible in some of them, while in others they are known as a result of special research" [12, 94].

When studying toponyms in the linguistic direction, basically, they are guided by three directions: semantics (meaning), grammar and etymology. The method of structural and grammatical analysis is widely used in onomastics. This method determines not only the grammatical structure of the onym, but also its semantics, model of formation, etymology, the initial body of the term.

The research of toponyms in a structural project began in the second half of the last century. In Russian linguistics, such scientific disciplines as V.A.Nikonov's "Geography of Russian Suffixes" (1959), V.N.Toporov and O.N. Trubachev's "Linguistic Analysis of Hydronyms of the Upper Dnieper" (1962) were the first examples of the study of toponyms in a formal way. In terms of content, these researches were continued in the

works of A.K.Matveev, G.Ya.Smina, P.M.Shansky, Yu.A.Karpenko.

METHODS AND RESEARCH RESULTS

The descriptive, structural and comparative analysis methods are widely used in toponymic researches.

A number of scholars have expressed their views on the toponyms of the Turkic languages, including the formation of oikonyms, the ways of their formation. In particular, A. Abdirahmanov says about the rules of formation of Kazakh toponyms, as well as a number of oikonyms: "There is a certain rule in the formation of toponyms. Toponyms of Kazakhstan (excluding those borrowed from other languages) are formed on the basis of the existing lexical base of the Kazakh language, in accordance with its internal capabilities" [2, 56]. T.Januzakov's opinion complements the above: "Examples of word formation and modification methods of the old lexical structure and grammatical structure of the language are preserved in any toponyms and anthroponyms, ethnonyms and cosonyms" [9,202].

Z.Dusimov, who studied the toponyms of Khorezm, showed that the formation of toponyms does not differ from the principles of word formation. The methods of word formation in the language act in the formation of toponyms. However, toponyms have their own semantic and grammatical differences compared to words in the language [5, 30]. The professor S.Koraev noted that the toponyms and oikonyms always form on the basis of language, through word-formation models



which grammatically act in the language, and therefore their semantic content, in most cases, helps to determine the grammatical analysis [8, 111-112].

Oikonyms which form a large part of toponyms enrich in two ways, that is, through the acquisition of other languages and the internal resources of the language. The next method is the leader in the development of oikonymy.

The similarity of the oikonyms of the regions where the Turkic peoples live in terms of the structural model shows that their (oikonyms') methods of formation are similar. "Methods and tools of formation of the toponyms have common criteria and rules for each language, as well as for languages whose origins are close to each other" [4, 82]. The origin of some differences may be related to the stages of development of the individual language. In this regard, in this article we have decided to review a number of studies on the formation of oikonyms in some Turkic languages.

DISCUSSION

A.Kamalov analyzed the structure of the hydronyms of the Bashkir language and spoke about their peculiarities. Depending on the structure, the hydronyms are divided into three groups. Terms which base from hydronymic indicators were included in the first group, the compound hydronyms formed on the pattern of attribute + apposition (noun, adjective, number, verb + geographical indicator) were added to the second group, and hydronyms which base from appellation (word) were included in the third group [6, 12]. O.T.Molchanova analyzed the structure and methods of formation of Turkic toponyms on the example of the names of various geographical objects (living places) in the Altai Mountains. The scientist showed that the toponyms are formed by lexical-semantic (non-affixed terms from one root) and lexical-syntactic (terms formed by the combination of two, three roots, conjunction) methods [8, 104-151].

Linguistic analysis of the hydronyms of the Tatar language, including their types by construction and ways of formation, is given in the work of F.G.Garipova. She showed that the hydronyms in any language are formed on the basis of word-formation patterns of that language, but in the formation of proper terms, some types of word-formation methods are used. She made a conclusion that the affixed simple hydronyms are formed by morphological connections, the compound hydronyms which formed from two and more roots are formed by syntactic connections [5, 83-102].

The structural patterns of Kazakh toponyms, ways of their formation are widely studied in the

monograph of B. Biyarov. He said that the toponyms of the Kazakh language are formed in three ways. 1. *Lexical-semantic method* - where the root (without affixes) is transferred to the toponymic function without changing the word form (Biyik, Jaylaw, Aymaq, Kent, etc.); 2. *Analytical-semantic method* - toponyms formed from the combination, conjunction, pairing of two (without affixes) root words, which are formed in the model of attribute + apposition; 3. *Synthetic-semantic method* - toponyms with word-forming affixes [3, 21-382]. The toponyms of this type are also called *affixation, morphological method* in other studies.

S.Karaev analyzed the differences in the structure of toponyms of Uzbekistan. He showed that the word-formative affixes and topoformant toponyms are formed by *morphological* (affixation) method, the toponyms which formed by the combination and conjunction of two or more words, are created *syntactically*. In other studies, the term "non-derivative toponyms" was used in connection with the toponyms such as Baraz, Durman, Qırq, Manğit, which are called root or non-affixed [7, 110-128]. The opinions on the derivation of Uzbek toponyms can be found in N.Okhunov's work "Ózbekstan toponimiyasi (Toponymy of Uzbekistan)". According to the scientist, the formation of the terms of land, water, place of residence is not much different from the patterns of word formation, but there are some distinctive features. According to him, oikonyms are formed by *onomastic (external and internal) conversion, affixation and syntactic-lexical methods* [11, 65-68]. N. Ulukov in his monograph "O'zbek tili gidronimlarining tarixiy-lisoniy tadqiqi (Historical and linguistic study of hydronyms of the Uzbek language)" noted the methods of *affixation, syntactical and conversion* (lexical-semantic) of hydronym formation [14, 154].

A.Otajanova who studied the ethno-toponyms of the Khorezm region, studied a number of ethnotoponyms in the region, including the origin of ethno-names, methods of their formation, and explained their formation by means of onomastic conversion, composition (lexical-grammatical) and affixation with the examples [10]. A.Turobov noted two ways to form the oikonyms based on the grammatical and structural features of ethno-names of Samarkand region. He noted that the ethno-names such as Balta, Jilanlı, Qilishlı, Esenbay, Botabay, Azizxoja, which are derived from the transition of an existing word in the language or proper term to the ethnonym, are formed by onomastic conversion, the ethno-names such as Sarykypshak, Karamangyt, Zhety Uryu, etc., which base composed of different syntactic relations of words from more than one root, are formed by *syntactic methods* [13, 106-122].



The ways of formation and models of the types of the toponymic (including oikonymic) materials of Karakalpak language depending on the structure are discussed in some studies. G.Abishov's dissertation for the historical and linguistic analysis of toponyms of Shimbay region shows that land and water terms in the region are formed on the basis of onomastic conversion and lexical-syntactic methods of toponym formation. The conversion of a word which has a certain meaning in the language or a proper term to a toponym without formal changes is called a *conversion method*, which includes terms which base is ethnonyms (Bessarı, Qayshılı), anthroponyms (Qurban, Sarman), phytonyms (Gujimli) and appellatives (Arbashi, Baliqshi). It is stated that toponyms consisting of two and three words, the components of which are semantic, grammatically interconnected, formed from combination and conjunction, are formed by the *lexical-syntactic methods*. The toponyms in the region, such as Issibulaq, Taqiroy, Qarakól, Kóksuw, Qızılózek, are given as examples to this group [1, 76-79].

Thus, in the above studies, toponyms, including several types of oikonoms, which do not differ much from each other from their formation ways, have been identified. As it turned out, the researcher proposed a classification of materials based on the requirements of the collected materials, as well as the specifics of the language in which the oikonym appeared. Further study of this issue in more detail is important for linguistics, its onomastics, and the branches of the morphology.

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TOOLS FOR STUDYING ENGINEERING GRAPHICS

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ABSTRACT

It should be achieved through the harmonious development of learners, the pursuit of moral action, the development of the will, and the nurture of an active life position subject to humanity and nature. In this case, engineering education should be a priority, because the world in which man lives is increasingly striving not for simplicity, but for complexity.

KEYWORDS: *harmonious development, the main task of education, engineering-technical education, organization of engineering-technical education.*

INTRODUCTION

In the second half of the twentieth century, the industrial revolution solved the biggest problem facing humanity, namely the need of mankind for food. Engineers were the connecting link between science and manufacturing. It was they who ensured the material well-being of mankind. With the emergence of an abundance of food, clothing, household appliances, humanity has entered a new industrial era of its own development.

As prosperity increases, so do people's needs. The education paradigm has also changed. Education has emerged as a means of personal wealth, property, a means of self-expression in life, a means of achieving a personal career. This changes the purpose of education and upbringing, its cause, norms and forms, methods, the place of the educator. The position of the engineer in modern society is increasing. Approaches to the organization of engineering and technical education will change. It is becoming increasingly utilitarian and profit-seeking. They are trying to make an engineer, an entrepreneur, a manager, a humanitarian.

METHODOLOGY

The main task of higher education is the formation of a creative person capable of independent development, independent learning, innovative activity. It is impossible to solve this problem only by transferring knowledge from the teacher to the student in a ready state. It is necessary to move the student from a passive receiver of knowledge to an active creator-creator who can formulate the problem, analyze the ways to solve it, find the optimal solution and prove its correctness. Reforms in higher education are closely linked to the transition from the teaching paradigm to the education paradigm. It should be noted that the independent work of students should not only be an important form of the educational process, but also its basis.

The main task of any educator in any practical training, in addition to teaching his subject, is to teach the student to

think, reason, imagine. Pedagogical experience shows that the period of practical training is not limited to the formation of practical skills and the ability to solve problems, build graphs and so on. Students should always be able to see the main idea of the course and how it relates to future practical professional activities. The purpose of the lesson should be clear not only for the teacher but also for the students. It gives a vital description of the learning process, confirms the need for professional experience, and integrates them with life practice. In such circumstances, the teacher's task will be to demonstrate more the practical significance of advanced scientific concepts and scientific ideas.

RESULTS

A comprehensive approach to solving the set tasks, which serves the common goal of training qualified specialists in each science, will be associated with the development of creative potential of engineers, at the level of modern development of future engineers. This approach is considered one of the optimal solutions of modern technical education, increases interest in science and knowledge, develops independence and self-esteem in their work.

The training of future technical specialists on engineering graphics to a new level of quality curricula, under the guidance of a teacher, especially in small courses, manifests itself in a reorientation of students to independent use of their independent work. At the present stage of our society, there is an unprecedented social need for non-standard-minded, creative individuals. The use of information technology in the process of indirect interaction between students and teachers can greatly contribute to the formation of relevant values and rules and norms of behavior accepted in society [1].

There is also a need for creative activity of the specialist and advanced thinking, the ability to construct, evaluate, come up with proposals for rationalization. Currently, the number of undergraduate students majoring in



engineering is growing day by day. Now there is a growing demand for personal qualities of these graduates, such as high level of culture, discipline, independence, responsibility for their actions.

The most important task of education is to achieve the self-development of this person. His ethics in society should be goal-oriented. Describing the human personality, such as instinct (innate emotion, intuition), spirituality, intuition (the notion that one can know the truth in a complex way without experience) it will be necessary to combine psychological categories into a single model. There is no doubt that engineers will create the future.

The most basic condition for human development is to create conditions for human self-development. The main goal of the Engineering Graphics course is to provide students with the knowledge, skills and competencies necessary for any specialty engineer to express their technical ideas and ideas using drawings and to understand the principles of working from drawings to constructions, described technical products. The theoretical part of engineering graphics is based on the laws of descriptive geometry. In the process of studying engineering graphics, students get an idea of the details, assembly units and their drawings, as well as get acquainted with the design elements of details and elements of their processing. Engineering graphics is the first stage in the study of the basic rules of design documentation.

For the scientific and cognitive development of students, modern technological universities have ample opportunities to design, develop and compile detailed programs for the intellectual and technologically effective development of students. It should be noted that the purpose and content of science, in a sense, does not depend on time [3].

They have not changed since the time of Gaspar Monj. G. Monj, Brief: In 1770, at the age of 24, Monj held two professors at the same time: mathematics and physics. In addition, he conducts classes on cutting stones.

While dealing with the issues of precise cutting of stones according to the sketches given in relation to architecture and fortification (military-engineering science), G.Monj later developed methods that were generalized in a new science-drawing geometry. He is truly the person who created this science. The name of Gaspar Monge, located on the first floor of the Eiffel Tower, is included in the list of 72 great scientists of France [4].

In ancient Greece, a sharpened wand-style was used for writing. At the other end of the styler, a shovel is mounted to correct errors. Our ancestors wrote with a device mounted on a pat. In some countries, indelible lines are drawn using silver sticks (pins). In the fifteenth century in France - Parisian pen or - sauce was created. The sauce is prepared as follows: charcoal is mixed with charcoal powder and weak glue.

In 1565, in Cumberland, England, graphite was discovered by chance. The soft stone left a mark on the man's hand. When the graphite was run over the surface of a cloth or paper, it left a similar mark on them. The first graphite pencils consisted of a graphite rod wrapped in paper or tape, and they were wrapped around the graphite rod as it was removed.

From the eighteenth century to the present day, the most popular and enumerated is a mixture of this powder with clay (clay soil). Changing the proportions of the mixture of powder with clay (clay soil) allows you to change the hardness of the pen (it will be hard, medium hard and soft pencil). The tools used to complete the drawings will change, and the process will accelerate over time. It has been a drawing tool for decades and hundreds of years, serving goose feathers and ink along with pencils. Later, they were replaced by metal pens, and then the use of gotovalnya was introduced (gotovalnya-drawing tool set, in which the compass and reysfeder is the central drawing tool). The modern student is always - what gotovalnya? can not answer the question, because in modern schools and higher education institutions this set of drawing tools has not been used [2].

These examples illustrate one important case. Even if the content of engineering graphics has evolved over time, only radical changes will not occur. By its very nature, this science is sufficiently conservative. Alternatively, the tools are changing almost in principle

At present, professors and teachers of higher education institutions do not use the opportunities of pens and flyers in the design of their educational and methodological developments in various disciplines. They prefer to use personal computers for this purpose.

The introduction of the computer into the learning process not only frees the teacher from the regularity in the organization of the learning process, it gives the ability to create a variety of reference and illustrative material; presented in various forms: text, graphics, animation, audio and video elements. Interactive computer programs activate all types of human activities: mental, verbal, physical, accelerating the process of mastering this material. Computer simulators contribute to the acquisition of practical skills. Interactive test systems provide knowledge quality analysis.

CONCLUSION

Students and professors of the Andijan Institute of Mechanical Engineering use the capabilities of graphics programs such as KOMPAS and AutoCAD for this purpose. Students draw and submit homework using these graphic programs. Regardless, these options save time and labor to get the desired result. The Skills Component defines the quantity and quality of professional knowledge and skills an engineering graphics teacher must have to solve problems in the field of education [5].

Of course, just writing texts on a computer breaks a person's handwriting, and drawing pictures and shapes on a computer leads to a loss of skill in using drawing tools. Indeed, rather than striving to preserve traditions, it would be expedient to study the new computer technologies of engineering graphics, so to speak. The content of this subject does not change, and students need to understand what and how to describe in any situation. From this perspective, mastering graphics systems does not negatively affect students' knowledge, as the work is not just about pressing buttons, but rather making students think no less than when working with a



pencil and ruler. At the same time, personal computers are familiar and fun for the modern student.

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TECHNOLOGIES OF USING COMMUNICATIVE TRAINING IN TEACHING ENGLISH TO SENIOR STUDENTS

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ABSTRACT

The article provides information on the effectiveness of the use of communicative learning technology in teaching English to senior students, the effectiveness of language development in students and its application to the educational process. Also; methods of developing English language skills in students through communicative training technology, methods of using innovative teaching methods.

KEYWORDS: *communicative training, language barrier, fluent speech, live communication, social language, task-based language learning, text-based teaching.*

Today, communities are increasingly facing rapid and profound changes and tensions that affect the social, economic, and political aspects of life. The role of education has also become questionable in the millennial era. A matter of fact, 21st century education requires a gradual shift in curriculum construction focusing on the transferable competencies that learners need to develop in instructional settings. In today's knowledge-based, types of skills and competencies that students need to gain are different from in the past. Emphasizing the communicative competence is one of the most influential developments in language education. The implementation of communicative activities in EFL/ESL classroom prepares learners to use English in the world beyond based on their own needs, interests and opportunities.

Learners in environments using communication to learn and practice the target language by interactions with one another and the instructor, the study of "authentic texts" (those written in the target language for purposes other than language learning), and the use of the language both in class and outside of class.

Learners converse about personal experiences with partners, and instructors teach topics outside of the realm of traditional grammar to promote language skills in all types of situations. That method also claims to encourage learners to incorporate their personal experiences into their language learning environment and to focus on the learning experience, in addition to the learning of the target language.

Communicative language teaching is one of the best and popular methods of learning a second language throughout the 20th century. Global communication is increasing day by day and in some cases rapidly.

In this modern era, we can easily connect from one country to another and even from one culture to another. The

third industrial revolution made our life easy and super fast, and we currently live in a period of globalization.

Language plays a vital role in global communication, especially the English language. That's why teachers and researchers have been searching for the best ways of teaching a second or foreign language.

The concept of communicative language teaching originated in the United Kingdom in the early 70s. In the late 60s, the British linguists analyzed the importance of communicative language teaching rather than grammatical, lexical, and phonological rules.

OBJECTIVES

Communicative language teaching can be understood as a set of principles about the goals of language teaching, how learners learn a language, the kinds of classroom activities that best facilitate learning, and the roles of teachers and learners in the classroom.

Communicative competence includes the following aspects of language knowledge:

-Knowing how to use language for a range of different purposes and functions;

-Knowing how to vary our use of language according to the setting and the participants;

-Knowing how to produce and understand different types of texts;

-Knowing how to maintain communication despite having limitations in one's language knowledge.

CLT is deployed to develop communicative proficiency, and it has some primary objectives to improve communication skills. Some of the objectives of communicative language teaching are given below:



- CLT improves communicative proficiency of all the skills including reading, writing listening and speaking.
- Gradually it focuses on the grammatical, discourse, functional, sociolinguistic of communicative competence.
- It used to engage the learners in the pragmatic and functional use of language.
- It enhances the productivity of the language in scientific ways.
- CLT usually appreciates the learners to engage in linguistic interaction with real-life objectives.
- Fluency is the first priority rather than accuracy.

Characteristics Of Communicative Language Teaching

Communicative language teaching is a learner-centered method that mainly focuses on learning the language through communication. The significant characteristics of communicative language teaching are given below:

- CLT emphasizes to engage the learners in real-life situations in the classroom so that they can understand how to communicate in the real world.
- It gives the importance of the necessity of the learners and attempts to explain it.
- In communicative language teaching, errors are considered in a natural phenomenon.
- Normally CLT focuses on the fluency of the learners rather than the accuracy of the grammar and learners acquire their accuracy gradually and naturally.
- CLT also believes that communication is the fundamental objectives of language and the learners need to develop all the skills of language (reading, writing, listening and speaking).
- It offers the opportunity to join in teacher-learner and learner-learner interaction in the classroom.
- It focuses on the use of techniques which encourage the learners in participating in the natural environment, for instance, group and pair work etc.
- CLT agrees with the perception of individual work.
- In communicative language teaching, grammar is the second option of the learners and they discover and internalize the grammatical rules and functions themselves.
- It uses authentic language materials so that the students find the similarity between the classroom activities and the real world.

Classroom Activities In Communicative Language Teaching

The classroom activities of communicative language teaching (CLT) are given below:

- Learners interact with other people through pair and group work.
- Students are encouraged to concentrate on communication.
- Reading and writing may start on the first day.

- Interaction between teacher and students should be applicable.
- Teachers motivate the students so that they can easily interact with them.
- The teaching methods must be learner-centred.
- Students should be engaged in several activities so that they can be able to generate new ideas.

Teachers Role In CLT

Teachers play a very significant role in CLT. However, the teacher's roles in CLT is given below:

- Teachers remain in the classroom as a facilitator to be done the communication process among all the participants. They also encourage learners to join various activities.
- As a professor, a teacher answers the questions of the students and also care about their performance and activities.
- The teacher also plays the role of a communicator in the learning process. He or she also cooperates with the learning-teaching group.
- Sometimes the teacher plays the role of a guide in the classroom activities. He/she monitors the errors of the students and delivers some positive feedback among the learners.

Students Role In CLT

Students also need to play some roles in CLT. These are given in the below:

- The learners have to create some groups among themselves for their learning purpose and taking care of how they are able to perform in the classroom.
- The students must have to cooperate and support each other in the group to complete their all tasks assigned by the responsible teacher.
- The learners should involve in interaction and conversation with the teacher and other learners in the classroom.
- The students should be more interactive and create an interactive environment in the classroom for making the learning more easy and attractive.

CLT teachers choose classroom activities based on what they believe is going to be most effective for students developing communicative abilities in the target language (TL). Oral activities are popular among CLT teachers, as opposed to grammar drills or reading and writing activities, because they include active conversation and creative, unpredicted responses from students. Activities vary based on the level of language class they are being used in. They promote collaboration, fluency, and comfort in the TL. The six activities listed and explained below are commonly used in CLT classrooms:

Role-play

Role-play is an oral activity usually done in pairs, whose main goal is to develop students' communicative abilities in a certain setting.



Interviews

An interview is an oral activity done in pairs, whose main goal is to develop students' interpersonal skills in the TL.

Group work

Group work is a collaborative activity whose purpose is to foster communication in the TL, in a larger group setting.

Information gap

Information gap is a collaborative activity, whose purpose is for students to effectively obtain information that was previously unknown to them, in the TL

Opinion sharing

Opinion sharing is a content-based activity, whose purpose is to engage students' conversational skills, while talking about something they care about.

Scavenger hunt

A scavenger hunt is a mingling activity that promotes open interaction between students.

Communicative Language Teaching is an approach which provides an opportunity to the learners to communicate in the target language. The use of the functional aspect of language makes them able to communicate in the target language in their day to day life. The activities which are used in CLT approaches such as dramas, role plays, and games make learning enjoyable. Generally, communicative language teaching makes use of authentic material because it is important to give them the opportunity to understand how language is actually used outside the classroom. Students are involved in real life situations tasks that require communication. In this approach, the teacher sets up a situation, in which students are likely to be involved in real life. In some activities, the outcomes of them are unknown to the students. The result depends on their reactions and responses. Thus, they will be kept motivated and they will be kept in suspense until they finish the activity and see the clear outcome. Furthermore, in a communicative language teaching class use the language through communicative activities. Most of these exercises are completed through pair and group work. Those activities give students the opportunity to be involved in real or realistic communication. Normally those activities are fluency-based activities, such as role-plays, games information gap activities, interviews. The communicative approach supports that learning is more student centered than teacher centered. A typical communicative language teaching lesson follows a PPP model. The teacher may present some part of the lesson, and students complete some exercises, but then students produce the language in freer activities that help them to communicate. As a result, the student talk is increased, whereas the teacher talk is decreased. The teacher establishes situations which promote communication and he facilitates students' communication. During the activities, he does not interrupt them, but he monitors their performance. Error correction is not immediate. If he notes a mistake and he realizes that he has to work on it, he does it later during a more accuracy-based activity. However, the role of students is to communicate by negotiating to mean. Even if their knowledge of the target language is not complete, they still have to try and make themselves understood, but also understand their classmates' intentions of communication. The

communicative approach is based on the idea that in order to learn a second language successfully, you have to communicate real meaning. Thus, when learners are involved in real communication, their natural strategies for language acquisition will be active and used, and this will allow them to learn to use the language.

To sum up, it can be said that communicative language teaching (CLT) is the most valuable and modern method to acquire the best ways to learn a second language quickly.

Students get enough opportunities to interact with the teacher and remove their misconceptions. The primary and exciting thing is that communicative language teaching tolerates errors as a natural phenomenon.

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A REVIEW ARTICLE ON FUNDAMENTALS OF AYURVEDA COSMETOLOGY

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ABSTRACT

Cosmetology is a widely discussed subject of modern era. Everyone wants to look attractive, for which they are experimenting on different products. There arises a demand for ayurveda cosmetology. Ayurveda promises results holistically which includes your body, soul, and mind, so when it comes to Ayurveda cosmetology also, it beautifies both from within and out. Ayurveda cosmetology includes shodhana chikitsa(elimination therapy) for elimination of Ama and bahu dosha, as well as samana chikitsa for balancing on tridoshas, agni(digestive fire) and proper nourishment of saptha dhathus. Correcting on Rithucharya, dinacharya and pathya ahara vihara helps in proper metabolism, which in turn maintains a healthy body and thus a healthy skin. This review article is trying to collect what are the basics of Ayurveda cosmetology.

KEY WORD: Dinacharya, Rithucharya, Pathyahara, Ama, cosmetology

INTRODUCTION

Cosmetology is an art of medical science for refining superficial beauty. It helps to attain attractive physic and pleasing looks, thus enhances ones confidence .Today's world is running behind a perfect derma. People all around the globe have been developing an immense obsession for a flawless skin. Presently most of the cosmetics available in the market are abundant with toxic chemicals, which lead to various ailments. On the other hand ayurveda enriched with natural herbs purifies our body from within and out, it is a complete package for the nourishment of body mind and soul. According to ayurveda the concepts of beauty is optimal health, it explain the concepts of skin by detailing it with seven layers of which the first one avabhasini functions to reflect color and complexion which is nourished by rasa dhathu. According to Acharya vagbhta varna is determined at garbhavastha (embryonic stage) itself depending on the ahara(food) and vihara(life style) of the mother. Ayurveda promises radiant and healthy skin, hair and nails which we can only attain through harmony of doshas, proper nourishment of dhathus, procedural functioning of agni and timely excretion of malas. The opinion of different Acharyas mentioned in samhithas has been collected which includes various factors for improving beauty in the concept of Agni, dinacharya, rithu charya, pathyahara etc

MATERIALS AND METHOD

The sources of data are collected from Brihatiriyis (CharakaSamhita,SushrutaSamhita,ashtanga

Sangraha/Hridaya), contemporey text books, relevant journals, and websites.

RESULTS

Ayurveda cosmetology mainly based on four factors . They are Agni(Digestive fire), Pathyahara(wholesome diet), Dinacharya(daily regimens), Rithu charya(seasonal regimens).

AGNI (Digestive fire)

Acharya Charaka mentioned functions of Agni(digestive fire) in Grahanirogadhayam. Varna(complexion) and prabha(lustre) depends upon agni.¹ Therefore, balanced agni or samagni has a key role in ones varna. Samagni is only possible by a balanced diet that is pathyahara.

PATHYAHARA (Wholesome Diet)

Pathyahara describes food, which is light, easy for digestion, proper in quantity, with nutrients. The quantity and type of food should be selected according to one's individual constitution. In charaka samhitha vimana sthana ashtahara vidhi visheshayathanas, rules for taking food is mentioned.² By following these rules, we can maintain samagani. Only proper food can maintain proper Agni and there by poshana of dhathus.

ROLE OF DHATHU AND SWEDA

Rasa dhathu nourishes raktha dhathu where function of raktha dhathu is varna prasadana.³ Twak saukumaryatha is the karma of swedas.⁴ Decrease in raktha dhathu will result in twak



parushyam and twak rukshatha. Decrease in asthi dhathu will result in roughness of skin, falling of hair ,nails and

eyebrows.⁵ Decrease in sweda will results in twak shosham.⁶ So maintaining good rasa and asthi dhathu is important

ROLE OF SROTHAS

SROTHAS	DUSHTIKARANA	LAKSHANA
Rasa vaha	chinthyanam athi chinthanam(excessive thinking)	Baldness, Graying of hair
Raktha vaha	vidahi anna ,dushta snidha anna	neelika ,vyanga, swithra(Vitiligo)
Sweda vaha	ati santhapa, vyayama,seetha ushna akrama sevana, krodha soka(excessive anger,excercise)	Parushyam(Roughness)

Rasa vaha raktha vaha and sweda vaha srothas has a role in healthy skin and hair.⁵

RELATION WITH DINACHARYA

Dinacharya means daily routine. According to ayurveda one should follow dinacharya for a healthy, disease free life. Dinacharya helps to establish balance in one's constitution. It

also regulates a person's biological clock, aids digestion, absorption, assimilation, and longevity. In dinacharya adhyaya we will get different charyas which improves beauty of a person.⁸

DINACHARYA	BENEFITS
Mukha prakshalanam	Neelika, mukha shosa
Tambula sevanam	Kanthi
Siro abhyangam	Su twak ananam, kesa mardavam,bahutwam
Abhyangam	Mardavam, Varna pradham
Vyayama	Gathra kanthi
Udwarthanam	Twak prasada karam
Anulepanam	Varnakaram
Mukhalepa	Drida ananam, Avyanga pidakam
Chatra dharanam	Varnyam, kharma anila rajogham
Nidra	Varnam
Anutailam	Mukha prasannam, na shwetha kapila kesa, kesa vardhana
Dhoomapanam	Removes khalithya , aplithya, kesa pathana
Murdhini tailam	No khalithya and palithya,krishne cha kesa
Padabhyangam	Padamalapaham
Gandoosham	Vadanopachayam, na oshta sphotam

ROLE OF RITHU CHARYA

In *Ritucharya* we will get some Cosmetic aspect references In hemantha and shishira rithu which are cold seasons to protect skin from its cold effects application of agaru is prescribed.⁹In spring season application of chandana and agaru lepa is advised.¹⁰

ROLE OF RASAYANA

Acharya charaka in chikithsa sthana while explaining the benefits of rasayana he has said that rasayana gives prabha, varna and kanthi.¹¹

OTHER RELATIONS

Agni	Varna
Udanavatha	Varna
Bhrajaka pitha	Varna
Rakta	Varna prasadam
Sweda	Twak saukumaryatha

DISCUSSION

Ayurveda cosmetology not only targets external beauty but also nourishes mind and body. A person will get healthy skin and hair only if the person having a balanced agni, diet, following dinacharya and rithu charya properly. By taking proper diet the agni will be in sama avastha as a result the food which is taken by a person will get properly digested and

assimilated and uthorothara dhathu poshana take place. A well nourished raktha dhathu helps in skin and hair health. In dinacharya explained by acharya mentions many charyas which increases the quality of life.Dinacharyas like vyayamam, udwarthanam, Dhoomapanam, murdhini taila etc has direct effect on skin and hair. Rithu charya is for adapting our body according to seasonal changes.



CONCLUSION

Ayurveda cosmetology unlike modern cosmetology gives more importance to a healthy beauty, which means not focusing mainly on external application. Sama agni, pathyahara, dinacharya, rithu charya all these matter provides beauty which comes from inside the body.

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EFFECTS OF CIRCUIT TRAINING WITH KETTLEBELL ON EXPLOSIVE POWER AND STRENGTH ENDURANCE AMONG HANDBALL PLAYERS

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ABSTRACT

The determination of the study was to find out the effects of circuit training with kettlebell on explosive power and strength endurance among handball players. To achieve the purpose of the study thirty handball players were selected as subjects from department of physical education, bharathiar university coimbatore, tamilnadu. The age of the subjects were ranged from 21 to 25 years. The subjects were further classified at random into two equal groups of 15 subjects, Group-I underwent Circuit Training (using kettlebell) and group-II acted as Control Group (CG). Training period limited with three days in a week for eight weeks of training. The selected criterion variables explosive power and strength endurance assessed before and after the training period. The collected data were statistically analyzed by using Analysis of Covariance (ANCOVA). From the results of the study it was found that there was a significant enhancement on explosive power and strength endurance among the handball players.

KEYWORDS: Circuit Training, Kettlebell, Explosive Power, Strength Endurance and Handball Players.

1. INTRODUCTION

In today's world, a sport is a marvel in and of itself. History sports have never been more popular, composed, or critical as they are today. All of the playing actions are dominated by explosive strength and power (Kumar, 2014); also, it is a high-intensity interval sport in which players compete in a continuous brief period of high-power work out followed by periods of low-level force action (Kunstlinge, 1987). As a result, players must have explosive power as well as strength endurance. "In a complete circuit, there are normally 6 to 12 platforms, each focused on one exercise, so that all regions of the body are covered." The entire circuit should be finished as quickly as possible, and the circuit should be repeated three times. A fixed quantity of work is allotted ahead of time.

2. METHODOLOGY

The determination of the study was to find out the effects of circuit training with kettlebell on explosive power and

strength endurance among handball players. To achieve the purpose of the study thirty handball players were selected as subjects from department of physical education, bharathiar university, Coimbatore, tamilnadu. The age of the subjects were ranged from 21 to 25 years. The subjects were further classified at random into two equal groups of 15 subjects, Group-I underwent Circuit Training (using kettlebell) and group-II acted as Control Group (CG). Training period limited with three days in a week for eight weeks of training. The selected criterion variables explosive power and strength endurance assessed before and after the training period. The collected data were statistically analyzed by using Analysis of Covariance (ANCOVA).

3. STATISTICAL TECHNIQUE

The collected data were statistically analyzed by using Analysis of Covariance (ANCOVA).

**Table 1: Analysis of co variance on explosive power of experimental and control group**

	Ex (CTK)	CG	Source of Variance	Sum of Squares	Df	Means Squares	F ratio
Pre-Test Means	204.33	205.47	BG	9.63	1	9.63	0.12
			WG	2235.06	28	79.82	
Post-Test Means	229.33	204.87	BG	4489.63	1	4489.63	44.59*
			WG	2819.07	28	100.68	
Adjusted Post-Test Means	229.77	204.42	BG	4800.57	1	4800.57	89.48*
			WG	1448.44	27	53.65	

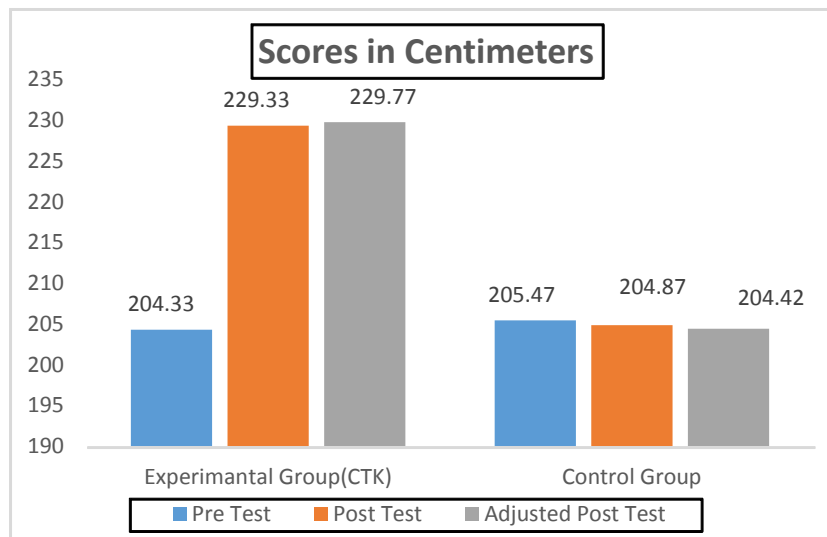
*Significant at 0.05 level of Confidence.

(The table values required for significance at 0.05 level of confidence with df 2 and 28 and 2 and 27 were 4.20 and 4.21 respectively).

3.1 Discussion on Findings of Explosive Power

The obtained F value on pre test scores 0.12 was lesser than the required F value of 4.20 to be significant at 0.05 level. This proved that there was no significant difference between the experimental and control group at initial stage and the randomization at the initial stage were equal. The post test scores analysis proved that there was significant difference between the groups as the obtained F value at 44.59 was greater than the required F value at 4.20. This proved that the differences between the post-test mean at the subjects were significant. Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated

and subjected to statistical treatment. The obtained F value at 89.48 was greater than the required F value at 4.21. This proved that there was Significant differences among the means due to eight weeks of circuit training with kettlebell on explosive power among handballplayers.

**Fig 1: Bar Diagram showing Pre, Post and Adjusted Means on Explosive Power**

**Table 2: Analysis of co variance on strength endurance of experimental and control group**

	Ex (CTK)	CG	Source of Variance	Sum of Squares	df	Means Squares	F ratio
Pre-Test Means	55.87	52.00	BG	112.133	1	112.13	2.64
			WG	1189.733	28	42.49	
Post-Test Means	72.40	61.87	BG	832.133	1	832.13	25.74
			WG	905.333	28	32.33	
Adjusted Post-Test Means	71.03	63.23	BG	417.074	1	417.07	36.19
			WG	311.129	27	11.52	

*Significant at 0.05 level of Confidence.

(The table values required for significance at 0.05 level of confidence with df 2 and 28 and 2 and 27 were 4.20 and 4.21 respectively).

3.2 Discussion on Findings of Strength Endurance

The obtained F value on pre test scores 2.64 was lesser than the required F value of 4.20 to be significant at 0.05 level. This proved that there was no significant difference between the experimental and control group at initial stage and the randomization at the initial stage were equal. The post test scores analysis proved that there was significant difference between the groups as the obtained F value at 25.74 was greater than the required F value at 4.20. This proved that the

differences between the post-test mean at the subjects were significant. Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value at 36.19 was greater than the required F value at 4.21. This proved that there was Significant differences among the means due to eight weeks of circuit training with kettlebell on strength endurance among handball players.

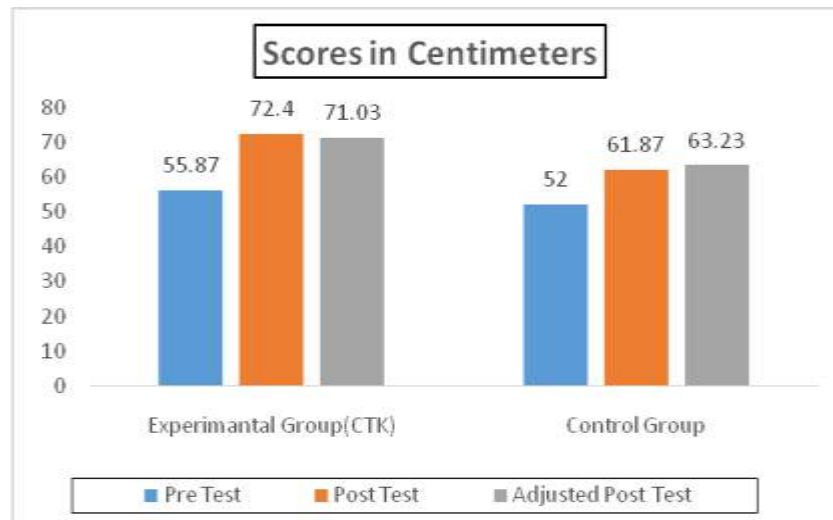


Fig 2: Bar diagram showing pre, post and adjusted means on strength endurance

4. CONCLUSIONS

On the basis of the interpretation of the data, there was a significant difference between experimental group and control group on selected variable of explosive power and strength endurance, further it was concluded that eight weeks of circuit training programme with kettlebell significantly improve on selected variables such as explosive power and strength endurance among handball players.

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THE DISTINCTION OF PRAGMATIC ANALYSIS IN LANGUAGE

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Pragmatics is the study of how language is used in particular situations to express a meaning or attitude that may not be obvious from the actual words. The person who aimed to learn the subject of pragmatics, was Klaus. According to him "Pragmatics is learning psychological as well as sociological side of linguistic character". Pragmatic linguistic was formed as an independent branch of linguistics in 60th and 70th years. The conference which was called pragmatics of natural languages were held in Dordrecht city in 1970. According to it, the expression plays an important role in pragmatic analysis. For instance; the word 'love'. People can express it by the word "kiss", or the heart which is drawn to the paper or saying "I love you". All of these samples express the word "love". But it differs from each other by expression. The power of expressive is different. Psychologists noted that the principles of assimilation play a vital role. Pragmatics is the study of relationship between word and uses of the word. For example, "I have got a new boat and now I have a specific picture of boat and you have different one in your mind. It is related to interpretation and utterances. According to George Yule express pragmatics along four detail dimensions.

Pragmatics is concerned with the study of meaning as communicated by a speaker and interpreted by listener. It has, consequently, more to

do with the analysis of what people mean by utterances than what the words or phrases in those utterances might mean by themselves. Pragmatics is the study of speaker meaning.

First of all, this type of study necessarily involves the interpretation of what people mean in specific context and how the context influences what is said. For example, you are at my place and I ask you could bring me a glass of water? So the utterances are not fitting the context. You can see how the context influences the meaning:

-Hi, how are you?

-Lovely weather today. So You can see it is grammatically correct, but it does not fit context and the situation. It requires a consideration of how speakers organize what they want to say in accordance with who they're talking to, where, when, and under what circumstances, Pragmatics is the study of contextual meaning.

Second of the dimensions is this approach also necessarily explores how listeners can make inferences about what is said in order to arrive at an interpretation of the speaker's intended meaning. This type of study explores how a greater deal of what is unsaid is recognized as part of what is communicated. We might say that is investigation of invisible meaning. Pragmatics is the study of how meaning more gets communicated than is said,



which means that you as a listener have to investigate the invisible meaning. For instance,

-Please, close the window! The invisible meaning, person asks that the person is freezing. That room is too noisy outside depending on the situation. So, for example if I hear noise of outside, the utterance”-, close the window. The invisible meaning which is not being spoken is that is too noisy.

Last dimension is the perspective then raises the question of what determines the choice between the said and the unsaid. The basic answer is tried to the notion of distance. Closeness, whether it is physical, social, or conceptual, implies shared experience. On the assumption oh how close, or distant the listener is, speakers determine how much needs to be said. Pragmatics is the study of the expression of relative distance. Physical closeness would be “take this!”. The only person close the speaker know what this refers to and Social closeness can be found between friend. For example, If I tell you we had fun at the weekend. You would know that last weekend and that you know which friends of mine I meant by we.

One traditional distinction in language analysis contrasts pragmatics with syntax and semantics. Syntax is the study of relationships between linguistic forms, how they are arranged in sequence, and which sequences are well-formed. Semantics is the study of the relationships between linguistic forms and entities in the world; that is, how words literally connect to things. Semantic analysis also tries to establish the relationships between verbal descriptions. Pragmatics is the study of relationships between linguistic forms and the users of those forms. In this three-part of distinction, only pragmatics allows humans into the analysis. The advantage of studying language via pragmatics is that one can talk about people’s intended meaning, their assumptions, their purposes or goals, and the kinds of actions that they are performing when they speak.

Language plays an important role in the communication process. In the study of language, there is a theory speech acts. Speech acts are the study how to do things with words. There are three processes of communication in speech act theory, those are the basic utterance what we say (locutionary), what we mean when we say (illocutionary), and what we perform by saying it(perlocutionary).

The development of pragmatics is connected with speech act. The dimension speech act was existed in the theories of famous scientists like M, Bakhtin, Burinist’s work, but it was developed as an independent education by English scientist J. Austin and American Psychologist J. Searl. John L. Austin, give an extraordinary impact on linguistics philosophy, especially in pragmatics with his following work “How to do things with word”. It was published in 1962. Austin’s theory called speech acts then established and classified by the American philosopher John R, Searle, who was Austin’s student. John Searle is most often associated with the theory. Ludwig Wittgenstein began a line of thought called «ordinary language philosophy”. He thought that the meaning of language depends on its actual use. Language, as used in ordinary life, is a language game because it consists of rules. In other words, people follow rules to do things with the language. The speech act theory is a pragmatic concept since 1962 and now. The existing of language is connected with writing as well as speaking. It expresses different meanings like confirmation, order, warning, promise apart from real meaning in the process of doing this attempt. The John Austin, the professor of Oxford university plays an important role in popularizing of speech act. He tells the problem in ‘the study of William James” lecture in 1955. After years, it was published under the name” How to do things with words” in 1962. John Ostin paid attention problems of gaps which were used by people. According to him, when a sentence was



pronounced, it acted apart from the expression of real meaning. It means the gaps give information about something. This information is confirmed or refused, pleased something banned. So, speech act is pronunciation of a specific sentence in the process of communication. Speech act is the result of the meaning of gaps which were used conversation of speaker and listener. Speech act is also connected with communication. For example, «How I can get to the station». If we see this sentence, it means the first aim of speaker is taking information from listener how to get to the station. But real goal of speaker is reaching station. This aim reaching station is the last goal. So, we can look as two steps in doing speech act. Firstly, the pronunciation of speech act. Secondly, the result of aim. According to Pocheptson the initial act comforts the structure of semantic features. For example, "How can I get to the station?" initial act is question." Today the meeting has been held in university. -declarative and "Give me my book!"-order. Acts are divided into three. They are locutionary act, illocutionary and perlocutive act. Illocutive act is active in works of writers and it differs from time of speech.

Having described various kinds of syntactic structures and what they mean we see that people often do not seem to say what they mean. They use languages differently from its apparent meaning: it has functions are different from the apparent structure. For example: Could I get you to open that window? «Open the window, Hand me the wrench», "I know this an imposition, but could you possibly open the window? We are 'used to' having questions being used to ask for information, declarative sentences to state something, and imperative sentences to give order. But the following may also occur:

If we analyze the work "Gone with the Wind", the reader may understand the difference of pragmatic analysis with other types of analysis.

"Scarlett O'Hara was not beautiful, but men seldom realized it when caught by her charm as the Tarleton twins were'. The girl Scarlet O'Hara is unknown for reader and writer is depicting her as a main hero of the work in order to be clarify for readers. The writes indicate the image of Scarlet O'Hara in order to be the meaning exactly for us. The thesaurus is also used in this sentence. For example, "Scarlet O'Hara" and the possessive pronoun "her" are thesauruses." Her" is dixies. The dixies shows us the person O'Hara. The writer also used thesauruses "beautiful" and "charm" in the context, because the writer wants to increase of the expression of the work. Sentences are grammatically correct; the meaning is also correct. The language of the work is literary. The locutionary act is used in this context, because the writer is giving some information about the heroes of the work. According to Searle theory, this context is representative act.

"If you say 'war' just once more, I'll go in the house and shut the door. I've never gotten so tired of any one word in my life as 'war,' unless it's 'secession.' Pa talks war morning, noon and night, and all the gentlemen who come to see him shout about Fort Sumter and States' Rights and Abe Lincoln till I get so bored I could scream! And that's all the boys talk about, too, that and their old Troop. There hasn't been any fun at any party this spring because the boys can't talk about anything else. I'm mighty glad Georgia waited till after Christmas before it seceded or it would have ruined the Christmas parties, too. If you say 'war' again, I'll go in the house."- if we look at this context, we can see the thesauruses "war" and "secession" in the first sentence. If I analyze pragmatics, the word secession is fulling the meaning war. Why is the author is using the word secession? Because the writer wants improve expression of literary work. Illocutionary act is using this context. If we look at this sentences, we can see the samples for illocutionary acts. For example, the sentence "I got



so bored “or the sentence “I’m mighty glad Georgia waited till after Christmas before it seceded or it would have ruined the Christmas parties” an argument for my opinion. This is vital reason is that it is indicating the feeling of the person. This speech acts express an inner state of the speaker. If we look at the sentence from the context! “And that’s all the boys talk about, too, that and their old Troop”- the words “the boys” and “their” are thesauruses. “Their “is dixies, because it directs the word “the boys”. The author firstly used the word children to clarify the meaning of context, then writer gives as dixies “their” in order to improve expression. Because reader may understand the meaning of why the word ‘their’ is using in context. Because if writer uses the same word “children” every time, it would be boring and literality does not show us. We can see also the pragmatic analysis of thesauruses in other sentences. For example, "You know, Ashley Wilkes' cousin who lives in Atlanta, Miss Pittypat Hamilton—Charles and Melanie Hamilton's aunt." "I do, and a sillier old lady I never met in all my life. «The thesauruses” cousin” and “old lady” are showing same meaning.

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A COLLABORATIVE ONLINE READING AND RESEARCH PROJECT

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ABSTRACT

This paper describes the conception and implementation of reading and research project designed to help students develop effective online reading and research skills. In addition to providing opportunities to practice traditional reading skills such as skimming, scanning, and critical reading, the project aims to help learners gain autonomous strategies for evaluating the credibility of online information. A student-centered, experiential learning approach to instruction framed the design. This required students to do most of the project work online, and involved a blend of face-to-face activity in computer laboratory along with out-of-class online collaboration.

KEYWORDS: *Collaboration, reading, face-to-face learning, online learning, project work online, teaching and learning*

INTRODUCTION

In general English such as Reading and Writing subjects in the Senior High School, the overarching goal is to prepare them for the language demands and cross-cultural challenges of typical undergraduate coursework in English medium post-secondary institutions.

Today, this subjects includes an expectation that faculty and students will use a variety of technologies to support teaching and learning, including internet-based research sources.

TEACHING CONTEXT

The English for Academic Purposes (EAP) Program has a four modular structure consisting of four courses at three levels. Each course (Grammar, Reading, Writing, Communication) is normally taught by a different instructor, for five classroom hours each week. The EAP semesters run three times per year, for 13 weeks, with class sizes generally ranging between ten and 18 students. Historically, the majority of students come from Philippines, China, Korea and Japan.

All EAP classrooms have networked computers and data projectors. The majority of students have their own laptop computers with wireless internet access. There is also excellent access to computer laboratory and networked computer stations throughout the campus. Hardware in the laboratory is updated annually and all laboratory have data projectors and whiteboards.

The school supports internet websites as its official online course management system. Advanced level students are

expected to demonstrate a high degree of autonomy when undertaking key tasks such as writing research papers and delivering presentations. In many of these assignments, students use internet-based information for content. The researcher personal observations and evaluations of student work led me to research use of the internet by English as a Second Language (ESL) students, both in general and in my immediate teaching context.

Students in the Advanced Writing course often include internet-based references in their work. Sometimes this information is taken from religiously biased, commercial, or politically motivated websites, where more objectives or neutral evidence was required for the assignment. In one instance, the researcher observed a student who was searching for information on the website. The student believed that she was viewing the official World Health Organization website. She remarked that she had spent around 15 minutes exploring this commercial site before I approached her.

Teaching English for Speakers of Other Languages (TESOL) researchers also recognizes that students may require specific guidance on appropriate use of internet-based information to support academic study. For example, Hedge (2020) remarks that problems are increasingly noticed by teachers as students' access information on the internet and that there are no gatekeepers here (on the internet) and users may need to evaluate information carefully. Jarvis (2009), questions whether EAP students are able to appropriate and effective use of internet resources in their academic work. He writes, the notion of equipping learners for academic study raises specific challenges of e-literacy skills for non-native speakers (NNS) of



English and it is by no means clear whether EAP providers are rising to this challenge.

Based on this evidence, the researcher determined that my Advanced level students needed further guidance and preparation if they were to make properly informed decisions about the credibility and applicability of information they were finding on internet web pages. In response, the researcher created the Online Reading and Research project in the Advanced Reading course.

The Advanced Reading course curriculum is based on a core ESL reading text which is used for the length of the course, but the course instructor is free to choose further readings and activities to supplement the text. Key tasks and skills in the course include summarizing, critical reading, reading strategies and reading response. The activities in the project were created with these learning goals in mind.

DESIGN AND RATIONALE

The design of the project was underpinned by the notion that the critical literacy and language skills which support effective online reading and research are probably best developed through student-centered experiential learning.

Experiential learning allows students to explore ideas from their own perspectives, building individual understanding of new ideas and information based on previous experience and knowledge. Many learning theorists reason that the current information-driven environment demands a student-centered, relevant, and engaging approach to teaching, wherein students are equipped with the dynamic skills and autonomous strategies for managing information in an increasingly complex and rapidly changing society.

Based on their study, Levine et. al. (2020) conclude that an online networked reading environment can provide opportunities for authentic reading experiences, and is conducive to the development of critical reading skills.

Laouta (2020) stresses the need for English for Academic Purposes learners to experience the texts that websites provide as part of a strategy to develop real world skills'. In order to build awareness and develop critical literacy skills for reading and researching online, a number of authors recommend having students work through web evaluation experiences recommends a constructivist, learner-centered pedagogical approach to developing critical literacy skills in learners, which can prepare them to work more effectively with constantly changing technology.

Miller et.al. (2020) note that a project-based learning approach 'lend itself to the use of new technologies because students can be encouraged to draw on a range of technological tools in order to research, present and share their projects'.

The researcher strong belief in the potential benefits of integrating technology into the projects, and confidence with the technical aspects of campus resources (networked computer laboratory, data projectors, Moodle) led to a blended learning design.

As determined by the pedagogical aims, the project necessarily involved student use of the internet to search for read, and evaluation web-based information. In addition, the project required groups to post their initial summaries and evaluations on the Moodle forum. According to Garrison and Vaughan (2020), such asynchronous text-based environments can decrease cognitive load and would appear to offer students a considerable advantage in processing information and constructing meaning.

Internet website was already established as an online learning space in the course, serving administrative functions such as scheduling and posting of course grades, and hosting a variety of learning activities including links to interactive reading skill exercises and course vocabulary learning resources materials.

The availability of well-equipped computer laboratory meant that induction and other initial online work could occur in a face-to-face setting during regular classroom hours. Groups could then do the project work outside of regular class time by using the online Moodle forums, which allowed students the flexibility to choose when and where they would contribute to their group project.

THE PROJECT: PREPARATION AND INDUCTION

At the beginning of the Advanced Reading course, the class met face-to-face in the computer laboratory to take part in general induction activities on the internet website, such as navigating the site, accessing site resources, creating forum posts, and hyperlinking in forum posts. Students then regularly used the internet website site to access course resources and activities.

Specific preparation for the collaboration online reading and research project occurred in the third and fourth week and required a total of around five hours of computer lab class time.

Preliminary student-led discussions took place around the students' perceived benefits and pitfalls of internet use for research purposes, experiences and the nature of internet use for research purposes, experience, and the nature of internet searches and reading online, and topic of interest for researching online.

Groups of three students were formed based on shared research interests. When the online work began carefully structured guidance was provided. Links to website evaluation guides were posted on internet websites. The guides and checklist were reviewed with the class and groups used them to evaluate several web pages on the topics of 'immigration' and Martin Luther King. The web pages were pre-selected to provide experiences with both reliable and unreliable information sources and groups were asked to rate the information on each webpage as unreliable, reliable or highly reliable, using the web evaluation tools provided earlier.

Following this exercise, a class discussions allowed learners to reflect on and share their experiences. Next, each



group developed research questions based on their shared interests and conducted an internet search for one article related to their topic. Requirements for the project were introduced at the end of this session.

TRANSITION TO ONLINE COLLABORATION

Groups transitioned to online work, and no further official classroom time for the project was scheduled. However, I did provide regular opportunities for students to ask questions or voice any concerns about the project. Each group was required to post brief summaries of around 150 words and critical webpage evaluations of eight different information sources on the web, related to the group topic/ research questions.

Groups were encouraged to complete full evaluation posts of any unreliable web pages they encountered, since it is in the process of doing so that they were most likely to develop the critical literacy skills needed to evaluate internet-based information sources.

The minimum length of each sourced article was 1,000 words. Groups posted their summary evaluation submissions on the Moodle course forum, and included hyperlinks to the web pages they summarized and evaluated in each post. This allowed for quick user to the web pages under scrutiny.

The first post was considered a 'practice post' and groups received extensive, detailed feedback from me in the form of a public reply on the forum. All class participants were able to see the work of other groups as it was posted and review my feedback posts on the work as well. Students were encouraged to post further comments or questions if desired.

Over the next five weeks, groups posted the remaining seven summary evaluations on the internet websites forum but received private feedback from me. At the end of the semester, each group delivered a ten to fifteen-minute presentation, bringing the online phase of the project back into the classroom. The presentation includes a step-by-step analysis of two of each group's evaluated web pages as they were displayed on-screen for the class, and a reflection on research activities, web page evaluation strategies, and collaborative processes involved in the project. A question and answer session followed each presentation.

DISCUSSION

Internet searches and the summary and evaluation of web pages were the main tasks for this project. Feedback indicated that participants saw the online forums as a logical option for collaboration, and the transition to online work went smoothly.

The content of the web page features evaluation posts revealed that the students were focusing on relevant webpage features to judge reliability. I have used the project in other semesters with some slight modifications based on this feedback, and seen similar results.

The blended design contributed to a positive and meaningful learning experience for the participants, and several

students commented that assessing web pages for credibility was a new activity for them and they found the project useful:

(a) It was a good experience to learn how to evaluate web page. Before we learn it, I have never thought about the credibility of the web pages. For our future study, evaluation is essential. Now, I always think and evaluate web pages before click them. Studying web sites evaluation and practicing critical thinking was very useful and interesting. You gave us a chance to think critically and we achieved it unconsciously.

One student commented that her understanding began to change as she realized the relevance and importance of evaluating web-based information:

(b) Actually, at the beginning I did not know why I was doing the project. However, as the time went by and I started my research paper, I realized how important the skills of determining whether the website I am looking at is credible. The time spent for this project was absolutely worthwhile, for I was able to recognize whether a website can be used for my research paper almost at first look. I am pretty sure that I have gained a good strategy of finding reliable sources on the web.

Open classroom discussions and careful learner preparation in key aspects of the project probably provided motivation and contribution to the project's success. These aspects include induction, relevance of the learning aims, and the rationale for using online forums in the project.

A dry run of the project tasks in a face to face setting was essential. For second language learners working online, a lack of confidence with technology and this in turn can decrease motivation. Experts caution against introducing technology to the learning environment too quickly and recommend sufficient scaffolding and close monitoring of student activity as technology is integrated into classroom activities (Ramachandran, 2020).

Coming into the project, students were already familiar with navigation and features of the Moodle course site. The project design included opportunity for participants to work together on structured tasks in a face to face setting before transitioning to online collaboration. Networked computer laboratories with data projectors provide the best support for this, as students can follow the teacher demonstrated tasks on screen and immediately attempt the tasks on their own computers.

The face-to-face induction sessions provided insight into the kinds of difficulties students might experience while working on the project tasks during the online phase. For examples, students can find it challenging to deal with the overwhelming volume of information that is returned when conducting web searches, and an induction period provides opportunities to discuss effective search strategies before students' tackle web search on their own. In this project, the researcher initially provided links to several different web pages' evaluation templates and asked students to choose the resource that they preferred. However, most students found the choice difficult, and wanted a recommendation instead.



In second experience with the project, the researcher provided more guidance and structure here, making students aware of the different guides available, but recommending the site in particular, based on positive student feedback.

Another motivator for students was probably the researcher effort to make clear links between the blended activities and learning aims, and the students' perceived relevance of those aims. An informal discussion at the start of the project revealed, as expected, that all students in the class regularly searched that internet for information on the internet. Some were quite surprised to be 'tricked' by the unreliable sites in the preparation tasks, and the researcher believe this experience generated interest and motivation to learn.

The online user interface for collaboration was not complex, and user issues were minimal. There were no connectivity issues, or technical difficulties with the internet websites. Some groups turned to additional technologies to facilitate collaboration, and reported using Skype, MSN, and web-based document storage in their work.

Students cited collaboration challenges, including the sharing of workloads and group dynamics, but no students attributed these difficulties to the online mode of work. There were also no concerns about the time required to complete the project, even with the study load of three other Advanced Level EAP courses.

The online phase of the project allowed group members flexibility in time and place of their work. Most importantly, the forums appeared to facilitate learning in important ways, although they were used mainly to display and share student work rather than as interactive discussion boards. The internet websites forums provided public evidence of the project work and teacher feedback, documenting individual and group learning as the projects developed. In turn, students had opportunities to learn from the work of their classmates. Several students commented that seeing the work of other groups on the forums motivated them to work harder to improve their own work. For example, one student wrote:

The researcher think model was good. We can see other groups' work. It motivates us to work harder than them. Furthermore, you can check everyone's work at the same time which was very convenient.

CONCLUSION

Students received course credit for their work in the online reading and research project, based on a topic proposal and the summary evaluation posts. This no doubt contributed to their motivation to work online. But the class discussions and student feedback also indicated that students perceived immediate practical value and relevance in the project and the use of the internet website forums to facilitate the group work.

For this particular EAP project, the use of technology is inextricably linked to the pedagogical aims and learner needs which inform those aims. Within the teaching context, face-to-face classroom time is quite limited and the requires for

effective collaboration work on the project exceeds available classroom instructional hours. A blended design allows for a face-to-face induction period and ongoing instruction support, while providing flexible opportunities for learner reflection and online collaboration.

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SUGBUANONG BINISAYA: A MEDIUM OF INSTRUCTION FOR GRADE TWO PUPILS

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ABSTRACT

Mother tongue as first language is the language a person is exposed to and acquired during the early years of child-hood and which normally becomes his natural instrument of thought and communication according to UNESCO, 1953 as cited by Charanchi (2011). The study focuses on the perception of the teachers, pupils and parents in the use of Sugbuanong Binisaya as medium of instruction and use Sugbuanong Textbooks provided by DepEd; the necessity of Mother Tongue or the Sugbuanong Binisaya as a medium of instruction; the language preference of the pupils and teachers as a medium of instruction; and the problems met by the teachers, pupils and parents in the implementation of mother tongue education.

The study used a quantitative and qualitative research. The instrument was adopted from the study of Afzal Shadi (2013). It was revised and translated into Filipino language to answer the objectives of the current study. A mean and percentage score was utilized to analyze the data. The grade 2 teachers and grade 2 pupils were the subject of the study.

Based on the findings of the study, the use of Sugbuanong Binisaya in the teaching and learning in the classroom is not effective because both teachers and pupils found difficulty in using the language. Therefore, the use of Sugbuanong Binisaya as MTB-MLE in grade 2 pupils of Falcon Memorial Elementary School shall be definitely suspended because it does not help pupils to develop their skills particularly speaking, writing, listening and reading. Hence, it is the hindrance to grade 2 pupils' and teachers' understanding.

KEYWORDS: *Sugbuanong Binisaya, language, MTB-MLE, classroom, discussion*

INTRODUCTION

Philippines is known to have more than 100 languages of which these languages have the variety and variation depending on the geographical location where these group of people lived. People use these languages to express ideas, thoughts and feelings; and use these to communicate either directly or indirectly in the community. Every individual in a certain community is unique in his language, and this language distinguishes the identity of each person from diversity. In Philippine education bilingual policy was instituted where English and Filipino are use as media of instruction. While, just recently two important acts which legalized the inclusion mother tongue in the Basic education Curriculum; RA 8990 Early Childhood Care and Development Act, Section 5 states that it shall use the child's first language as a medium of instruction and RA 8371 (NCIP) – authorizes indigenous people to establish educational system in their own language. As early as 1953, UNESCO supported the use of vernacular languages, and

especially the use of children's home languages, in education. To quote:

“It is axiomatic that the best medium for teaching a child to read is his mother-tongue. Psychologically, it is the medium of meaningful signs that in his mind works automatically for expression and understanding. Sociologically, it is a means of identification among the members of the community to which he belongs. Educationally, he learns more quickly through it than through an unfamiliar language (UNESCO, 1953: 11, in Wagner, 1991, p. 169).”

Hence this study proves that the use of Sugbuanong Binisaya in the classroom as a medium of instruction of the grade two pupils in Tago, Surigao del Sur is totality foreign. Specifically this aims to: (1.) determine the perception of the teachers, pupils and parents in the use of Sugbuanong Binisaya as medium of instruction and use Sugbuanong Textbooks provided by DepEd;(2.) identify the necessity of Mother Tongue



or the Sugbuanong Binisaya as a medium of instruction; (3.) identify the language preference of the pupils and teachers as a medium of instruction; and (4.) point out problems met by the teachers, pupils and parents in the implementation of mother tongue education.

In several studies in the past the use of Mother Tongue as a Medium of Instruction becomes a continued debate. Dixon (1976) and Malmgren (1996) as cited by Geijerstam (2012) said that over the past 40 years, issues concerning mother-tongue education have been discussed in many countries. Its function, content and identity have been the subject of dynamic discussions among teachers as well as researchers and research students. Charanchi (2011) defined mother –tongue as one’s first or native language. In an elaborate term, it is a language acquired in early childhood and spoken with native speaker’s competence. He added that according to UNESCO, 1953, mother tongue as first language is the language a person is exposed to and acquired during the early years of child-hood and which normally becomes his natural instrument of thought and communication. There are also several studies which prove the positive impact of mother tongue based education, to cite a few the study of Dastoor & Wamoron, (1975) and Adetula (1990) as cited by Charanchi (2011) using the children’s mother tongue from Ibadan Yoruba and Kano Hausa respectively which revealed that pupils taught by their mother tongue performed significantly better than those taught in English medium of instruction. Mother-tongue education in the early years has traditionally had a focus on early literacy – i.e. learning to read and learning to write.

According to Almario (2011) that in some parts of the Philippines, the mother tongue, or the child’s first language, is employed in learning, together with English and Filipino. A popular example is the trilingual teaching approach used in Lubuagan a municipality in the province of Kalinga. The program model uses the mother tongue in all subjects including Science and Math for 4.5 hours a day, then Filipino and English as specific subjects for 1 hour each day (Dumatog and Dekker, 2003). Research findings support Lubuagan’s model stating that not only did using the mother tongue improve student performance and parent participation, it also strengthened the community’s connection to their local roots and culture.

In the study of the Effect of Mother Tongue and Mathematical Language on Primary School Pupils Performance in Mathematics conducted by Omoniyi and Olabode (2013) recommended that, indigenous language must not be only taught and use but taught properly at all level of educational ladder both by utilizing the outcome on research with these language and by ensuring adequate and suitable training for the teachers concerned. They added that Mathematics taught in a child’s mother tongue has a lot advantages, such as overcoming limited knowledge of foreign mathematical vocabulary,. Teaching in mother tongue also bring closer to children mathematics example and concepts, it helps the children to develop a mathematical vocabulary in the mother tongue. It equally helps

adults who are not literate in English to understand and appreciate mathematics Abiri (1990).

In the DepEd Order 28, s. 2013 - Additional Guidelines to DepEd Order No. 16, s. 2012, Guidelines on the Implementation of the Mother Tongue Based-Multilingual Education (MTB-MLE). Surigaonon was included as language to be used in the specified regions and divisions starting school year 2013-2014. However, Surigaonon in the province of Surigao del Sur has a variety and variation of the language wherein people speak in different ways. Presently, the instructional materials or textbooks in particular for grades one-three are in *Sugbuanong Binisaya* which is a different from Surigaonon language. Unfortunately, the pupils in this area are non- native speakers of Sugbuanong binisaya; however, the said materials are used by the teachers and pupils as teaching and learning materials in the DepEd Surigao del Sur. Hence, this study.

OBJECTIVES OF THE STUDY

1. What is the perception of the teachers, pupils and parents in the use of Sugbuanong Binisaya as medium of instruction and use Sugbuanong Textbooks provided by DepEd?
2. Does the use of Sugbuanong Binisaya necessary in the Classroom?
3. What is the language preference of the teachers, pupils and parents?
4. What are the problems met by the teachers and pupils in the use of Sugbuanong Binisaya in the classroom?

METHODS AND DESIGN

The study used a quantitative and qualitative research. The researchers utilized the universal sampling for teachers and pupils while convenience sampling was employed to the parents as participants of the study. The instrument was adopted from the study of Afzal Shadi (2013) “Using of the First Language in English classroom as a way of scaffolding for both the students and teachers to learn and teach English”. It was revised to answer the objectives of the current study.

The researchers asked permission from the school principal to conduct the study. The instrument was distributed to the Grade 2 teachers for them to answer. The Grade 2 pupils were given a group interview with the help of their teacher through raising their hand which correspond to their answer. The researchers and the teachers’ help one another in translating the instrument into their own mother tongue (*Surigaonon-Tagon-on*) so that everybody understood and participated. On the other hand, an interview was conducted to teachers and pupils to answer the problems encountered by them in the use of Sugbuanong Binisaya in the classroom. A mean and percentage score was utilized to analyze the data.

There were three groups of respondents in the study. The grade 2 teachers, grade 2 pupils and the parents of the said school. There were 3 grade 2 teachers, 114 grade 2 pupils and 20



parents according to availability who participated the study. The study was conducted in Falcon Memorial Elementary School,

Tago, Surigao del Sur.

RESULTS AND DISCUSSIONS

Table 1: The perception of the teachers in the use of Sugbuanong Binisaya as medium of instruction and use Sugbuanong Textbooks provided by DepEd

A. The perception of the teachers in the use of Sugbuanong Binisaya as medium of instruction and use Sugbuanong Textbooks provided by DepEd	Strongly agree 5	Agree 4	Undecided 3	Strongly disagree 2	dis-agree 1
1. Explain the difficult ideas and opinion.	0	0	0	2	1
2. Determine the meaning of the new vocabulary.	0	0	0	1	2
3. To explain complex grammar points.	0	0	0	2	1
4. Easy and comfortable to use.	0	0	0	2	1
5. Help to understand.	0	0	0	1	2
6. To give instructions.	0	0	0	1	2
7. Effective in the classroom discussions.	0	0	0	1	2
8. Less time consume in the discussions.	0	0	0	1	2
Mean	0	0	0	1.38	1.62
Percentage Score	0%	0%	0%	46%	54%

Table 1 is the perception of the teachers in the use of Sugbuanong Binisaya as medium of instruction and use Sugbuanong Textbooks provided by DepEd. The table shows that grade 2 teachers do not agree of using sugbuanong binisaya in the classroom. The result denotes that the Sugbuanong Binisaya is not easy to use and the teachers are not comfortable in using the language inside the classroom. Hence, the language is foreign to grade 2 pupils because Sugbuanong Binisaya is not the language used by the people of Tago, Surigao del Sur. Using

the text books do not help teachers especially in giving some instructions and it is time consuming because the teachers were always translate the text or statement in their own language which is Surigaonon- Tagon on. The result negate to the idea of Haldiday and Martin (1993) that mother tongue is a key to learn the skills such as reading, writing, speaking and listening. It is also a key to learn how to express ideas and giving instructions clearly.

Table 2: The perception of the pupils in the use of Sugbuanong Binisaya as medium of instruction and use Sugbuanong Textbooks provided by DepEd

B. The perception of the pupils in the use of Sugbuanong Binisaya as medium of instruction and use Sugbuanong Textbooks provided by DepEd (Pupils)	Strongly agree 5	Agree 4	Undecided 3	Strongly disagree 2	dis-agree 1
1. Explain the difficult ideas and opinion.	0	4	0	106	4
2. Determine the meaning of the new vocabulary.	0	4	0	102	8
3. Easy and comfortable to use.	0	4	0	104	6
4. Help to understand.	0	4	0	105	5
5. Effective in the classroom discussions.	0	4	0	105	5
6. Less time consume in the discussions.	0	4	0	107	3
Mean	0	4	0	104.83	5.17
Percentage Score	0%	4%	0%	92%	4%

Table 2 is the perception of the pupils in the use of Sugbuanong Binisaya as medium of instruction and use Sugbuanong Textbooks provided by DepEd. The table demonstrates that 92% of the grade 2 pupils strongly dis-agree of using sugbuanong binisaya in the classroom discussions. This

entails that majority of the pupils has a difficulty to use the language. It means that the language used as MTB-MLE in the class is not effective because the pupils can hardly express the ideas and opinion. Thus, sugbuanong binisaya is unfamiliar language for them. The language used is the hindrance in the



learning process of the pupils. The result contradict to the study of (Dumatog and Dekker, 2003) as cited by Almario (2011) they found out that not only in using the mother tongue improve

student performance and parent participation, it also strengthened the community's connection to their local roots and culture.

Table 3: The perception of the parents in the use of Sugbuanong Binisaya as medium of instruction and use Sugbuanong Textbooks provided by DepEd

C. The perception of the parents in the use of Sugbuanong Binisaya as medium of instruction and use Sugbuanong Textbooks provided by DepEd	Strongly agree 5	Agree 4	Undecided 3	Strongly disagree 2	dis-agree 1
1. Explain the difficult ideas and opinion.	0	1	0	15	4
2. Determine the meaning of the new vocabulary .	0	1	0	17	2
3. Easy and comfortable to use	0	1	0	18	1
4. Help to understand	0	1	0	16	3
5. Less time consume in the discussions	0	1	0	16	3
Mean	0	1	0	16	3
Percentage Score	0%	5%	0%	80%	15%

Table 3 is the perception of the parents in the use of Sugbuanong Binisaya as medium of instruction and use Sugbuanong Textbooks provided by DepEd. The table shows that parents strongly dis-agree in the use of Sugbuanong Binisaya language which has 80% of the total parents as participants. This means that the parents don't like to use the language because they also have a difficulty to use and they found uncomfortable using it because the Sugbuanong Binisaya

is not their first language. The result is different to the study of Dastor & Wamoron (1975) and Adetula (1990) as cited by Charanchi (2011) entitled "Using the Children's Mother Tongue from Ibadan (Yoruba) and Kano (Hausa) Respectively" proven that pupils taught by their mother tongue performed significantly better than those taught in English medium of instruction.

Table 4: The necessity of Mother Tongue or the Sugbuanong Binisaya as a medium of instruction in the Class room

	Yes	Percentage	No	Percentage
Teachers (Mga Guro)	0	0%	3	100%
Pupils (Mag-aaral)	4	3.51%	110	96.49%

Table 4 is the necessity of Mother Tongue or the Sugbuanong Binisaya as a medium of instruction in the Class room. The table displays a 100 percent no as responses of the grade 2 teachers. Majority of the grade 2 pupils said that sugbuanong binisaya does not need in the classroom and only

few needed it because they are transferee pupils coming from other provinces and regions. This implies that using sugbuanong binisaya is not effective language to be used in the municipality of Tago, Surigao del Sur.

Table 5: The language preference of the teachers, pupils and parents

PERCENTAGE OF THE LANGUAGE PREFERENCE						
	Teachers		Pupils		Parents	
	No. of Cases	%	No. of Cases	%	No. of Cases	%
Sugbuanong Binisaya	0	0%	4	3.51%	1	5%
Surigaonon- Tagon on	3	100%	110	96.49%	19	95%
Others	0	0%	0	0%	0	0%

Table 5 is the language preference of the pupils and teachers. The table presents that both teachers and pupils preferred Surigaonon (Tagon-on). This is very clear that Surigaonon (Tagon-on) shall be used in classroom discussion as MTB-MLE because they easily understand concepts whereby they can express their ideas clearly. The parents also can help their

children in answering the assignment given by the teachers if Tagon-on language will be used in the textbooks.

**Problems met by the teachers in the use of Sugbuanong Binisaya in the classroom**

1. Time consuming during class discussion because the pupils has a difficulty to understand the language and it is strange for them.
2. Uncomfortable to use because pupils cannot easily understand the meaning of the words and the teachers always translate the words or statements in their own language- Surigaonon (Tagon-on).
3. The parents were complaining the materials used by their children because the language used (content) in a book is Sugbuanong Binisaya which is unfamiliar for them.
4. Sometimes, the teachers are not able to understand the word or statement which affect their understanding from the whole idea of the text.

Problems met by the pupils in the use of Sugbuanong Binisaya in the classroom

1. The pupils did not actively participate the class discussion because majority of them cannot speak fluently the language and others were ashamed to speak.
2. They cannot understand the language which result to the slow progression of the learning.
3. Others can understand yet they cannot directly speak the language.
4. The pupils lost interest in learning because they found difficulty to use the language.

CONCLUSION

Based on the findings of the study, the use of Sugbuanong Binisaya in the teaching and learning in the classroom is not effective because both teachers and pupils found difficulty in using the language. Therefore, the use of Sugbuanong Binisaya as MTB-MLE in grade 2 pupils of Falcon Memorial Elementary School shall be definitely suspended because it does not help pupils to develop their skills particularly speaking, writing, listening and reading. Hence, it is the hindrance to grade 2 pupils' and teachers' understanding.

RECOMMENDATION

It is recommended that there is a need to revise the curriculum because the Sugbuanong Binisaya as MTB-MLE in Grade 1-3 is a language not appropriate for the people living in Tago, Surigao del Sur. The Teachers or the DepEd personnels shall develop and design instructional materials suited to the language, interest and culture-based reading materials. An informative seminar-workshop shall be conducted to the newly hired and old teachers about MTB-MLE in Philippine education system and the development of instructional materials.

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EFFECTS OF NUTRITION NUMBERS AND TERMS ON THE PRODUCTION OF SOYA VARIETIES IN THE CONDITIONS OF THE REPUBLIC OF KARAKALPAKSTAN

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ANNOTATION

There was a research about the impact of the norms of mineral fertilization on the yield of soybeans in the article and the results of the field experiment conducted on the application of various norms of mineral fertilizers in the feeding of 4 soybean variety Tamaris man-60, Ayamol, Selekt-201, Amigo varieties in the Kashkadarya branch of the scientific research institute of grain and leguminous crops and at Karakalpakstan research stations in the conditions of the northern and southern regions for 2018-2020.

KEYWORDS: Soy, variety, mineral fertilizers, yield, nitrogen, nutrition, quantity, option.

INTRODUCTION

The soybean crop, which is a legume, is expanding day by day in agriculture around the world.

Today, 109.7 million soybeans area are grown in the world. hectares are being planted. Brazil, the United States and Argentina are the leaders in terms of gross soybean production. Soybeans are second only to wheat, rice and corn. More than four hundred different products are made from soybean grain and protein, and they are used in all sectors of the national economy.

The main sector that determines the economy of our country is agriculture, and its leading sectors are cotton and grain. Today, a number of works are being carried out to include soybeans in the main crop and to grow crops from them. Without the development of key sectors in agriculture, it is impossible to meet the demand for agricultural products of both the population and industry.

There was a resolution of the President of the Republic of Uzbekistan dated March 14, 2017 №2832 "On measures to increase the sowing of soybeans and soybean crops in the country in 2017-2021." The resolution instructs to gradually expand the area under soybeans in 2017-2021 and increase oil production. In order to ensure the fulfillment of this task, in 2021 it is planned to cultivate soybeans on 17.3 thousand hectares in the country.

At present, soybean varieties recommended for planting in different irrigated soil climatic conditions in the Republic do not fully meet the requirements of industrial production due to incomplete scientific standards and timing

of sowing. There is a need to determine the norms and timing of feeding with mineral fertilizers, to scientifically substantiate its impact on the growth and development of shade, productivity and grain quality, to scientifically substantiate the placement of biological properties and the development of agricultural technology.

According to scientists (Spijevskaya and Tojiev, 1970), legumes compact the soil to a lesser extent than alfalfa. Their small root systems rot a certain amount during the period of plant growth and increase the organic matter in the soil, improving the water-physical condition of the soil.

In a single plant of the soy, the leaves are 7-140 and more, 15-200 cm in height and the number of pods in the joints is 1-3 to 6-8, in the interior 5-8 and more (Baranov, Dovydenko and Kochegura 2005).

In order to maintain soil fertility, legumes, especially soybeans, are considered suitable, as before the experiments the soil contained 0.65-0.72% of humus, but after the experiment it was observed that its content reached 0.95-1.03% (D.Yormatova 2013).

The widespread introduction of soybean cultivation in the country, along with increasing soil fertility, strengthens the fodder base of livestock and poultry and provides valuable raw materials for food industry enterprises (H. Ergasheva 2013).

Soybean grain is an environmentally friendly quality raw material used in the food industry. Currently, 35-40% of vegetable oil, which does not contain harmful substances in



human consumption, is obtained from soybeans (J.Husanbaev 2017).

Grown grain yields were also lower at 3.2 quintals per hectare than in the late sown variant. It was found that the timing and norms of sowing of soybean varieties had a significant impact on biometric indicators (T.Oserbaeva 2017).

THE FOLLOWING METHODS WERE USED IN THE RESEARCH

Phenological Observations Methodological Manual of the Botanical Research Institute (VIR) (1977), Mathematical Analysis of Field Experiments Dospekhov (1985) new technical, inventions and rationalization proposals (M. Kolos, 1987).

The research was conducted in 2018-2020 in the northern and southern regions at the Kashkadarya branch of

the Research Institute of Cereals and Legumes and at the Karakalpak research stations in 4 varieties of soy Tomaris Man-60, Oyjamol, Seleкта-201 and Amigo.

RESULTS OF THE RESEARCH

The following results were obtained in the experiments conducted in the conditions of the Republic of Karakalpakstan, the northern region of the Republic of Uzbekistan (Table 1).

In the experiments conducted in 2020, the average yield of Tomaris Man-60 was 10.1 c/ha in the absence of nitrogen fertilizer (control) in the cultivation of soybean varieties, 13.2 c/ha in 2 variants using the norm of 60 kg/ha Nitrogen fertilizer rate was 90 kg/ha in 3 variants 15.4 c/ha, nitrogen fertilizer rate was 120 kg/ha in 4 variants 17.9 c/ha, nitrogen fertilizer rate was 150 kg/ha in 5 variants 18.4 c/ha grain yield in the amount of.

Table 1.

Influence of mineral fertilizer norms on productivity indicators in the conditions of the northern region. (2018-2020)

№	Name of varieties	Variants	Yield by years, c/ha			Average yield, c/ha	Difference +,-
			2018	2019	2020		
Karakalpakstan							
1	Tomaris Man-60	1	12.5	16.1	10.1	12.9	-
		2	14.1	18.5	13.2	15.3	2.4
		3	16.3	19.3	15.4	17.0	4.1
		4	18.8	19.8	17.9	18.8	5.9
		5	19.3	20.3	18.4	19.3	6.4
2	Oyjamol	1	11.6	15.3	9.6	12.2	-
		2	13.9	17.2	12.8	14.6	2.4
		3	15.5	20.0	14.7	16.7	4.5
		4	17.7	20.7	16.9	18.4	6.2
		5	18.0	21.0	17.3	18.8	6.6
3	Seleкта-201	1	3.8	4.3	3.8	4.0	-
		2	6.5	6.3	5.9	6.2	2.2
		3	7.5	7.9	7.8	7.7	3.7
		4	8.0	9.6	9.8	9.1	5.1
		5	8.6	10.1	10.2	9.6	5.6
4	Amigo	1	3.6	6.1	3.2	4.3	-
		2	5.2	7.7	5.4	6.1	1.8
		3	7.4	9.5	6.8	7.9	3.6
		4	7.9	10.2	8.9	9.0	4.7
		5	8.2	11.6	9.3	9.7	5.4
1	Tomaris Man-60	NSR (05)	1.07	0.59	0.66		
2	Oyjamol	NSR (05)	1.14	1.26	0.61		
3	Seleкта-201	NSR (05)	0.84	0.86	0.73		
4	Amigo	NSR (05)	0.73	0.55	0.60		

In the Oyjamol variety, the average yield was 9.6 c/ha in the non-nitrogen fertilizer (control) variant, 12.8 c/ha in 2 variants with 60 kg/ha nitrogen fertilizer, and 14 in 3 variants with 90 kg/ha nitrogen fertilizer. 7 c/ha, nitrogen fertilizer rate was 120 kg/ha in 4 variants 16.9 c/ha, nitrogen fertilizer rate was 150 kg/ha in 5 variants 17.3 c/ha, Seleкта-201 nitrogen fertilizer was not applied (control) the average grain yield was 3.8 c/ha, nitrogen fertilizer rate was 60 kg/ha in 5 variants, 5.9 c/ha in 2 variants, nitrogen fertilizer rate was 90 kg/ha, 7.8

c/ha in 3 variants, nitrogen fertilizer rate was 120 kg/ha in 9 variants 9.8 c/ha, nitrogen fertilizer rate 150 kg/ha in 5 variants 10.2 c/ha, in Amigo variety without nitrogen fertilizer (control) the average yield was 3.2 c/ha, nitrogen fertilizer rate of 60 kg/ha was 5.4 c/ha in 2 variants, nitrogen fertilizer rate of 90 kg/ha was 6.8 c/ha in 3 variants, nitrogen fertilizer rate of 120 kg/ha was 8.9 c/ha in 4 variants. ga, Nitrogen in 5 variants with a fertilizer rate of 150 kg/ha, a grain yield of 9.3 c/ha was obtained.



In the 3-year research conducted in 2018-2020, the average grain yield for 3 years from the soybean varieties planted in the main areas was as follows, the average grain yield from the Tomaris Man-60 variety without nitrogen fertilizer (control) was 12.9 c/ha. Nitrogen fertilizer was applied at 60 kg/ha in 2 variants at 15.3 c/ha, nitrogen fertilizer at 90 kg/ha at 3 variants at 17.0 c/ha, nitrogen fertilizer at 120 kg/ha at 4 variants at 18.8 c/ha, nitrogen fertilizer rate of 150 kg/ha was achieved in 5 variants with an average grain yield of 19.3 c/ha.

Oyjamol variety yielded an average of 12.2 c/ha in the non-nitrogen fertilizer (control) variant, 14.6 c/ha in 2 variants with 60 kg/ha nitrogen fertilizer, 16 kg in 3 variants with 90 kg/ha nitrogen fertilizer. 7 c/ha, nitrogen fertilizer rate 120 kg/ha in 4 variants 18.4 c/ha, nitrogen fertilizer rate 150 kg/ha in 5 variants 18.8 c/ha, Selekt-201 nitrogen fertilizer not applied (control) The average yield of grain was 4.0 c/ha, the norm of nitrogen fertilizer was 60 kg/ha in 6 variants of 6.2 c/ha, the norm of nitrogen fertilizer was 90 kg/ha in 7 variants of 7.7 c/ha, the norm of nitrogen fertilizer was 120 kg/ha in 4 variants 9.1 c/ha, nitrogen fertilizer rate 150 kg/ha in 5 variants 9.6 c/ha, in the case of non-nitrogen fertilizer of Amigo variety (control) the average grain yield was 4.3 c/ha, nitrogen fertilizer rate was 60 kg/ha in 2 variants 6.1 c/ha, nitrogen fertilizer rate was 90 kg/ha in 3 variants 7.9 c/ha, nitrogen fertilizer rate was 120 kg/ha in 4 variants 9.0 c/ha, the grain yield was 9.7 c/ha in 5 variants with the application rate of 150 kg/ha.

The results of the experiment show that with the increase in the amount of nitrogen fertilizer applied to all varieties of soybeans, an increase in the average grain yield from soybean varieties was observed. Soybean varieties Tomaris Man-60, Oyjamol, Selekt-201, Amigo averaged 2.4 in 2 variants with 60 kg of nitrogen fertilizer per hectare compared to the variant without nitrogen fertilizer; 2.4; 2.4; 2.2; 1.8 centners of grain was harvested, in the remaining variants the rate of nitrogen fertilizer was increased from 30 kg per hectare to 1.7 in 3 variants, respectively, compared to 2 variants; 2.1; 1.5; 1.8 quintals, 3.5 in varieties according to 2 variants in 4 variants; 3.8; 2.8; 2.9 quintals, 4.0 according to varieties compared to 2 variants in 5 variants; 4.0; 4.4; 3.4; 3.6 centners of grain was grown.

According to the results of 3-year field experiments, when the annual nitrogen fertilizer rate was given during the mowing and flowering stages of the plant, the Tomaris Man-60 variety yielded an average of 18.8 c/ha of grain in 4 variants given pure nitrogen fertilizer at 120 kg/ha. In the 5 variants of the experiment, the norm of nitrogen fertilizer was 30 kg more than in the 4 variants, but the additional grain yield per hectare was only 0.5 quintals.

Therefore, it was found that the application of nitrogen fertilizer rate of 120 kg/ha in the conditions of the Northern region (Karakalpakstan) is the most cost-effective among the options for planting in the main area for Tomaris Man-60 variety.

When feeding Oyjamol variety, the average yield was 18.4 c/ha in 4 variants with 120 kg/ha of pure nitrogen fertilizer, and 18.8 c/ha with 150 kg of nitrogen fertilizer in 5

variants. Although the nitrogen fertilizer rate was increased by 30 kg/ha compared to option 4 in option 5, it was found that the average grain yield obtained in addition to option 4 was 0.4 quintals higher. It was found that the application of nitrogen fertilizer at a rate of 120 kg / ha was the most cost-effective option for growing oyjamol in the main area.

An average of 9.1 c/ha was obtained in 4 variants with 120 kg/ha of pure nitrogen fertilizer and 9.6 c/ha with 150 kg of nitrogen fertilizers in 5 variants. Although the nitrogen fertilizer rate was increased by 30 kg/ha compared to option 4 in option 5, it was found that the additional grain yield obtained compared to option 4 was only 0.5 quintals more. It was found that the application of nitrogen fertilizer rate of 120 kg/ha was the most effective among the options in the cultivation of Selekt-201 cultivar in the main field.

When feeding the Amigo variety, an average of 9.0 c/ha was obtained in 4 variants with 120 kg/ha of pure nitrogen fertilizer, and an average of 9.7 c/ha with 150 kg of nitrogen fertilizer in 5 variants. Although the nitrogen fertilizer rate was increased by 30 kg/ha compared to option 4 in option 5, it was found that the additional grain yield obtained was 0.7 quintals more. Thus, the application of nitrogen fertilizer at 120 kg/ha was found to be the most effective among the options for growing the Amigo variety of soybean in the main area.

CONCLUSION

Analyzing the 3-year data obtained as a result of the experiments, we come to the following conclusions.

Early-maturing varieties Selekt-201 and Amigo are not adapted to the soil and climatic conditions of the Republic of Karakalpakstan. yielded and showed that these varieties would not be economically viable in the conditions of the northern region.

In our experiment, the norm of mineral fertilizers for soybeans is 90 kg of pure phosphorus per hectare, 60 kg of potassium per hectare, the annual rate of nitrogen fertilizers is 120 kg / ha for all varieties of soybeans in two periods during the mowing and flowering stages 18.8 c/ha, Oyjamol variety 18.4 c/ha, Selekt-201 variety 9.1 c/ha, Amigo variety 9.0 c/ha were found to be the most economically viable option.

After in-depth analysis of the results of the experiments, the planting of soybean varieties Tomaris Man-60, Oyjamol and Selekt-201 in the conditions of the Republic of Karakalpakstan is economically viable.

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EVIDENCE-BASED TEACHING STRATEGY

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ABSTRACT

Most teachers care about their students' results, and if you are reading this article, you are undoubtedly one of them. Be supported by hard research, instead of anecdotal case studies or untested theories. Have a substantially higher effect on student results than other teaching strategies. Be able to be used on a wide range of subjects and at every year level.

What evidence-based teaching strategies made it onto the list? Research shows that evidence-based teaching strategies are likely to have the largest impact on student results performance. Research shows that a few of these teaching strategies, such as holding high expectations of students, have a significant positive impact on student results.

Do not assume that a teaching strategy is no good just because it is not in the top 10 or commonly used by teachers. That said, some popular teaching strategies do not have a large effect on student results. Once you are clear about what you want your students to know and be able to do by the end of the lesson, you need to tell them what they need to know and show them how to do the tasks you want them to be able to do.

Some evidence-based teaching strategies that did not make the top 10 or are commonly used by teachers are still worth adopting. However, when you explore the thousands of research studies on the topic, it is apparent that some teaching strategies have far more impact than other teaching strategies do.

KEYWORDS: *Teaching Strategies, Research, Evidence-Based Teaching, Learning and Teaching*

EVIDENCE-BASED TEACHING STRATEGY

Evidence-Based Teaching Strategy 1: Clear Lesson Goals

You must be clear about what you want your students to learn during each lesson. Meta-cognition involves thinking about your options, your choices, and your results - and it has an even larger effect on student results than teaching strategies.

Techniques such as randomized sampling, student answer-boards, and tell-a-friend help you to check for understanding before moving on from the show and tell part of your lesson while you can use other questioning techniques at different stages of your lesson. And, just as with content, you need to tell students about these strategies, show them how to use them, and give them guided practice before asking them to use them independently.

Evidence-Based Teaching Strategy 2: Questioning to Check for Understanding

Research suggests that teachers typically spend a large amount of teaching time asking questions. If you cannot quickly and easily state what you want your students to know and be able to do at the end of a given lesson, the goal of your lesson will be unclear.

Other evidence-based teaching strategies, such as reciprocal teaching, did not make the list purely because they can only be used within a single subject. You can increase how well your students do in any subject by explicitly teaching them how to use relevant strategies. The effect that such clarity has on student results is 32% greater than the effect of holding high expectations for



every student (and holding high expectations has a sizeable effect).

When using meta-cognition your students may think about what strategies they could use before choosing one, and they may think about how effective their choice was (after reflecting on their success or lack thereof) before continuing with or changing their chosen strategy.

Evidence-Based Teaching Strategy 3: Get Students Working Together

Group work is not new, and you can see it in every classroom. Clear lesson goals help you (and your students) to focus every other aspect of your lesson on what matters most. From assignments and studying to characterization, there are strategies underpinning the effective execution of many tasks that you ask students to perform in school. Encouraging students to adopt strategies is important, but it is not meta-cognition.

Evidence-Based Teaching Strategy 4: Be Flexible About How Long It Takes to Learn.

The idea that given enough time, every student can learn is not as revolutionary as it sounds. When teaching children to read you need to teach them how to attack unknown words, as well as strategies that will deepen their comprehension. Your students should be practicing what they learned during your show and tell, which in turn should reflect your lesson goal.

When teaching them mathematics, you need to teach them problem-solving strategies. Unlike praise, which focuses on the student rather than the task, feedback provides your students with a tangible understanding of what they did well, where they are at, and how they can improve.

Evidence-Based Teaching 5: Summarize New Learning In A Graphical Way

Outlines include things such as mind maps, flow charts, and Venn diagrams. Put simply, giving feedback involves letting your students know how they have performed on a particular task along with ways that they can improve. Finally, research shows that students do

better when their teacher has them practice the same things over a spaced-out period.

For teaching strategies to be included on this list, they had to practice help students to retain the knowledge and skills that they have learned while also allowing you another opportunity to check for understanding.

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ONLINE FRAUD DETECTION

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ABSTRACT

In today's fast moving world as the demand of the internet is increasing with this cyber-attacks are also increasing and Phishing is one the most common cyberattack among them. Taking a user's personal information such as credit card numbers, login details, confidential info, and so on through illegitimate activities of using the internet without the user's knowledge and using it for blackmailing, debiting money from the user's account, or any other purpose with the wrong intentions is known as phishing. In phishing attack, a phisher or attacker pretends to be masquerade as a known person or organization to the user and sends the mails or messages which contains malicious links in them and these malicious links contains harmful software's or viruses which steals the user's computer data, financial data, login credentials such as User ID and passwords, credit card details, etc. Phishing is the most common and dangerous cyberattack which is growing in the today's world. Nowadays phishers are working smartly they are using the new techniques for creating the malicious links and embeds them in the emails and messages and sends it to the user which looks similar to the trusted mail or message to the user and as soon as the user clicks on the malicious link it redirects the user to the malicious webpage or runs the harmful software in the backend while the user is reading the email or message and takes over the control of the user's computer and steals all data of the user's computer. Due to a speedy development inside the digital commerce generation, the usage of credit playing cards has dramatically extended. In view that credit card is the most popular mode of fee, the number of fraud instances related to it is also rising. As a result, in order to prevent these frauds, we need an excellent fraud detection system that can detect them correctly. We created the idea of credit card frauds in this paper, and we used a variety of device learning methods on an unbalanced dataset, including logistic regression, naivebayes, and random wooden area with ensemble classifiers using the boosting approach. An in-depth analysis of the existing and proposed models for credit card fraud detection has been completed, as well as a comparison of these tactics. So one of a kind classification models are applied to the statistics and the model performance is evaluated on the basis of quantitative measurements which include accuracy, precision, recollect, f1 score, confusion matrix. The realization of out observe explains the first class classifier via schooling and trying out using supervised strategies that offers better answer.

KEYWORDS: *phishing, credit card, cyberattack, malicious, detection, webpage.*

I. INTRODUCTION

Annually, phishing websites cost web users, businesses, and organisations tens of billions. because they steal their personal data, financial data, login credentials such as User Id's and passwords, as a result these companies and organizations are going into loss which affects not only the company but also it affects more badly to their employees because they lose their jobs when any company goes into loss. In the current Covid-19 pandemic the use of the internet has increased very rapidly as a result all the physical activities such as official meetings, classes, shopping, financial activities, etc. shifted from physical mode to online mode

which gives the opportunities to phishers to attack on the user's data. Companies are also promoting work from home due to the guidelines of the government, schools and colleges has shifted offline classes to online mode to avoid mass gathering and for safety reasons, in fact every sector is working in online mode which increases the cyberattacks and most common and dangerous one is the phishing attacks. In phishing attack phishers or attackers sends emails and messages to the user's and pretends as if they are from a genuine organization or a person and as soon as the victim clicks on that email or message which contains malicious links it starts their process in their backend or redirects the user to the some other page which contains some type of forms which



asks for the user's identity and as soon as user's fills all the details including credit card details all the information of the user goes to the attacker who uses this information for blackmailing purpose and flushes all the money from the user's account and the victim loses all his/her hard earned money in just a minute. Nowadays it is becoming difficult even for the cybercrime department to track the phisher or keep track on phishers because they are also smart enough because they are also engineer's and well educated persons who are having a good knowledge of computer's and new technologies and they create those kind of malicious links which looks similar to a genuine website and hard to detect whether it's a genuine or a fake one. As a result for the detection of these type of links it becomes more important to use new kind of approach which can detect these links which can't be detected by the older approach. Detection of phishing websites is not an easy task because URLs are altered in a variety of ways, including shortened URLs, link redirections, and modifying links to make them appear trustworthy, to name a few. This necessitated a shift away from traditional programming methods and toward machine learning. In recent years, humans have been concerned about the winning statistics mining model, which is mostly based on statistics mining. Classification data mining algorithms aren't immediately appropriate because our problem is handled as a type problem. Supervised learning algorithms are evolutionary algorithms that aim to provide better results as time goes on. Credit card is the most popular mode of price because the number of credit card users is rising very hugely, the identity robbery is multiplied, and frauds also are increasing, within the virtual card purchase, best the card record is needed which includes card variety, expiration date, comfortable code, and so forth. Such purchases are commonly achieved on the net or over phone. To commit fraud in those forms of purchases, a individual surely desires to know the card information, The mode of charge for online buy is in general achieved by using credit score card. The information of credit card need to be saved personal. To secure credit score card privateness, the details ought to now to be leaked. Exceptional ways to scouse borrow credit score card information are phishing sites, steal/lost credit score playing cards, counterfeit credit score cards, robbery of card info, intercepted cards and many others. For security reasons, the above matters need to be averted. The purchase is made remote best the card's data are wished in online fraud. At the time of purchase, a guided signature, a PIN, or a card imprint are not required. In maximum of the cases the real card holder is not conscious that someone else has seen or stolen his/her card records. The simple manner to locate this sort of fraud is to analyze the spending styles on every card and to figure out any variant to the traditional spending patterns. Fraud detection by analyzing the existing facts purchase of cardholder is the first class manner to decrease the rate of a success credit score frauds. Because these facts sets aren't available and additionally the outcomes are not disclosed to the public. The fraud cases should be the detected from the available record sets referred to as the logged records and person conduct. At present, the online fraud detection has been implemented by using some of techniques including information mining, records and

synthetic intelligence.

II. PHISHING DETECTION USING URL

As we are all aware about the vast usage of internet which involves browser surfing (visiting websites). This is one of the major reasons where phishers target to steal personal information of user. Different types of algorithms are employed to prevent various kind of attacks (ML algorithms).

A. PHISHING

Phishing is a form of cyber bullying in which phishers obtain the user's credentials without their knowledge. It is a combination of technology and social engineering that is used to collect personal and private information such as credit card numbers and other financial information. There are various ways of cyber attacks using phishing, some of them are listed below:

1. An illegal website is created which resembles just like original website.
2. Phishers sends various text messages in name of verified sender along with that phishing website link, and user unknowingly visits their website.
3. The user accesses the website and provides his or her personal information by clicking on the link provided by the sender.
4. Phishers then use that information in carrying out other illegal stuffs.

B. APPROACH TO MACHINE LEARNING

In this approach, URL features are obtained and used to determine whether a website is phishing or not. In this various ML algorithms are used which work on features extracted from URL.

1. Naïve Bayes algorithm

The Nave Bayes algorithm is a supervised machine learning method used mostly for classification tasks. A machine learning model known as Nave Bayes is utilised to make fast predictions. It predicts the result based on the likelihood of the thing. Because it uses the Bayes' Theorem principle, it's called Bayes. The Nave Bayes method is a machine learning approach for forecasting a set of datasets that is straightforward to implement.

It can be used to classify binary and multi-class data. It's a popular tool for text classification. Credit rating, spam detection, and medical data classification are just a few of the applications.

2. K-Nearest Neighbor Algorithm

K-Nearest Neighbors is a type of supervised learning method that is based on the simplest machine learning algorithms. The K-Nearest technique is utilised in a variety of applications, including data mining, pattern recognition, and intrusion detection. The K-nearest approach can be used to tackle both classification and regression issues. K-Nearest Neighbor is built on the measure of similarity, and it stores all available examples before generating a new set of cases based on the



similarity measure.

Because it uses all available data for training purposes during classification, K-Nearest Neighbors is also known as the Lazy Learning Algorithm. KNN is utilized in regions where there is significant domain knowledge, which is why it is employed in applications that require high accuracy. When a big collection of training data is available, KNN can be employed efficiently.

3. Decision Tree Algorithm

The category of Supervised machine learning algorithms includes decision trees. It can be used to tackle problems involving classification and regression. In a decision tree, there are two sorts of nodes: Decision Node and Leaf Node. Decisions have several branches and are used to make decisions, whereas Leaf Nodes have no branches and indicate the decisions' result. The structure of a Decision tree is similar to that of a tree, which is why it is called a Decision tree. It features a root node that has many branches and resembles a tree.

The decision tree is simple to comprehend because it makes decisions in the same way that humans do. If-else conditions are comparable to decision trees. It tests the condition first, and if it's true, it moves on to the next node, which makes the prediction.

4. Random Forest Algorithm

The Random Forest method is based on the technique of Supervised Machine Learning. It's utilised for both classification and regression problems. Random forest creates decision trees from a variety of datasets and then votes on the best answer from those trees. Random forest chooses a variety of random samples from the dataset. Then it constructs a decision tree for each sample and obtains the predicted result for each decision tree, votes on those predicted results, and finally chooses the most voted forecast result as the final result. In this approach, it is able to forecast the outcomes with more precision. It solves the problem of overfitting by averaging the different decision trees.

Random forest is capable of handling extremely huge datasets. In circumstances where a major amount of the data is absent, random forest produces accurate results.

5. Support Vector Machine Algorithm

The Support Vector Machine is based on the Supervised Machine Learning algorithm, which is used for both classification and regression of issues. SVM creates a decision boundary that divides the n-dimensional space into

classes, making it easier to categorise new data points later. A Hyperplane is the name for this decision boundary. SVM selects extreme points to aid in the construction of the hyperplane. Support vectors represent the extreme examples, which is why the technique is called Support Vector Machine.

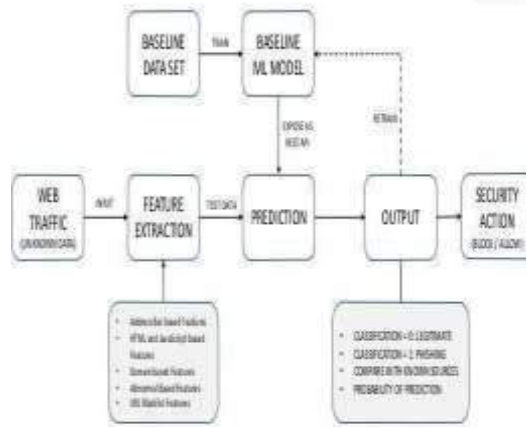
Because it uses a subset of training points in the decision function known as support vectors, SVM is a memory-efficient approach. SVM provides high-accuracy findings and works well in high-dimensional spaces.

III. PROPOSED WORK

1. Developing a browser plugin that can track all of a user's system traffic (http). We developed a browser extension rather than software or an application to ensure that the system is entirely real-time. [1]
2. The next stage is a comparison-based task in which the URL is compared to URLs on the whitelist and blacklist. Web scraping will be utilised to extract the data for these lists on the fly. If the URL's domain falls into the whitelist category, mark it as safe; otherwise, proceed to the next step and use other methods. [1]
3. The website will now be thoroughly examined utilising the various functionalities. We used the following features: URL length, favicon similarity, website registration and expiration dates, number of @ symbols used in the URL, number of dots used in the URL, website protocol (secure or unsecured), number of hyphens (-) used in the URL, and whether the URL uses direct IP address or not. [1]
4. If the hyphen in the URL equals 1, the website is suspect. If the URL < 1 has a hyphen, it is a legitimate website. Because attackers increasingly design malicious webpage that seem like trusted web pages, we extract and compare the CSS of the suspicious URL with the CSS of the real URL in the next technique. [1]
5. Then we apply random forest, decision tree, and logic regression machine learning algorithms to the collected data to generate the score. [1]
6. Then we calculate the similarity and match score, and if it is more than the threshold, the URL is marked as phishing and blocked.
7. The aforementioned technique is more efficient, precise, and safe than any other initial solution since it creates a three-level security barrier.



ARCHITECTURE / WORKFLOW



IV. ANALYSIS PHASE

The following are the detailed rules that we devised as a result of our research:

1. Domain length in URL
If the length is between 3 and 20, it is considered genuine.
If the length is between 20 and 24, be cautious. If the length exceeds 24, it has been phished. [1]
2. The @ sign in the domain
If the amount of @ symbols is zero, the website is real; otherwise, it has been phished.. [1]
3. The keyword "http" is used between domains.
If "http" appears in the domain, it is phished; else, it is legal. [1]
4. Is there a protocol?
If yes, it is legitimate; otherwise, it is suspect. [1]
5. If the time gap between the expiration date and the date of registration on the website is higher than 90 days, the website is legitimate; otherwise, it is suspect. [1]
6. IP Address (Direct)
If the URL contains a numeric value in IP address, it is suspect; otherwise, it is valid.
7. In a domain, the number of hyphens is
If the number of hyphens is zero, the website is real; otherwise, it has been phished.
8. Google indexing for favicon similarity
The website has been phished if the favicons of the two websites are identical but the domain of the URL is distinct.

CONCLUSION

The suggested system, which is built using the above approaches, is safer and more effective than prior systems since it allows the user to safely surf the web and all transactions conducted by the user using the above system are secure. The above system ensures that the user's private information is kept private. It is much easier to provide our proposed system to users in the form of browser extensions. Because we applied machine learning algorithms, the proposed solution is extremely efficient. The attackers are continually devising new techniques to counter our proposed solution, which is one special issue.

To solve this challenge, we need new algorithms that can adapt to the characteristics of phishing URLs. The system that will be created with the above algorithms will be more precise. The system will be more accurate, efficient, and secure and protected if all of these diverse ways are combined. The weaknesses in the system can be solved by giving a much richer characteristic to the machine learning model, which would result in much greater accuracy.

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EFFECTS OF LADDER AND PLYOMETRIC TRAINING ON AGILITY AMONG CRICKET PLAYERS

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ABSTRACT

The purpose of the study was to investigate the effects of ladder and plyometric training on agility among cricket players. To assist the study, thirty cricket players from V.C.V. Shishu Vidyodaya Matric. Hr. Sec. School, Coimbatore, Tamilnadu, India were selected as subjects at random and their ages between 13 to 16 years. The subjects were separated into three equal groups. Group-I performed ladder training, group-II performed plyometric training and group-III was control. Agility was assessed by Illinois agility run test. The subjects were involved with their respective training for a period of six weeks. At the end of the six weeks of the training post-tests were taken. The significant differences between the means of experimental group and control group for the pre-test and post-test scores were determined by paired 't' ratio and ANCOVA. The level of significance was fixed at 0.05 level of confidence for the degree of freedom 14. The ladder training and plyometric group produced significant improvement in agility. The 'f' values of the selected variables have reached the significant level. In the control group the obtained 'f' value on agility were failed to reach the significant level.

KEY WORDS: Agility, Ladder, Plyometric & cricket players.

INTRODUCTION

A ladder is an outstanding piece of training equipment and is useful to enhance body control and agility and increase the foot speed. For this training need not to go out and purchase the own Ladder, it is just as easy to use throw-down lines and as far as juniors are concerned, they may be found to be enhanced as there is no chance of their getting tangled up in the Ladder. The added advantage of lines is that the distance between them can be changed to suit various exercise patterns. Using a building block system of skill development is very important to achieve success in training with a Ladder. The training start with general expansion up to advanced skill development, from a full range of motion to smaller, quicker movements. Keeping in mind the principle of working from slow and controlled movements and moving onto fast, explosive movements as a teaching and learning progression will have a greater amount of success.

Plyometrics is the term given to exercises designed to increase the power of an athlete. It is defined as the equal of explosive strength and referred to by others as "speed-strength". In layman's terms, the aim of plyometrics is to increase the explosiveness of the muscle allowing an athlete to run faster, jump further, or generate force at a greater rate. Plyometric training is a form of training that is used to help develop and enhance explosive power, which is a vital component in a number of athletic performances. This training method is meant to be used with other power development methods in a complete training program to improve the relationship between maximum strength and explosive power.

The modern history of Plyometrics is somewhat brief but not relatively new. This technique was originated in Russia and Eastern Europe in the middle of 1960. The Soviets were very successful in the use of Plyometrics in their training programmes, especially in track and field. This technique was originally known as the "Shock Method of Training". Yuri Verhoshansky, a Russian coach whose success with jumpers is legendary, could very well be called the "Father of Plyometrics". He had tried and succeeded in increasing his athletes' reactive abilities by experimenting with exercises like the depth jump. He has been the leading researcher and coach most recognized with the spread of Plyometrics. He also has been credited with most of the forms of plyometric training that are still in use today (Coetzee, 2007).

METHODOLOGY

The reason of the study was to investigate the effects of ladder and plyometric training on agility among cricket players. To assist the study, thirty cricket players from V.C.V. Shishu Vidyodaya Matric. Hr. Sec. School, Coimbatore, Tamilnadu, India were selected as subjects at random and their ages between 13 to 16 years. The subjects were separated into three equal groups. Group-I performed ladder training, group-II performed plyometric training and group-III was control. Agility was assessed by Illinois agility run test. The subjects were involved with their respective training for a period of six weeks. At the end of the six weeks of the training post-tests were taken. The significant differences between the means of experimental group and control group for the pre-test and



post-test scores were determined by paired ‘t’ ratio and ANCOVA. The level of significance was fixed at 0.05 level of confidence for the degree of freedom 14.

RESULTS

Table 1: Descriptive Analysis of the Data on Agility

Name of the Group	Testing Period	Mean Score	SD	MD	Obtained ‘t’ Ratio	Magnitude of Changes
Ladder Training Group	Pre	18.25	0.93	2.04	4.91*	11.11
	Post	16.21	0.38			
Plyometric Training Group	Pre	18.14	0.75	1.67	3.84*	9.20
	Post	16.47	0.54			
Control Group (CG)	Pre	18.21	1.01	0.06	0.39	0.32
	Post	18.15	1.06			

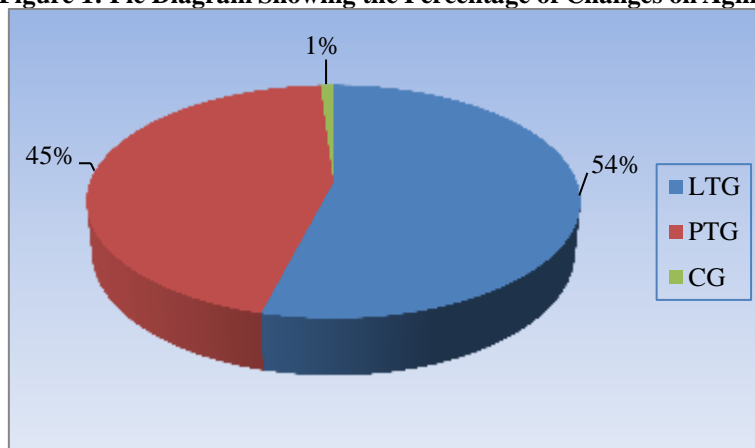
Table Value for 11 degrees of freedom is 2. 20

*Significant at 0.05 level of significance

Table-1 shows that the obtained ‘t’ values 4.91, 3.84 and 0.39 respectively of the ladder, plyometric and control groups are higher than the table value (2.14) required for significant at 0.05 level for 14 degrees of freedom. It exposed that significant mean differences existed on agility between the pre and post test scores of experimental groups. On the other hand, insignificant differences were found between the pre test and post test means of control group on agility as, the

obtained ‘t’ value 0.39 is lesser than the table value (2.14) required for significance. The result of the study produced 11.11%, 9.20% and 0.32% of improvement due to ladder, plyometric and control group on agility. The magnitude of changes on agility of ladder, plyometric and control groups are graphically shown in figure I for superior understanding.

Figure 1: Pie Diagram Showing the Percentage of Changes on Agility



The data collected from the three groups on agility was statistically analyzed by ANCOVA and the outcomes are presented in table 2

Table 2: Analysis of Covariance on Agility of Experimental and Control Groups

	Ladder Training	Plyometric Training	Control Group	S o v	SS	df	MS	Obtained ‘F’ ratio
Pretest Mean	18.25	18.14	18.21	B	0.21	2	0.10	0.13
SD	0.93	0.75	1.01	W	32.17	42	0.76	
Posttest Mean	16.21	16.47	18.15	B	11.06	2	5.53	7.00*
SD	0.38	0.54	1.06	W	33.18	42	0.79	
Adjusted Posttest Mean	16.17	16.45	18.13	B	11.35	2	5.67	7.12*
				W	32.64	41	0.79	

(Table value for df 2 & 42 and 2 & 41 is 3.21 & 3.22)

*Significant at 0.05 level



Table-2 reveals that the indicated that the obtained F-ratio for the pre-test means among the groups on agility were 18.25 for experimental group – I, 18.14 for experimental group – II and 18.21 for control group. The obtained F-ratio 0.13 was lesser than the table F-ratio 3.21. Hence the pre-test mean F-ratio was insignificant at 0.05 level of significance for the degree of freedom 2 and 42. The post-test means were 16.21 for experimental group – I, 16.47 for experimental group – II and 18.15 for control group. The obtained F-ratio was higher than the table F-ratio 3.21. Hence the post-test mean F-ratio was significant at 0.05

level of confidence for the degree of freedom 2 and 42. The adjusted post-test means were 16.17 for experimental group – I, 16.45 experimental groups – II and 18.13 for control group. The obtained F-ratio 7.12 was higher than the table F-ratio 3.22. Hence the adjusted post-test mean F-ratio was significant at 0.05 level of confidence for the degree of freedom 2 and 41. It was concluded that there was a significant mean difference among ladder training group, plyometric training group and control group, in developing agility of the cricket players.

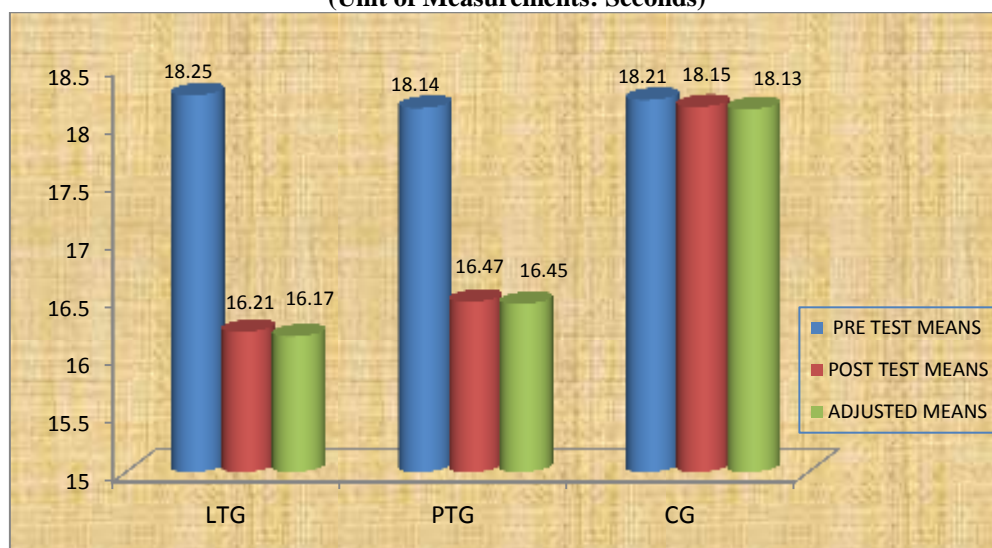
Table 3: Scheffe’s Post Hoc Test on Agility of Experimental and Control Groups

Ladder Training	Plyometric Training	Control Group	MD	C I
16.17	16.45	--	0.28	0.98
16.17	--	18.13	1.96*	0.98
--	16.45	18.13	1.68*	0.98

Table-3 shows the post hoc analysis obtained on adjusted post test means. The mean difference required for the confidential interval to be significant was 0.98. It was

observed that the ladder training and plyometric training group significantly improved agility better than the control group.

Figure 2: Graphical Representation of the Mean Values on Agility of Ladder, Plyometric and Control Groups (Unit of Measurements: Seconds)



DISCUSSION ON FINDINGS

The result of the study indicates that the experimental group namely ladder training group and plyometric training group had shown significant enhancement in agility among the cricket players. The control group cricket players had not shown significant changes in agility. The analysis of the study indicates that the ladder and plyometric groups had shown significant level difference in agility among cricket players.

It is contingent from the literature and from the outcome of the present study. That methodically designed training develops dependent variables are very importance quilts for better performance in almost all sports and games. Hence it is concluded that systematically designed training may be programmes of all the discipline in order to achieve maximum given due recognition and implemented properly in the training performance. These findings are in accordance with the findings of **Senthil Kumaran (2021)¹**, **Abdul Halik (2021)²**, **Jenith (2021)³**, **Senthil Kumaran (2018)⁷** and **Ooraniyan (2018)⁸**

CONCLUSIONS

✚ The ladder training group produced significant improvement in agility. The 'f' values of the



selected variables have reached the significant level.

✦ The plyometric training group produced significant improvement in agility. The 'f' values of the selected variables have reached the significant level.

✦ In the control group the obtained 'f' value on agility were failed to reach the significant level.

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DATA DEDUPLICATION ON FILE SYSTEM USING FUSE

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ABSTRACT

For any organization or any of business community their data is must needed thing to take next decision or forward strategies . As just now days in market many of platforms are available which works on previous data or using previous data they can forward but there would be problem about large amount data where they can store then there would be many resource like cloud computing or etc. but using thing they have paid for these things how much they can use it. For any organization there would have same data in repeating manner but can't clarify it because of it takes more time. Apart of that as example if we had to conduct any exam in online mode and we launch the software at each computer to conduct exam it also take more time and man power and it's very complex.to elaborate all these problem which thing mention we have data deduplication on file system using fuse by these can operate many file from one computer any by we can rectify the duplicate data and solve the having by these by this whole solution here we have good advantage like less time consumption, less cost , less man power need. There have many of advantages. This task is achieved with varying degree of success through the implementation of data deduplication on file system using fuse.

KEYWORDS - Time complexity, Less storage, Fuse library, SHA-256 Algorithms, data analysis, Database, libraries, result.

I. INTRODUCTION

Data Deduplication is complicated technologies that may dramatically scale back the quantity of backup knowledge hold on by eliminating redundant knowledge.

The deduplication method needs compression {of knowledge of knowledge of information} chunks which are a singular contiguous block of data; these chunks are known and hold on throughout the method of research and compared to different chunks among existing data.

Whenever a match happens the redundant chunk is replaced with a tiny low reference that points to the hold on chunks.

It is Technology which is able to for for sure amendment maps name to associate degree object and object to file contents. as an example, a file 'abc.txt' could be a file name that maps to a file that eventually contains file knowledge. Thus, classification system provides the way to prepare, store, retrieve and maintain info with the services like open(), read(), write(), close() among several.

all the Tradition methodology to store and retrieve knowledge, as in forthcoming days storing would possibly become an enormous downside which might be simply solved exploitation knowledge Deduplication methodology up to some extent, additionally can facilitate correct knowledge storing. It Uses FUSE for writing Virtual classification system. in contrast to ancient file systems that primarily work with knowledge on mass storage, virtual filesystems do not truly store knowledge themselves.

A Filesystem manages knowledge on a ADPS. Filesystem is organized as a ranked system with directories at the highest, containing a collection of files, and a file itself being a group of information blocks. Filesystem primarily

II.LITERATURE SURVEY

B. Thakkar and B. Than Kachan [1], created a comparison of cryptanalytic algorithms like AES, RSA, IDEA, Blowfish and DES over cloud during a survey. The comparison of cryptanalytic algorithms were supported the factors of coding type, key size, block size, variety of rounds used, execution



time, memory usage and encoding capability. They concluded in their survey that interchangeable algorithms are a lot of economical. On the idea on memory usage Blowfish was best and supported coding time, AES and Blowfish were quick.

V. Radia and D. Dingh[2] made a study of data deduplication techniques: file level, block level, inline post process, source based and target based. The study concluded that source-based deduplication is best to optimize upload bandwidth and storage space over cloud. Distributed deduplication provides security and confidentiality. Both approaches together provide reliability.

N. Pachpor and P. Prasad[3], projected a new Performance-Oriented knowledge(POD) deduplication technique and conjointly made comparative analysis with different existing techniques. The new theme removes duplicate files and duplicate knowledge.

L. Suresh and M. Bharathi [4], made a study of various data deduplication techniques and issues of data deduplication on cloud storage. A new strategy was proposed that allows for fast data transfer from client to server, use of new hash algorithm and removal of duplicate data using block level deduplication.

K. Akhila et al.[5], study of various data deduplication techniques like ClouDedup, DupLESS, HEDup, and SecDup was done. Algorithms were based on convergent key method. Authors stated that a good strategy for enhanced storage optimization technique could be used.

W. Kim and I. Lee[6], have discussed various ways of data deduplications sites and level. Issues regarding secure data deduplications like data encryption, dictionary attacks and poison attacks were put forward. The authors also discussed security techniques for achieving secure deduplication like use of convergent encryption and currently used secure deduplication systems like DupLESS, ClouDedup and PerfectDedup.

A. Nair et al.[7], proposed three protocols for the process namely File uploading protocol, Integrity auditing protocol and Proof of ownership protocol. In first protocol, client generates hash for chunks of a file using SHA-1 algorithm, checks if hash already present on cloud and if found third protocol would be called. If

no hash is found on cloud, client sends chunks to auditor, where auditor creates tags for chunks, encrypts the chunks using AES algorithm and compresses it using Deflate algorithm that is combination of Huffman coding and LZ77 and later sends the tags and chunks to cloud. Second protocol is used for verifying integrity, which is done by the cloud server. Client or auditor asks for verification or establishing proof and server verifies the same. Third protocol is used to identify the ownership of the file where server verifies the client. The authors applied the scheme on file of various sizes and achieved utilization of efficient space.

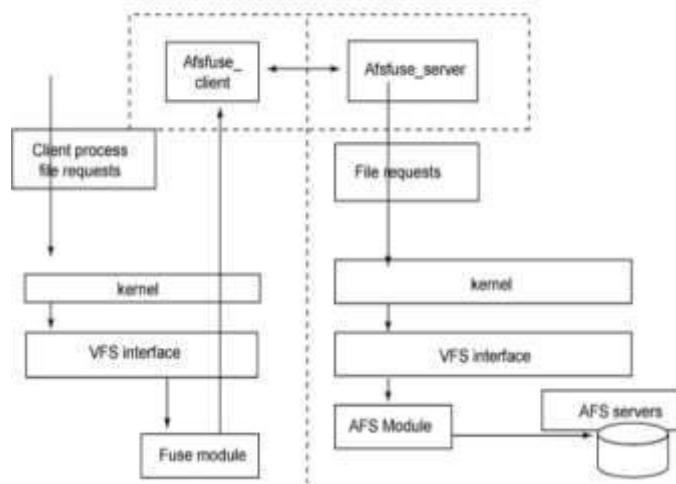
J. Malhotra and J. Bakal[8], identified various challenges of deduplication, comparison of current deduplication techniques were made based on chunking method, metadata processing and throughput. Two Threshold Two Divisor algorithm with Switch Divisor and Two Threshold Two Divisor algorithm were used on different file sizes, analysis was made on time taken for deduplication, and it was identified that Two Threshold Two Divisor algorithm with Switch Divisor takes less time. The authors proposed that throughput could be achieved by using parallelized deduplication process.

S. Sathe and N. Dongre[9], applied block level data deduplication strategy. The user registration is done before uploading of the file. The file is then fragmented into fixed size blocks. Before uploading the file, the hash value is generated using SHA-512 algorithm and this hash value is compared with already existing file fragments on cloud. If no match is found or the count of duplicate block is below a predefined threshold value, the file is uploaded on server. After the file is uploaded, it is encrypted using AES algorithm and stored. The file can be downloaded later if proper key attributes are provided. The server can also delete the file only after the owner is verified by using the policy based file assured deletion method.

III. PROPOSED SYSTEM

We have made a filesystem in fuse using python and implemented all method for filesystem and also implemented a block level data deduplication using **SHA-256** and used a back-end **MYSQL** to take backup of file. Software used Tech: Python, FUSE, MYSQL SHA-256, MYSQL-Connector Hardware used Processor: i3 4th Generation or higher, 4GB RAM, 1GB Storage.

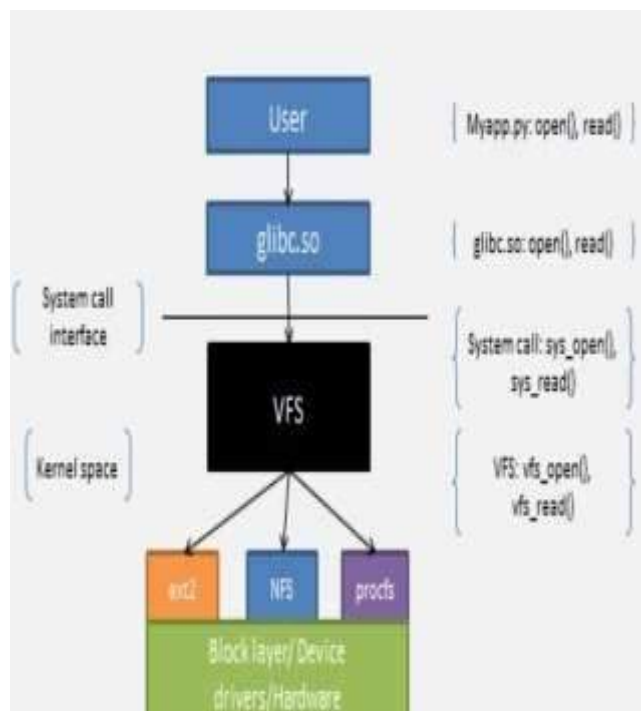
Figure 1. Overview of AFS-FUSE filesystem



File system in UNIX: Virtual Filesystem

In OS kernel, a Filesystem implementation is abstracted with a virtual Filesystem (VFS) . VFS is Associate in Nursing umbrella that acts as Associate in Nursing interface to all or any on the market (mounted) Filesystems on a system. Its major task is to: Decouple Filesystem operation from the interface - Manage Filesystem ‘mount’ - puzzle out the target Filesystem

for Associate in Nursing file I/O request and route the request - give a uniform interface (POSIX) to user application for file I/O Filesystems on *NIX system get registered with VFS with a mount purpose. What happens once a user application tries to access a file residing on (e.g. NFS partition) Filesystem? Let’s .



**Converting the kind of a folder system**

It may be necessary to possess folders during a completely different filing system that they presently exist reasons embrace to requirement for a rise within the house necessities on the far side the boundaries of the present filing system the depth of route may have to be exaggerated on the far side of restrictions to the filing system there is also performances or responsible concerns providing access to a different operating system that doesn't support the present filing system is one more reason

Migrating to a unique filing system

Migrate the disadvantage of requiring further house though it's going to be quicker the simplest case is that if there unused house on media which can contain the ultimate filing system for example to migrate a fat32 filing system They are often filled and mount at normal user thus their suitable for folder system that users favor mount by themselves for network entrance for researching archive files for demountable media etc If a fuse file system pilot collision it will not read us kernel you will notice nothing worse than io errors at application where accessing the file system Their often programme terribly rapidly there square measure fuse binding to several writing language wherever a helpful fuse file system pilot are often written in an exceedingly few hundred lines of code initial produce a brand new ext2 filing system then copy the info to the filing system Then delete the fat32 filing system different once there insufficient house to recover the first filing system till the new one is made is to use a piece space such as a removable media this takes longer however a backup of the info could be a nice aspect impact In-place conversion in some cases conversion is done in-place though migrating the filing system is a lot of conservative because it involves a making a duplicate of the info and is suggested on windows fat and fat32 file systems is regenerate to ntfs via the convert exe utility however not the reverse on Linux ext2 is regenerate to ext3 and regenerate back and ext3 is regenerate to ext4 but not back and each ext3 and ext4 is regenerate to and regenerate back till the undo info is deleted these conversions area unit doable because of victimization identical format for the file information itself and relocating the data into empty house in some cases victimization support. We implemented Data deduplication by using these two types of method

File Level Data Deduplication

As the title it totally works on only files. In this method comparing the file with existing file and after that if their match occur with existing files then it eliminate it otherwise it store the file on cloud File Level Data Deduplication only works on files not works on data so that it can't eliminate all duplicate value

Block Level Data Deduplication

As it name totally works on blocks and the blocks "files divided into small chunks is called blocks" here blocks compare with existing blocks over cloud if the match occur then it store otherwise remove the similar data. This technique takes more time but it completely remove the duplicate value.

The implementation follows these steps

Step 1: we install fuse python: pip install fuse

Step 2: we have install mysql connector: pip install mysql connector

Step 3: database setup

We CREATE DATABASE mydb;

```
CREATE TABLE mytable(key VARCHAR(64) PRIMARY KEY, blocks CHAR(4096));
```

IV RESULT

Unix file system square measure historically enforced within to kernel fuse permits filesystems to be enforced by user program In kernel folder systems square measure higher fitted to leading file systems for a plan and data

There are often used on field boot method that plan implement a fuse file system should be loaded from somewhere.

They are additional sturdy in this it will not get far because of a method blooming or being killed by error.

They are somewhat quicker fuse filesystems produce extra blessings principally revolves around their pliability

They are often deploy terribly rapidly each as a result of there's no want for administrate os interfaces to put in it and since they'll be moved simply between os There aren't any permit problems associated with being fixed connected with kernel has effects on





V. CONCLUSION

We have described the operation, performance, and convenience of a transparent, adaptive mechanism for file system discovery and replacement. The adaptiveness of the method lies in the fact that a file service client no longer depends solely on a static description of where to find various file systems, but instead can invoke a resource location protocol to inspect the local area for file systems to replace the ones it already has. The observation that file system switching might be needed and useful. The idea of an automatically self-reconfiguring file service, and of basing the reconfiguration on measured performance. Quantification of the heuristics for triggering a search for a replacement file system. The realization that a "hot replacement" mechanism should not be difficult to implement in an NFS/ vnodes setting, and the implementation of such a mechanism

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CONTENT ANALYSIS

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ABSTRACT

This article tells you about the advantages and disadvantages of content analysis and its types of sub-categories. The research function provides codes for words or phrases. It is presented here to analyze its qualitative and quantitative methods. The sub-categories and steps included in both the methods are explained in detail here. This article will be of great help to researchers in analyzing content in research work.

KEYWORDS: *Content, Analysis, Quantitative, Conceptual, Qualitative, Relational*

INTRODUCTION

The journey of basic tools or content or analysis is described as a scientific study of the material. The term content analysis is 6 years old. It is listed in 181 by the English language dictionary. Bernard Berelson published Content Analysis in the 19th Communication research. The discovery was also welcomed by media researchers as a tool and technique useful in all aspects of the social sciences. It was also adopted by some scholars for historical and political research (Holsti, 1968). This method became the choice of more and more people in the field of social sciences. After World War II a completely scientific method of material analysis was developed. Launched a project led by Harold Lasswell to evaluate enemy propaganda by the US government. Participated in the problems noted by this project. One book that emerged from this project was the 1940s (Lasswell et al. 1965). The language of politics he used is still a classic today. Timeliness This method of material analysis spreads to other branches. (Woodrum, 1984).

TYPES OF CONTENT ANALYSIS

The pervasive analysis of the concepts can be considered the frequency of the concepts. It can be conceptualized. It is represented by pictures and words. The words are common here. It is important to have the idea that synonyms are analyzed against words. It is not necessary that where there are identical words, then they are synonymous. You should not do analysis according to any such hypothesis. Each document is independent. So you may also have related words freedom, and liberation words. On the contrary, Relation Analysis goes one step further. The relationship between the concepts in the previous text. By examining it and appearing next to the word in the relationship, it is called the relative word. Let us analyze its investigation. E.g. Determine related concepts based on what words appear in the next topic.

(1) QUANTITATIVE OR CONCEPTUAL ANALYSIS

In this analysis, a single concept is determined and considered. It is analyzed. E.g. Exam. The standard of attendance is determined in the analysis. And its calculation is included. Which we also call the analysis of subjects. The occurrence of the selected words within the text can also be a word, a synonym. Or a concept that is unexpressed using a range of different words. Thus, identifying the second category is a bit difficult.

CONTENT ANALYSIS METHODS OF QUANTITATIVE OR CONCEPTUAL ANALYSIS

In this method, the analysis begins with the identification of the questions. Samples are selected. Texts are requested and placed in it. Content is coded in different categories. The researcher pays attention to it by coding phrases, words, and words. Can reduce text. This is why it is also known as the selective reduction method. For example, specific words that indicate a research question. An example of quantitative or conceptual analysis would be to do many other tests. Library website and to code them for the existence of certain words.

For example, "online learning" may use the information needed to check web pages that relate to it, to check the number of keywords for answers. The researcher will not be interested in examining "online learning" and how they relate to other concepts but only in the introduction. In this analysis, the researcher checks the presence with support. The presence of positive or negative in his research questions is strong. Words used in relation to the proposed questions Once the research question has been decided, the researcher can choose the coding of the eight categories indicated (Carley, 1992).

The eight categories are as follows for coding steps.

- 1) Determine the level of analysis.
- 2) Decide how many concepts to code.
- 3) Decide whether to code for concept or frequency.



- 4) Decide how you will differentiate between the concepts.
- 5) Develop rules for coding your texts.
- 6) Decide what to do with "irrelevant" information.
- 7) Code the texts.
- 8) Analyse your results.

1) Determine the level of analysis

The level of analysis must first be determined. The word or phrase that chooses the coding is called the level of analysis. Researchers create code for the word to continue.

For example, the phrase "Edu7" for "online education".

2) Decide how many concepts to code

Once the concept is decided it decides how the other concept should be considered. It should be a pre-defined and favorable level when determining the range. It is then necessary to decide. The researcher should be allowed to select the category if he/she feels related to another category. Along with this, it should also be decided whether each word that appears in the content analysis should be coded or what qualitative aspects should be considered, and which words should be considered.

3) Decide whether to determine the code for frequency or for the existence of the concept.

Another important decision that the researcher has to make is to count the words. The concept of frequency or cluster of words. The word in question leads to finite if it counts frequency. Can get a perspective of the concept.

For example, "Education" is very comprehensive and offers perspective. But if we consider the words "e-learning" we understand that it is about online education.

4) The researcher has to decide how to distinguish between the decided concepts.

Whether the concepts are coded exactly as they appear or when they appear, the same can be recorded.

For example: "Learning" may appear as education. The researcher needs to determine if the two mean the same thing. So that both can be placed in different categories.

5) Develop rules for calling your texts

The process is thoughtful. After generalizing the concepts, the researcher will want to think and create different translation rules. Allows making systematic and proper arrangement of numbers and words. What exactly is it to understand coded words. For which he has coded. Developing a set of rules gives the researcher accuracy or coding.

For example, "online learning" and "offline learning" are different categories. Can't put the first under the second. Because it will break the rule. Making rules can help a person understand their relationships. The importance and relevance of their meaning and use are gained. Because of the classification schemes, they are consistent in the codification of the terms.

6) Decide what to do with irrelevant information

The researcher has to decide if there is any irrelevance in the findings, keep it or delete it or repeat the process. Some words are unnecessary. We have to let it go. Such as, 'and', 'no', etc. Deleting them does not affect the outcome.

7) Code the texts

Let's codify the word. The next step is to code. The researcher himself has to do this. Read manually and write concept events using a computer. The computer analyses the given material. And not only can code be based on information but errors can be more easily identified by the researcher. This problem is exacerbated when coding for more in-depth, implicit, where specific series preparation is required.

8) Analyse your results:

The researcher should draw conclusions from the data after coding, but should also first decide whether to retain or delete or re-encode information that is not coded. Once this is done conclude by looking at trends, findings, and results.

For example, one might say that technology is used in education. What has changed in education?

QUALITATIVE OR RELATED ANALYSIS

Extension of quantitative analysis means qualitative or relative analysis. The concepts that have been identified. Exploring the relationship between them. A relative analysis is also known as semantic analysis. In other words, the focus analysis of a relationship is to look at the relationship in a meaningful way. Everyone's concepts are seen as having no natural meaning. Instead, meaning is production. Linguistics and cognitive science are the two main theoretical approaches to looking at the relationship between concepts in the text in such depth. To analyse qualitative content.

A) Linguistic approach to content analysis focuses on the analysis of texts. Level of the linguistic unit, usually one clause unit. One such example is Gottschalk's (1995) research. Who created a process run by himself? This process analyses each clause in the text and assigns it a numerical score based on several. Emotional / mental scales.

B) Cognitive Science

Approaches derived from cognitive science include decision-making. Maps and mental model decision maps try to show the relationship. Beliefs, attitudes, thoughts, and information obtained by the author can be logically represented when it comes to making decisions within the text. Causal, sequential, mathematical, and inferential relationships are usually two, one study comparing these links. This is analysed as a network.

This method is further called general cognitive mapping. Cognitive scientists state that there are groups or networks of interrelated concepts. Which we call content analysis. Which is quantitative in the brain in the conscious or semantic state. These qualitative aspects form the inner mental structures. The reason is people's speculation. Gathers information around them. The mental model is more specific. Ideological entities



can be analysed numerically and graphically due to measurement approaches.

Semantic Net falls into this category:

- 1) Identification of concepts
- 2) To define the types of relationships
- 3) Coding of text based on (1) and (2)
- 4) Coding of statements
- 5) Graphically displayed and numerical analysis of the resulting map.

RELATIONAL ANALYSIS: AN OVERVIEW

The basic objective of qualitative analysis is to understand and identify the concept in question and then its size. The smaller the size, the lower the results and reliability. And if there is a large size then relevant information is required. Which will be given for clarification in the result. The use of rigorous statistical techniques is very helpful in analysis and computer qualitative.

The steps for conducting qualitative or relative analysis are the following insane qualitative analysis.

- A) Identify the question.
- B) Select the sample or samples for analysis.
- C) Determine the type of analysis.
- D) Decrease text into categories and code for words or patterns.
- E) Explore the relationship between concepts. (Power, signal, and direction).
- F) Code relationships.
- G) Do statistical analysis.
- H) Make a map of the representative.

A) Identify the question

The first question to identify is. Advance planning provides guidance to the researcher throughout the process. Often provides guidance. Often the analysis becomes difficult. Because so many interpretations are possible. Content analysis for a similar observation, what information is requested from the example of previous library web pages and from the library site.

B) Select samples for analysis

Once the question has been identified, select the sample or samples for analysis. The material attached to the sample should be preserved and care should be taken not to exceed the limit. The researcher has come up with extensive and overwhelming results in the coding process. Take special care of it.

C) Determine the type of analysis

Decide what type of sample it is after the analysis work or if you want to check the types of relationships. There can be many additional categories in the analysis of relationships. There are three sub-categories of relationship analysis which are as follows.

A. Affects extraction

What will be the mental level of the writer or speaker? It is very difficult to confirm. The writer or the speaker is convinced by his behaviour. Psychological scales of numerical

value, with their corresponding sentiments, apply to their well-known ideas. The statistics are then checked.

B. Proximity analysis

A string is known as a window. Window documents are used to scan coincidences that represent a concept. The concepts are then shown a matrix from all interrelated concepts. Known as the concept matrix. This technique is also problematic. This is because the window only records clear concepts and treatments. This means it's about to be the most delusional time of the year, as well. Other techniques such as clustering, scaling, and grouping are also useful in proximity analysis.

C. Cognitive mapping

This approach attempts to go one step further than previous approaches. This relationship allows for further analysis of the two results. By presenting these relationships in terms of comparison, effective and proximal analysis work attempts to model the overall meaning of cognitive mapping in the preserved order of the main text. Text can be represented in a graphic map. Which represents relationships with concepts. He compares the semantic connections in each of the books. This helps in understanding the possible meanings of the texts. And diversify. The researcher's mental outlook becomes possible. It is necessary to review the text as the subcategory of analysis is selected. The researcher must decide whether to code for the level of analysis or to code for a set of words or phrases.

D) Reduce texts to categories and codes for words or patterns

The next step in qualitative and quantitative aspects is to determine the category. Words are to be codified. As we have to do in quantitative analysis the basic conditions are removed. Thesaurus can be used to remove the ambiguity of words when there is ambiguity in the problem in synonyms or synonyms. Use a supporting file or pre-existing thesaurus.

E) Explore the relationship between concepts (strength, sign, and direction)

Let us see the relationship between the concepts of words and their concepts after coding. These three factors are strength, sign, and contamination. Mainly the strength of the relationship can be expressed by these words as it should be, should be, maybe, maybe, except that the sign basically shows. As it is positive or negative. The bear and the bull are typical examples on the stock exchange. So the bull runs and runs. It shows positive while the bear shows negative. Thus the direction of the relationship is also an important factor here. This can be done in the programming language of the computer. The various related conditions are shown as if - then-else.

F) Code Relationships

There is a major difference between qualitative and quantitative. That the relationship between concepts or statements is coded or in other words, the relationship between words is identified and represented by symbols.



G) Perform statistical analysis

Quantitative analysis of qualitative or related analysis data is carried out.

H) Create a map of representation

Qualitative analysis can also be done by different theoretical approaches. Psychological modeling, decision mapping, and linguistic content analysis. The relational or qualitative analysis takes this. In addition, the statistical analysis leads to this. Representation of text in mental model i.e. mapping of text.

• Benefits of Content Analysis

It can be used for the purpose of interpreting texts for the development of expert systems. Showing the relationship between the two develops concepts based on rules or by the power of conjecture. Hence it can be used to understand human beings. Texts or written copies provide social shock among experts. Text can be analyzed both quantitatively and qualitatively. Understanding the relevance of the ancient culture can be understood from the analysis of the text. Inscriptions allow the proximity of that text. Which alternates between specific categories and analyzes the text form of statistics and relationships.

• Disadvantages of Content Analysis

A relational analysis is a matter of very high interpretation. It also has the potential to lead to inaccuracies. So far there is no sound theory in content analysis. So its accuracy may also decrease. The small form of a large concept can also give impractical losses with complex coding texts. Content analysis is criticized as a calculation of words. The context needs to be understood at the conclusion. Because of the analysed text, there can be a lot of possible interpretations.

CONCLUSION

This paper contains the information required for content analysis. Here's a look at where content analysis started, its types, sub-categories, advantages, and disadvantages. Content analysis is very useful in the field of research. The content of the words contained in it and the qualitative and quantitative analysis contained in it also provide special research to the researcher in his research work. Eight categories in conceptual or quantitative analysis which Carley (1992) is very helpful in coding selection. The qualitative or related analysis speaks to the exploration of known concepts and has two main theoretical approaches, linguistics, and cognitive science. In addition to this, steps for conducting qualitative or related analysis also help in research function and content analysis. There are advantages and disadvantages in every case.

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AN OVERVIEW OF STANDARD GUIDELINES CONCERNING BIOANALYTICAL METHOD DEVELOPMENT

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ABSTRACT

Bioanalysis plays a key role in the development of a new drug. In the present time, it is an integral part in the toxicological assessment and also in pharmacodynamics and pharmacokinetic studies in the process of developing a novel drug. It is the analysis of the desired analyte in the respected biological fluids performed by considering numerous parameters by following certain guidelines.

INTRODUCTION

This Bioanalytical method development is a procedure that is basically used to incorporate quantitative analysis useful in biomedical applications. Quantification of concentrations of drugs in biological matrices comprising serum, urine, plasma, saliva and blood are a relatively critical facet of development of a medicinal product; correspondingly these statistics might be a requisite for novel active substances and generics along with deviations to authorized drug products. The findings and repercussions of clinical trials and such animal toxicokinetic studies are utilized to make pivotal decisions assisting the potency and safety of a medicinal drug product. It is thereby crucial that the implemented Bioanalytical methods employed are considerably characterized, documented and completely validated to an adequate standard for the purpose of yielding trustworthy results. Bioanalytical method validation is used for the figuring out quantitative analysis of drugs and their further metabolites in biological fluid exerts substantial purpose in the elucidation and assessment of bioequivalence along with the bioavailability of the drug as well as the pharmacokinetic and toxicokinetic evidence of the study. It is paramount not only in terms of the regulatory submission but also for guaranteeing procreation of high standard data in the course of drug discovery and development. The caliber of these research studies is bluntly proportional to the quality of the fundamental data of bioanalysis. Thereby it's quite pivotal that steering principles for the validation of these methods of analysis be accustomed and distributed to the pharmaceutical society. As per the guidelines issued by globally recognized regulatory body like *European Medicines Agency (EMA)* and *The United States Food and Drug Administration (USFDA)* it is evident that methods like *high-performance liquid*

chromatography (HPLC) or *gas chromatography (GC)* are predominantly employed for validation.

IMPORTANCE OF BIOANALYTICAL METHOD VALIDATION

1. It is paramount to utilize completely verified and validated methods of Bioanalysis for showcasing dependable results which can be interpreted tolerably.
2. Such methods of bioanalysis and their sets of techniques are regularly altered and developed.
3. It is vital to highlight that every single technique of Bioanalysis has unique peculiarities that may change depending on the type of analyte, there has to be development of a particular criteria for assessment of every other analyte.
4. On top of that, the suitability of the technique can also change with respect to the aim of the study that needs to be done. For e.g., during analysis of a specific sample for defined research is carried out at multiple sites, it is essential to assess the method of Bioanalysis at every site and present relevant assessment data for various sites to set up inter-laboratory stability.

METHOD VALIDATION

It comprises of 3 types of validation methods, namely:

1) FULL BIOANALYTICAL METHOD VALIDATION PARAMETERS OF FULLBIOANALYTICAL METHOD VALIDATION

- Selectivity or specificity
- Carry-over
- Lower limit of quantification (LLOQ)
- Accuracy
- Precision
- Calibration curve



- Dilution integrity
- Stability

2) PARTIAL VALIDATION**3) CROSS VALIDATION****FULL BIOANALYTICAL METHOD VALIDATION**

It is a thumb rule that even if the method of analysis is new-fangled or is based upon some sort of a literature review, a complete method validation must be performed. The primary intent of method validation is to illustrate the dependability of a peculiar method for the assessment of the concentration of an analyte in a particular biological matrix which includes saliva, blood, plasma, urine or serum. On top of that it is of utmost importance that if a specific decoagulant is being used for the study samples that same decoagulant must be used for

the complete validation process. Usually, a full validation should and must be performed for every matrix and species involved. It has been observed that in a handful of cases, it is a plight in validation related purposes to procure an analogous matrix in contrast to the matrix of the study samples. Whereas a befitting substitute of matrix can also be used if it can be justified, for e.g., a synthetically produced cerebrospinal fluid (CSF). Generally, a single analyte or maybe drug is assessed, while it is also possible to determine more than one analyte. This might include use of two different drugs, however can also involve same parent drug with its enantiomers or metabolites or isomers of a drug. In such types of cases standards of analysis and validation imply to all analytes of interest.

CHROMATOGRAPHIC METHODS

Reference standards: The process is as follows:

- | |
|---|
| 1) Firstly, a blank biological matrix will be spiked with the analyte using solutions of reference standard (RS) to formulate calibration standards, quality control (QC) samples and stability samples. |
| 2) Addition of favorable internal standards (IS) while processing the sample in chromatographic methods. |
| 3) The quality of the RS and IS should be taken under consideration, as the quality the purity might most probably affect the overall outcome of the analysis and thereby the outcome of the data received through studies. |

Note: It is quite significant that the reference standards used while performing the study sample analysis and validation must be acquired from fairly genuine and traceable sources to guarantee the purity of the reference standard.

PARAMETERS OF FULL BIOANALYTICAL METHOD VALIDATION

- Selectivity or specificity

Definition: Selectivity and specificity are often misjudged as same terms, in broader perspective they are, but there are slight distinct meanings of either of them when we observe minutely.

Difference between Selectivity & Specificity:

Selectivity	Specificity
It shows the capability of a particular method to distinguish the analyte from other analytes or impurities that are in there in the samples.	It shows the capability of a particular Bioanalytical method to distinguish the analyte but not for the other intruding components

IMPORTANCE

- 1) Selectivity must be verified by using no less than 6 individual sources of the appropriate blank matrix, which are analyzed, done by one and assessed for interference.
- 2) Utilization of a smaller number of sources is tolerable in event of rare matrices.
- 3) Lack of interfering compounds is sometimes approved where the response is not more than
 - 20% of the total lower limit of analyte quantification.
 - 5% for the IS.
- 4) It is also necessary to take under consideration the interference that metabolites of the drugs might have

caused, the interference by degradation compounds created during the production of sample and also the interference from probable medications that might have co-administered.

- 5) Some co-medications that are ordinarily used in the subject population studied which might interfere potentially should be taken into account at the time of method validation or on a study specific and compound specific base.

- **Carry-over**

In the process of method validation, carry-over is one such element which should be used as less as possible.

**Process**

- Carry-over is determined by inducing samples pertaining blank reading after a high concentration sample or calibration standard at the upper limit of quantification.
- This blank sample following the sample having higher concentration must have a carry-over of not more than
- 20% of the lower limit of quantification (LLOQ) and
- Should be 5 percent for the internal standard (IS).

Note

- If it is observed that the carry-over is unavoidable, the study samples used must not be randomized.
- Some peculiar sort of measures must be taken under consideration and tested during the validation and applied amid the analysis of the study samples just because it does not affect the accuracy and precision.
- This could probably also inculcate the injection of blank samples after samples with an expected higher concentration, before the analysis of the next study sample.

- **Lower limit of quantification (LLOQ)**

Definition: LLOQ is the lowest concentration of an analyte in a sample which can be quantified precisely, with justifiable accuracy and precision.

- The LLOQ is regarded being the lowest calibration standard.
- Note that the analyte signal of the LLOQ sample must be at least **5x** the signal given by a blank sample.
- The LLOQ must be adapted to expected concentrations and to aim of the study done.

For an example, while doing the bioequivalence studies of the LLOQ, it should not be more than 5% of the C_{max} (maximum concentration), whereas such a lower LLOQ might not be necessary for exploration of pharmacokinetic studies.

- **Accuracy**

Process:

- Accuracy ought to be measured employing a minimum of five repetitions of determinations per concentration.
- A minimum of 3 concentrations in the range of expected study sample concentrations is

recommended.

- The mean value should be within 15% of the nominal value (except at LLOQ).
- This mean value should not deviate by more than 20%.
- The deviation of the mean from the nominal value serves as the measure of accuracy.
- The more the deviation, the lesser the accuracy.

Note:

- The accuracy of a method of bioanalysis elucidates the ratio of nearness of the calculated value obtained and the method to the analyte's nominal concentration.
- Accuracy should be assessed on samples spiked with known amounts of the analyte; the quality control samples (QC samples).

Method

1. Firstly, the QC samples should be spiked independently from the calibration standards, using separately prepared stock solutions, unless the nominal concentration(s) of the stock solutions have been established.
2. The QC samples are analyzed against the calibration curve, and the obtained concentrations are compared with the nominal value.
3. The accuracy should be reported as percentage of the nominal value.
4. Accuracy should be evaluated for the values of the QC samples obtained within a single run (the within run accuracy) and in different runs (the between-run accuracy).

Basically, accuracy may be divided in two segments:

- 1) Within-run accuracy
- 2) Between-run accuracy

Within-run accuracy

It should be identified by analyzing in a single run for at least 5 samples per level at a minimum of 4 concentration levels which are covering the calibration curve range as described.

	Reading of 5 samples	Mean Reading
LLOQ (Lowest)	Not more than 5% of C_{max}	20% of the nominal value
LLOQ (Low QC)	Not more than 3x	15% of the nominal value
Medium QC	30-50% of CC Range	15% of the nominal value
High QC	At least 75% of CC Range	15% of the nominal value

Note:

CC – Calibration curve
QC – Quality control

Fig 1: Tabular comparison of readings



Between-run Accuracy

- For the validation of the between-run accuracy, it is basically done in 3 repetitions where the LLOQ, low, medium and high QC samples are analyzed on at least two days should be assessed.
- The mean concentration should not be more than 15% of the nominal values for the QC samples, except for the LLOQ which should be under 20% of the nominal value.

Note: The data procured from validation should be reported and the assessment of accuracy should comprehend all the results acquired except those cases where inaccuracies are evident and recorded.

• Precision

The precision of a method of bioanalysis is a measure of the random error and is defined as the nearness of agreement between a series of measurements obtained from multiple sampling of the same analogous sample under the ordained conditions.

It is typically measured as coefficient of variation (%CV) or relative standard deviation (R.S.D.) of the replicate measurements.

Mainly, precision can be segmented into:

- 1) Within-run precision
- 2) Between-run precision

Within-run precision

In the assessment of the within-run precision, there should be at least 5 samples per concentration level at

- LLOQ (Lowest)
- Low QC
- Medium QC
- High QC samples in one run.

The within-run CV value for:

LLOQ – should not be more than 20%.

QC samples – should not be more than 15%.

Between-run Precision

In the assessment of the between-run precision, LLOQ, low, medium and high QC samples from at least 3 repetitions assessed on at least 2 different days must be determined.

The between-run CV value should not be more than 15% for the QC samples, and for the LLOQ it should not surpass 20%.

Calibration curve

The feedback of the instrument in contrast with the concentration of analyte must be unanimous, and should be evaluated through a stated range of concentration

Procedure

Preparation of calibration standards should be done in the matrix of the aimed study samples by the technique of spiking a blank matrix with an analyte whose concentrations are recognized.

Note

- 1) Single calibration curve for every analyte should be studied in the method development and for individual run of analysis.
- 2) Generally, prior to executing the validation of a bioanalytical method it must be acknowledged that what sort of range of concentration is anticipated.
- 3) The calibration range must be included by this particular range, where the LLOQ is the lowest standard of calibration and the upper limit of quantification (ULOQ) is the highest standard of calibration.
- 4) The range should be accustomed to permit appropriate explanation of the pharmacokinetics of the analyte.

Procedure

- Take a blank sample with treated matrix which has no analyte and no internal standard, a zero sample with treated matrix and internal standard and at least 6 calibration concentration levels must be utilized.
- Every single calibration standard should be examined in replicate.
- Ignore the blank and zero samples reading to reckon parameters of calibration curve.
- These calculated parameters should be stated.
- Additionally, the back concentrations reported must also be presented with the mean values of the accuracy.

Range

- For back concentration – It should be within $\pm 15\%$ of the nominal value.
- For LLOQ - It should be within $\pm 20\%$.
- For replicates – There should be fulfillment of the criteria for at least 50% of the standards of calibration examined per level of concentration.

Dilution integrity

- 1) In the first place, the dilution integrity must not influence the precision and accuracy. However, if it does, then it should be displayed by
 - Spiking the matrix with an analyte concentration above the ULOQ&
 - Diluting this sample with blank matrix with not more than five determinations per dilution factor.
- 2) Precision and accuracy should be within the set criteria, i.e., within $\pm 15\%$.
- 3) Dilution integrity should cover the dilution applied to the study samples.
- 4) Evaluation of dilution integrity may be covered by partial validation.
- 5) Use of another matrix may be acceptable, as long as it has been demonstrated that this does not affect precision and accuracy.

Stability

Aim: The test for stability is for the identification of any sort of deterioration of the analytes amid the complete

duration of collecting samples, processing, storing, preparing, and analysis.

Stability is broadly dependent of certain conditions; they are as follows:

- 1) Nature of the analyte
- 2) Biological matrix
- 3) Time period of storage

Note: During the preparation and analysis of samples, at each individual stage the stability must be reaffirmed, and additionally the conditions utilized for prolonged storage.

Process

- 1) An analyte's stability is assessed with the help of samples having low and high QC.
- 2) In this process, a blank matrix is usually spiked with an analyte at a concentration of a maximum of 3 times the lower limit of quantification and close to the upper limit of quantification that are evaluated directly after preparation and after the storage conditions that are to be assessed.
- 3) The samples of QC are evaluated upon a calibration curve which is collected from promptly spiked calibration standards and the acquired concentrations are matched to the nominal concentrations.
- 4) The mean concentration at every level must be under $\pm 15\%$ of the nominal concentration.

Types of Stability tests that should be evaluated are:

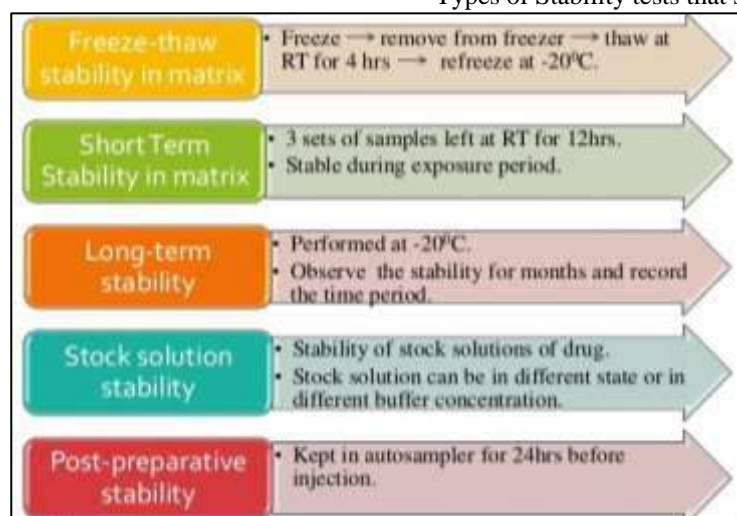


Fig 2: Types of stability tests

Long-term stability

Note

- The analyte in the sample matrix must have stability either same or more than the time amid the date of collection of first sample and the date of analysis of last sample.
- The QC samples must be kept in the freezer under the identical storage conditions and at least for the equal time period as the samples of study.
- For relatively tiny molecules, it is passable that if the stability at -70°C and -20°C has been established, it isn't mandatory to examine the stability of the temperature in its bracket.
- For relatively big molecules, stability must be studied at every temperature at which the samples for study are kept.

Freeze and Thaw Stability

- Amid freeze and thaw stability assessments, the freezing and thawing of stability samples must be identical to the conditions of sample handling to be used during the analysis of sample. Stability should be evaluated for at least 3 freeze-thaw cycles.
- After full thawing, samples are frozen again by application of equivalent conditions.

- At every cycle, samples should be frozen for at least 12 hours before they are thawed.

Bench-Top stability

Bench top stability experiments must be planned and carried out to cover the laboratory handling conditions that are expected for study samples.

Stock solution stability

The stability of stock solutions of drug should be evaluated.

When the stock solution exists in a different state (solutions vs. solid) or in a different buffer composition (generally the case for macromolecules) from the certified reference standard, the stability data on this stock solution should be generated to justify the duration of stock solution storage stability.

Processed Sample Stability:

The stability of processed samples, including the time until completion of analysis, should be determined.

FORCED DEGRADATION STUDIES (FDS)

AIM: The primary objective of forced degradation studies is to expose the finished composition and the active pharmaceutical ingredient to external factors like:



- 1) base,
- 2) heat,
- 3) light conditions,
- 4) acid,
- 5) and peroxide,

To the point a sufficient amount of degradation has reached.

PROCESS

- A satisfactory degradation can range from 10–30% but is subject to change based on the API getting degraded.
- It has been observed that sometimes on account to excess degradation of the active, there has been formation of secondary form of deteriorating agents, hence it is advisable to avoid surplus degradation.

EVALUATION PROCESS BY PEAK PURITY ANALYSIS

- Assessment of these products and also assay and its related substances after forced degradations is usually done through analysis of its peak purity with the help of a special photodiode array detector or mass spectral evaluation which shall affirm that the active peak in no way co-elute over any of the degradation products formed as a consequence of this process.

CONCLUSION

- 1) Every single stage in the methodology of development of a composition, the method of analysis should exhibit selectivity or specificity; the same method must necessarily possess the capability to explicitly assess the analyte of in the vicinity of all other components, which might include deteriorating agents, reagents, filters and sample matrix.
- 2) During the tests for identifying analytes, selectivity must showcase positive results for the sample that contains analyte and negative for the one that doesn't.
- 3) Also, it should be capable of separating out the primary analyte which is important and the one which similar properties that might prevail.

PARTIAL VALIDATION

In many cases there is need for only small changes to method of analysis which has been validated already, so there is no space for a full validation, relying on the nature of the changes, and that's why partial validation is performed.

Partial validation includes the following factors:

- 1) Transfer of method of bioanalysis to another laboratory
- 2) Limited volume of sample
- 3) Procedure of sample processing
- 4) Change in equipment
- 5) Calibration concentration range
- 6) Another matrix or species
- 7) Storage conditions

CROSS VALIDATION

Where data are obtained from different methods within and across studies or when data are obtained within a study from different laboratories, applying the same method, comparison of those data is needed and a cross validation of the applied analytical methods should be carried out.

Cross validation should be performed in advance of study samples being analyzed if possible. For the cross validation, the same set of QC samples or study samples should be analyzed by both analytical methods.

For study samples, the difference between the two values obtained should be within 20% of the mean for at least 67% of the repeats.

The outcome of the cross validation is critical in determining whether the obtained data are reliable and whether they can be compared and used.

It is a comparison of validation parameters when two or more Bioanalytical methods are used to generate data within the same study or across different studies.

1. An example of cross-validation would be a situation where an original validated Bioanalytical method serves as the reference and the revised Bioanalytical method is the comparator. The comparisons should be done both ways.

a. When sample analyses within a single study are conducted at more than one site or more than one laboratory, cross validation with spiked matrix standards and subject samples should be conducted at each site or laboratory to establish inter laboratory reliability.

b. Cross-validation should also be considered when data generated using different analytical techniques (e.g., LC-MSMS vs. ELISA) in different studies are included in a regulatory submission.

APPLICATION

The following recommendations should be noted in applying a Bioanalytical method to routine drug analysis:

1. A matrix-based standard curve should consist of a minimum of six standard points, excluding blanks (either single or replicate), covering the entire range.

2. Response Function: Typically, the same curve fitting, weighting, and goodness of fit determined during pre-study validation should be used for the standard curve within the study. Response function is determined by appropriate statistical tests based on the actual standard points during each run in the validation. Changes in the response function relationship between pre-study validation and routine run validation indicate potential problems.

3. The QC samples should be used to accept or reject the run. These QC samples are matrix spiked with analyte.

4. System suitability: Based on the analyte and technique, a specific SOP (or sample) should be identified to ensure optimum operation of the system used.

5. Any required sample dilutions should use like matrix (e.g., human to human) obviating the need to incorporate actual within-study dilution matrix QC samples.



6. Repeat Analysis: It is important to establish an SOP or guideline for repeat analysis and acceptance criteria. This SOP or guideline should explain the reasons for repeating sample analysis. Reasons for repeat analyses could include repeat analysis of clinical or preclinical samples for regulatory purposes, inconsistent replicate analysis, samples outside of the assay range, sample processing errors, equipment failure, poor chromatography, and inconsistent pharmacokinetic data.

7. Sample Data Reintegration: An SOP or guideline for sample data reintegration should be established. This SOP or guideline should explain the reasons for reintegration and how the reintegration is to be performed.

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MODERN SCIENTIFIC AND PSYCHOLOGICAL INTERPRETATION OF RELIGIOUS IDEAS ABOUT MARITAL RELATIONS IN THE FAMILY

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ANNOTATION

This article talks about the sanctity of the family, the rules of religious sources about a married couple's relationship, the interpretation of educational and psychological ideas in the views of Uzbek folklore and Eastern thinkers.

KEYWORDS: Sacred sources, religious beliefs, Eastern thinkers, cultural heritage, psychological makeup, family lifestyle, healthy mental attitude, readiness for marriage, human qualities, modesty, devotion to love, justice, beauty, wisdom, moderation, respect, respect, mutual respect, trust, honor, and pride of the family, justice.

At the present stage of the development of society, a rational attitude to family and marriage traditions and values remains a priority. Therefore, a comprehensive study of family and marriage traditions, the scientific study of their still well-studied social and ethno-psychological aspects is of great importance. Modern research aimed at fulfilling these tasks reveals problems associated with preserving and respecting family and marriage traditions, their use as a factor in strengthening the family. Nevertheless, the issues of developing a psychological description based on the study of socio-cultural, territorial, ethno-psychological characteristics of family and marriage traditions and lifestyles are still relevant.

PF-5325 By the Decree of the President of the Republic of Uzbekistan dated February 2, 2018 "On measures to radically improve activities in the field of supporting women and strengthening the institution of the family", tasks such as the development and implementation of targeted proposals are more relevant than ever. This requires the strengthening and improvement of universal, national values in the family in our country, relations between spouses, parents, children, spiritual, moral, religious, legal foundations of the family. This research work was completed on

February 2, 2018, No. PF-5325 "On measures to radically improve activities in the field of supporting women and strengthening the institution of the family", June 27, 2018, No. PP-3808 "Strengthening the family in the Republic of Uzbekistan" PF- 1079 of April 16, 2018 "On measures to radically improve activities in the field of religious education" and other regulatory legal acts in this area.

Issues related to the holiness of the family and a healthy lifestyle that determine the relationship between spouses are widely covered in the works of the great hadith scholars Muhammad ibn Ismail Bukhari, Imam At-Termizi, as well as in the sects of Ahmad Yassawi, Bahauddin Naqshband, Najmiddin Kubro, Abu Muyin Nasafi.

Studying the scientific and cultural heritage of our great ancestors, we learn about the virtues of childbearing, the rules, and norms for preparing teenagers for family life, the culture of relations between young brides and grooms, the culture of relations between young brides and grooms, growing up of children, relations between men and women, the formation of human qualities. We testify that this is a scientific and cultural heritage based on its membership.



Indeed, in the oral works and epics of the Uzbek people are famous (epics, fairy tales, proverbs, sayings, and legends) love-loyalty, courage, honesty, humility, trust, friendship, justice, diligence, solidarity, moderation, beauty, wisdom, faith, respect, cherish the honor and pride of the family, love the place of birth, strive for goodness, live honestly and cleanly. In them, women and men are portrayed as individuals with equal social status, and women are portrayed as brave, loyal, not lagging behind their husbands.

We know that the Holy Quran and Hadith, which are the main sources of Islam, also contain valuable information about all aspects of family life and marital relations, and Sharia law. First of all, special attention was paid to the formation of a future family. According to Sharia, the following rules were observed for marriage. 1. Mutual consent of spouses. 2. Achievement of marriageable age. 3. Marriage in the presence of witnesses. 4. Pay for the bride with a thick coat and dowry. 5. Unity of religious beliefs and professions. 6. The absence of close relatives of the couple. 7. Equality by class. 8. The mental health of those entering into marriage [2]. Only marriages entered into by the established conditions are considered legal and the parties are provided with appropriate rights and obligations [2; 64].

The verse of the Qur'an defines the role of husband and wife in the family. According to Sharia law, a man is primarily responsible for all financial and moral aspects of the family, protecting it from any threats and encroachments from outside. He is considered the head of the family because of his qualities such as restraint, breadth of views, foresight, courage, honesty, and enterprise in the family. A good wife is a religious, imaginative, polite, educated woman who makes her husband's house prosperous and faithful to him for life [2; 59]. There are many illustrative examples from the Holy Quran for married couples or family relationships.

Even in Zoroastrianism, which was the religion of our ancestors in ancient times, the issue of marriage and family responsibilities held an important ethical place. In Zoroastrianism, polygamy is strictly prohibited. At the same time, loneliness is condemned. If an adult girl disregards the opinions of her parents and society and deliberately does not marry, she is put in a

bag and punished with 25 lashes. If a grown man is not married, he is forced to wear a chain around his waist to discredit him. According to the Avesta, to marry, a man must first of all be strong materially and spiritually. In addition, this holy book contains wonderful ideas about marriage (should avoid haste in choosing an honest partner and listen to the advice of parents, the elderly, and society). It also sets out specific criteria for marriage and divorce, which both husband and wife strictly adhere to.

The women's issue is also given a special place in the code of ethical norms of the Avesta. In Zoroastrianism, the family is considered sacred and cannot be dissolved for other reasons, including gossip, slander, disagreements between spouses, under the pretext of inability to get along with parents [4; 32].

Most importantly, both Zoroastrianism and Islam emphasize the equality and dignity of both parties in the marriage. According to the rules of marriage and the historically established life experience of our people, the bride and groom should be close to each other in origin, social status, level of knowledge, taste, knowledge, property. Accordingly, from time immemorial, among the people, serious attention has been paid to the education of young people and their preparation for family marriage, the search for and marriage to their peers. Especially about the preparation of girls for marriage, first of all, about the formation of human qualities in them, the sanctity of the family, its care and purity depend on the housewives.

As a striking example of this, the advice of a mother to her daughter-in-law in the Treasury of Wisdom, collected by the Turkish scholar Yusuf Tavasli, attracts attention. The mother said to her daughter-in-law, "My dear, my beloved daughter, listen to me carefully. Everyone needs advice, everyone needs admonition. Exhortation teaches the ignorant or reminds them of what they know.

Men are made for women; women are made for men. As long as there is life, no one can break this law. That's why you leave the house where you were born, grew up, played, and laughed for a house that you don't know. In the future, this house is yours. Serve your husband so that he will be your servant too.

If you follow what I have said, you will have a wonderful life with your husband and you will have a



happy, happy and prosperous life. We (both families - both ours and your husband's family) will be happy and prosperous. Otherwise, there will be no peace in both families. You will feel like you are living in hell.

My daughter! Now listen to my ten instructions to you! Always remember this:

1. Be pleased. Be grateful for your condition. That is, whatever your husband brings home, be it food or clothing, accept it with kindness and good manners! Thank your husband and show your joy. After all, one way to live a happy life is to be grateful for your wealth, and one who does not restrain himself from ingratitude will not have peace of mind.

2. Listen to your husband, do what he says, and don't do what he says not to do! That is, when you talk to your husband, let him know that you are obedient. When you are in fellowship, listen so carefully that your husband knows that you will obey him in the future. Then Allah will be pleased with you.

3. Pay special attention to easily visible areas! That is, to keep the house inside and out in exceptional cleanliness so that an ugly stain does not appear in the eyes of your husband.

4. Keep yourself and your clothes clean. When the husband only sniffs, let it not smell bad. Because bad smells will lower your reputation in the eyes of your husband. This disgusts him. It is well known that purity and elegance are the best qualities and appeal to the human eye.

5. Prepare food on time. That is, never delay eating. When your husband is used to eating, prepare food for him at that time. Set the table as soon as he arrives. Keep in mind that hunger makes a person angry quickly.

6. Know his bedtime and wake-up time! That is, when he goes to bed, prepare his place. After all, insomnia makes a person sad. Gradual nervous breakdown, sadness, human passion, and love also fade away.

7. Be very careful with your husband's property! That is, take care of the husband's property, take care of his things. Because his wealth belongs to you. Not to waste the wealth of a husband means to know and appreciate labor.

8. Respect your husband's relatives and friends! That is, respect for the relatives and friends of the

husband means to win the attention of his loved ones. To respect them is to respect your husband. It means gaining dignity and attention.

9. Don't tell others your husband's secrets! That is, be careful when you find out some secrets of your husband, keep it, do not tell anyone. If you tell, you will piss him off and lose his trust. It will destroy the family you are building.

10. Keep all the commandments of your husband according to his religion! Never disobey him. If you make such an attempt, you will anger him, and eventually, you will become enemies. He gets on the path of enmity towards you, you will suffer a lot and there is nothing you can do [3; 32]

Hence it is known that folklore and religious ideas and wisdom were preserved in oral form from generation to generation, and the sages and scientists of our people, relying on the traditions and values of the people, more fully illuminated them in their works, left as a cultural heritage for future generations.

From this point of view, in the works of our great thinkers and enlightened ancestors Abu Nasr Farabi, Abu Raykhan Beruni, Abu Ali ibn Sino, Kaikovus, Yusuf Khas Khadjib, Alisher Navoi, Rizuddin ibn Fakhruddin, Ahmad Donish, Fitrat, and others, including peoples, living in Central Asia, we tried to study the value views of the Uzbek people on family life, family and marriage relations, national psychological characteristics of relations (especially marital relations), duties and responsibilities of spouses, family life, educational environment, and other important aspects.

In particular, the great scientist Abu Nasr al-Farabi describes the laws of the development of society and the stages of human maturity, the ways to achieve happiness in the process of human life in his famous work "The City of Noble People" [14]. Speaking of intelligent people, Farabi said: "Intelligent people are those who are virtuous, witty, devoted to useful deeds and avoid evil deeds. Such people are called wise" [5; 182]. Allama notes that where there are wise people, there will never be problems and disagreements. His ideas also include ideas that reflect the importance of the completeness of the family, a healthy spiritual and psychological environment in which it is inhabited. "Everyone is arranged by nature in such a way that he



needs a lot to live and achieve a high level of maturity. He cannot achieve such things alone; for their possession, a community of people is necessary. The activity of such members of the community as a whole provides a person with what is necessary for survival and maturity" [5; 186]. A city that unites people who help each other in achieving true happiness (in our opinion, a family) is virtuous, and a community of people united in the pursuit of happiness (in our opinion, a family community) is a virtuous community. [5, 187].

The scientist-encyclopedist Abu Rayhan Beruni tried to express his views on social issues in many rare works or express critical views on them. His specific views are specific to family life, family and marriage, the bride and groom in a young family, family values, and relationships between its members. We find such advice in the wisdom of Beruni. "Good behavior is a sign of goodness" "It is not good to do something with people with bad intentions and bad morals" [6; 19-20]. "Where equality reigns, there will be no betrayal, false passions, sadness [6; 21]. In family relations, a young bride and groom should follow such wisdom.

Beruni's views also contain valuable information about the duties and responsibilities of the young bride and groom. "They need to perform certain tasks is the rule of human activity throughout life. The dignity of a person is determined by the excellent performance of his function, and therefore the most basic task and place of a person is determined by work. For man has achieved his will by labor" [6; 78].

Valuable comments on the topic of our research can be found in several works by Abu Ali ibn Sina, such as "Encyclopedia", "Risolai ishik", "Laws of Medicine", "Housekeeping". These sources occupy a special place in the world of ethics, pedagogical psychology, philosophy, and medicine of the peoples of Central Asia. Ibn Sina said that the relationship between the bride and groom should be based on equality, solidarity and mutual respect and is an assistant" [7; 208]. Ibn Sina emphasized that a healthy lifestyle of the family, peace, harmony in the family, kindness, family pride, and honor largely depend on the woman (bride). In particular, in *The Family Economy*, he writes that a woman should have the most morally acceptable, high human qualities. The next section of this work, entitled "On the good qualities of women," describes the

following qualities of them; a woman should be wise, shy, timid, chaste, and not talk too much; she must be submissive to her husband, love him, have children, always be honest, clean, straightforward, humble; should not be capricious, should not lose her chastity and dignity; she should never be arrogant towards her husband, it's good, do her job on time, economically spend the material resources of the family; she should not by her behavior leave room for fear in her husband's heart [7; 38]. Ibn Sina in his book "Kitab ush-shifo" also pointed out the factors leading to family crises and breakups. To them: 1. If the husband and wife did not give birth to a child. 2. If the wife cheats on her husband and belittles his attention. 3. If a woman is uneducated and does not want to be educated. 4. If the husband and wife have a character that does not like each other. It can be seen that in the works of Ibn Sina, using illustrative examples, he singled out the important role of marital relations in family marriage and family life, especially the role of women in relationships.

"Nightmare" (written in 1082-1083) by Kaikovus, one of the rare wisdom of the peoples of the East, is known and popular among the peoples of the world. In addition to exemplary life advice, *The Nightmare* also contains valuable information about "the memory of love and its customs" and "the memory of marriage." "O child, a man is not allowed to fall in love until his character is subtle, because the character of love arises from subtlety. It is indicated here that when a person's heart is pure, pure, and morally high, his heart, qualities, and virtues, as well as his spiritual experiences will be pure and beautiful.

O child, if you wish to marry, guard your dignity. Do not deprive your wife and children, even if the property is sacred. But it is in your hands to keep your wife clean, the child obedient and kind. At this point, he is warned that the husband must treat his wife in a certain way.

If you are not jealous of your wife, she will treat you sincerely. She will be kinder to you than your parents and children, and no one will be friendlier to you than she is. If you show jealousy towards her, she will be more hostile to you than a thousand enemies.

If you marry a girl, no matter how much you love her, don't go to bed with her every night, she thinks it's a habit for everyone. If you make it a habit to sleep



with her every night, she will dream of someone else without you, and it will be difficult for her to endure [8; 104]. From the above proverbs, one can find a reasonable way to ensure a healthy psychological relationship between a young couple.

Yusuf Khos Hajib in his book "Kutadgu Bilig" ("Knowledge Leading to Happiness") provides valuable information about the important conditions for a successful marriage, which are also important for the proper functioning of the current family life and marital relations. In the play "If you take a wife, take the lowest of all, do not look after the superior, you will remain a slave." Let there be a good, shameless, caring, and pure beginning, a seed. Don't want a pretty face, want a good demeanor, if she has a good demeanor, it will light up your face. If she has a good character, she will be complete. If she has the right character, she will be very worthy, the beauty of a woman is her character, she knows it [9; 669-671]. If you can find a thoughtful woman, do not miss (take it right away), O noble person, if she is thoughtful and pure, then such a person will be original. If you want a wise woman, oh wise, intelligent woman, if you find a wise woman, you will find wisdom, wisdom, wealth, beauty, and lineage. 673].

In this play, the husband, like the wife, must be knowledgeable, intelligent, prudent, intelligent, disciplined in maintaining family order, economically wealthy, kind, considerate, and kind to his wife and children.

The poet-thinker Alisher Navoi in his works "Mahbub ul Gulub", i.e. "Lover of Hearts" and "Wakfia" discusses the important socio-ethnic challenges associated with family life between young brides and grooms, their responsibilities, the culture of interaction, their compatibility and incompatibility, its consequences provided by valuable advice and information, In particular, chapter 37 "Mahbub ul-Kulub" "On Marriage and Wives" describes the virtues of a woman and her place in the family; "If the husband and wife are compatible, then among them there will be prosperity and order, the decoration of the house will be from him, and the peace of the married (husband) will be from him. If you have such a spouse, grief will be your confidant and companion in adversity, and you will be your companion in secret and hidden pain and suffering. An unsuccessful couple (bride) is a terrible disease that

manifests itself both in explicit and latent form for the home. If it is shameless, the heart will suffer from it, if it is naughty, the soul will suffer from it. If the tongue is bad, then the groom's heart will hurt, if it's bad, then the face will be dark. If she is a drinker, then the well-being of the house is lost, and if it is violated, the atmosphere of the house will become a disgrace" [10; 201].

The thinker expresses his thoughts about good deeds and bad qualities that everyone needs: contentment, patience, humility and morals, love, fidelity, modesty, gentleness, and gives valuable advice about several bad habits of people. If we analyze the views of Alisher Navoi from a psychological point of view, then and now young men and women choose a spouse suitable in all respects, he has the necessary qualities and qualities, the happiness and well-being of the family, the incompatibility of a husband or wife. Rizuddin ibn Fakhruddin, a mature scholar of his time, recognized the importance of purity in marital relations. "Noble husbands who treat their wives well will not send their wives to what is forbidden by Sharia and reason and will protect their wives from all adversity and not prescribe what they are not capable of. The world of the husband will be peaceful, and the afterlife the world will be pleasant." [eleven; 35].

Abdul Rauf Fitrat, one of the major representatives of the Turkestan Jadid movement, wrote in his book "Family" that children should be educated, girls should be educated, and the duties of parents in this area, to marry or not, which wife to take to choose in marriage, what should pay attention to the future couple, he put forward advanced ideas about how a couple should live, based on vital information about the life and management of a family, about the qualities and qualities inherent in a husband and wife. He writes that "the fate of a nation depends on the state of the family in which the representatives of this nation live, where family relations are based on strong discipline, the country and the nation will be just as strong and orderly" [12; 8].

According to Fitrat, to get married, one must pay special attention to four other things: wealth (material security), origin, beauty, and faith. "The wealth and pedigree of a man and woman who dream of marriage should be about the same. Otherwise, the



husband and wife will not be equal to each other and will suffer for the rest of their lives” [12; 23].

As we have seen, in the sacred sources of Islam and the works of Eastern thinkers and enlightened intellectuals, the sanctity of the family, important national-cultural and national-psychological factors that determine the holiness of the family and their role in society are emphasized [13]. The most important thing is that the qualities of husband and wife are formed in the young bride and groom, which form the basis of the family, they conscientiously fulfill family duties and responsibilities, kindness, and forgiveness to each other are revered as the most necessary values. Valuable information about the interpretation of the qualities of the bride and groom in a young family is also important for current family life and its prospects.

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IMPACTS OF COMPLEX WITH SAQ TRAINING ON CARDIO RESPIRATORY ENDURANCE AND RESTING PULSE RATE AMONG VOLLEYBALL PLAYERS

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ABSTRACT

The rationale of the study was to find out the impacts of complex with SAQ training on cardio respiratory endurance and resting pulse rate among volleyball players. To achieve this purpose, thirty men volleyball players were selected as subjects, their aged between 21 to 25 years, they are studying in the Agricultural College and Research institute, Eachangkottai, Thanjavur, Tamilnadu. The selected subjects were divided into two equal groups of fifteen subjects each, namely Complex with SAQ training group and control group. The selected subjects had undergone the Complex with SAQ training for twelve weeks, with three days per week in alternate days. The Complex with SAQ training group trained for three sets per exercise per session at 60 to 80% with a progressive increase in load with the number of weeks. Cardio respiratory endurance and resting pulse rate were selected as criterion variables and they were tested by using cooper's 12 minutes run and walk test and radial pulse rate respectively. ANCOVA was used to find out the significant difference if any between the groups. The results of the study showed that there was a significant difference on Cardio respiratory endurance and resting pulse rate between complex training with SAQ training group and control group.

KEYWORDS: *Complex Training, SAQ Training, Cardio Respiratory Endurance, Resting Pulse Rate, Volleyball Players.*

1. INTRODUCTION

Physical fitness and physiological components is one of the parts of the absolute wellness of the person, which additionally incorporates common, social and enthusiastic wellness. It is one of the fundamental prerequisites of life comprehensively talking it implies the capacity to do every day assignments without under weakness. Strength perseverance is needed in all games development, regardless of whether quick or moderate, developments must be done under lesser or higher states of weakness. Readiness is a blend of a few athletic attributes like strength, response time and speed of development, force and co-appointment. Its presentation becomes fundamental in such developments as avoiding, crisscross running, halting and beginning and evolving body positions rapidly. Complex is a technique for creating touchy force, a significant segment of the athletic presentation as Complex developments are acted in a wide range of sports. In volleyball, it tends to be played all the more capably when players have the force that consolidates with strength and speed to foster hazardous force for partaking in different games exercises. SAQ aims to coach the necessary techniques to provide the basic skill to complete the movements. The Complex with SAQ activities further develop essentially in creating actual wellness factors of volleyball players.

2. METHODOLOGY

The rationale of the study was to find out the impacts of complex with SAQ training on cardio respiratory endurance and resting pulse rate among volleyball players. To achieve this purpose, thirty men volleyball players were selected as subjects, their aged between 21 to 25 years, they are studying in the Agricultural College and Research institute, Eachangkottai, Thanjavur, Tamilnadu. The selected subjects were divided into two equal groups of fifteen subjects each, namely Complex with SAQ training group and control group. The selected subjects had undergone the Complex with SAQ training for twelve weeks, with three days per week in alternate days. The Complex with SAQ training group trained for three sets per exercise per session at 60 to 80% with a progressive increase in load with the number of weeks. Cardio respiratory endurance and resting pulse rate were selected as criterion variables and they were tested by using cooper's 12 minutes run and walk test and radial pulse rate respectively. ANCOVA was used to find out the significant difference if any between the groups.

3. SELECTION OF VARIABLES AND TESTS

The subjects were tested on the following variables.

**Table-1**

Name of Variables	Test	Unit
Cardio Respiratory Endurance	Cooper's 12 Minutes Run and Walk Test	Meters
Resting Pulse Rate	Radial Pulse Rate	Beats/Minute

4. EXPERIMENTAL DESIGN AND STATISTICAL PROCEDURE

The experimental design used for the present investigation was random group design involving 30 subjects for training effect. Analysis of Covariance (ANCOVA) was

used as a statistical technique to determine the significant difference, if any, existing between pre test post test and adjusted post test data on selected dependent variables separately and presented in Table-2.

Table-2

F-ratio for Pre-Test and Post-Test among The Complex with SAQ Training group and control group on Cardio Respiratory Endurance and Resting Pulse Rate.

Variables	Test	Complex with SAQ Training Group	Control Group	Source of Variance	SS	df	Mean Square	„F“ Ratio
Cardio Respiratory Endurance	Pre test	2267	2267.35	Between Within	0.53 132.92	1 28	0.53 4.75	0.11
	Post test	2282	2268	Between Within	218.70 126.67	1 28	218.70 4.53	38.34*
	Adjusted post test	2282.46	2268.25	Between Within	233.78 56.08	1 27	233.78 2.07	102.55*
Resting Pulse Rate	Pre test	77.23	77.20	Between Within	0.03 1.25	1 28	0.03 0.04	0.74
	Post test	71.20	77.10	Between Within	0.38 0.49	1 28	0.38 0.01	20.04*
	Adjusted post test	71.27	77.14	Between Within	0.33 0.44	1 27	0.33 0.01	18.30*

Level of Significance 0.05*

4.1 RESULTS OF CARDIO RESPIRATORY ENDURANCE (in meters)

An examination of table-2 indicated that the pre test means Complex with SAQ Training and control groups were 2267 and 2267.35 and. The F-ratio for the pre-test was 0.11 and the table F-ratio was 3.75 Hence the pre-test mean F-ratio was insignificant at 0.05 level of confidence for the degree of freedom 1 and 28.

The post-test means of the Complex with SAQ Training and control groups were 2282, and 2268. The acquired F-ratio

for the post-test was 38.26 and the table F-ratio was 3.75. Therefore the post-test mean F-ratio was significant at 0.05 level of confidence for the degree of freedom 1 and 28.

The adjusted post-test means of the Complex with SAQ Training and control groups were 2282.46 and 2268.25. The acquired F-ratio for the adjusted post-test means was 102.55 and the table F-ratio was 3.78. Hence the adjusted post-test mean F-ratio was significant at 0.05 level of confidence for the degree of freedom 1 and 27.

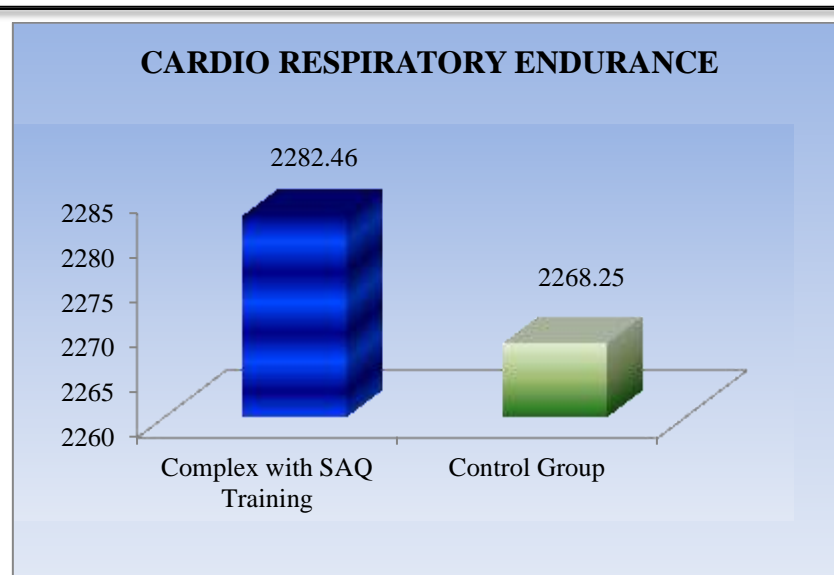


Fig-1: Adjusted mean values of cardio respiratory endurance of complex with SAQ training group and control group

4.2 RESULTS OF RESTING PULSE RATE (Beats per Minute)

An examination of table-2 indicated that the pre test means Complex with SAQ Training and control groups were 77.23 and 77.20 and. The F-ratio for the pre-test was 0.74 and the table F-ratio was 3.75 Hence the pre-test mean F-ratio was insignificant at 0.05 level of confidence for the degree of freedom 1 and 28.

The post-test means of the Complex with SAQ Training and control groups were 71.20, and 77.10. The acquired F-

ratio for the post-test was 20.04 and the table F-ratio was 3.75. Therefore the post-test mean F-ratio was significant at 0.05 level of confidence for the degree of freedom 1 and 28.

The adjusted post-test means of the Complex with SAQ Training and control groups were 71.27 and 77.14. The acquired F-ratio for the adjusted post-test means was 18.30 and the table F-ratio was 3.78. Hence the adjusted post-test mean F-ratio was significant at 0.05 level of confidence for the degree of freedom 1 and 27.

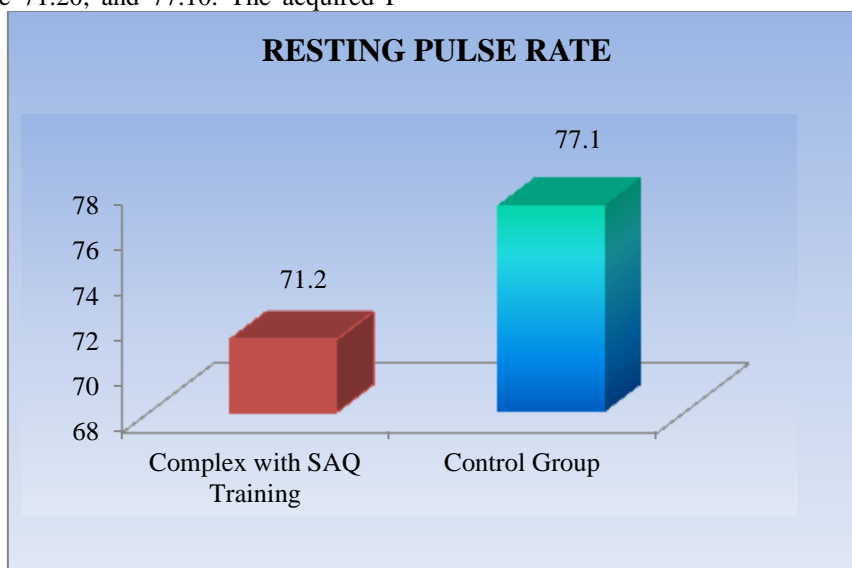


Fig-2: Adjusted mean values of resting pulse rate of complex with SAQ training group and control group

5. DISCUSSION ON FINDINGS

The result of the study indicates that the experimental group namely complex with SAQ training group had shown significant improvement in cardio respiratory endurance and resting pulse rate among volleyball players. The control group volleyball players had not shown significant changes in any of the cardio respiratory endurance and resting pulse rate. The analysis of the study indicates that the complex with SAQ

training group (had shown significant level difference in cardio respiratory endurance and resting pulse rate among volleyball players.

It is conditional from the literature and from the result of the present study. That systematically designed training develops dependent variables are very importance quilts for better performance in almost all sports and games. Hence it is concluded that systematically designed training



may be programmes of all the discipline in order to achieve maximum given due recognition and implemented properly in the training performance. These findings are in accordance with the findings of **Abdul Halik (2021), Krishnamoorthi (2021), Senthil Kumaran (2021), Mavis (2013) and Gayen (2013)**.

6. CONCLUSIONS

From the analysis of the data, the following conclusions were drawn.

1. The volleyball players of control group had not shown significant changes in any of the cardio respiratory endurance and resting pulse rate.
2. The complex with SAQ training group shown significant improvement in cardio respiratory endurance and resting pulse rate among volleyball players.
3. There volleyball players who had undergone eight weeks of complex with SAQ training showed significant improvement in cardio respiratory endurance and resting pulse rate when compared with control group.

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THE ORIGINALITY AND ROLE OF SAMUEL RICHARDSON'S NOVELS IN THE LITERATURE OF THE 18TH CENTURY

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ANNOTATION

Hereby article is devoted to the study of the peculiarities of the language and style of the English Enlightenment writer Samuel Richardson, the founder of English Sentimental school and master of English epistolary novel.

KEY WORDS: *Sentimentalism, epistolary novel, moral and ethic*

INTRODUCTION

A novel, as a literary genre flourished and reached the highest level of glory in the 18th century. According to The Shorter Oxford Dictionary, novel is “a fictitious prose narrative of considerable length in which characters and actions representative of real life are portrayed in a plot of more or less complexity” (cited in Rees, 1973, p.106).

Though English novel, as a literary genre gained popularity in the eighteenth century, its beginning can be traced back to 612 BC when world's oldest literature Epic of Gilgamesh was written. Homer, who lived in 700 or 800 BC, was the first notable poet or a literary pioneer who wrote the famous Greek epics, The Iliad and The Odyssey. He established the tradition of epic which had particular structure and subject matter.

The word novel is considered to have been derived from the Latin word “novellus”, Italian word “novella” (which meant a little new thing) and French word “novella”. The term “novella storia” (short tale in prose) was first used by Italian writer and poet Boccaccio, who was first to experiment writing prose. Boccaccio popularized the vogue of collections of novella with his collection of ten short stories titled Decameron in fourteenth century.

Majority of the literary critics attribute 18th century as the time period in which novel took its birth, subsequent growth and development. With adequate literary predecessors such as Bunyan, Behn, Chaucer, Malory, Cervantes, Boccaccio and numerous other writers of the 17th century, the 18th century writers availed opportunities to further experiment and produce novel as a literary genre.

THE ORIGINALITY AND WRITING STYLE OF SAMUEL RICHARDSON'S NOVEL

Samuel Richardson was born in 1689 in Derbyshire in London. He worked as a printer of the Journals of the House of Commons and Law Printer to the King. During his youthful stage he had experiences of writing love letter for three girls through which he understood the ways of femininity and utilized the same knowledge in his epistolary novel Pamela or Virtue Rewarded. Richardson believed that the novelist had dual purpose of writing novels; to inform the readers and impart morality.

Richardson had enormous influence on the development of the novel. His epistolary works transposed the details of ordinary life into high dramas of moral decision-making. In Richardson's novels, his characters reveal the minutiae of their thoughts, their emotional responses to social conflict and their efforts to understand themselves. This innovative approach to literary form, which Richardson called ‘writing to the moment’, would spur later novelists to attempt to bring fictional narrative even closer to everyday life.

Samuel Richardson created a family-household psychological novel, which depicted the daily life of a bourgeois family. He depicted people in the everyday atmosphere of the family and household. Richardson glorifies bourgeois virtues, but at the same time shows both the cruelty and inhumanity of existing mores. He was the first to give the description of private life in a deep drama, the first English novelist who tried to penetrate into the world of thoughts and feelings of his characters. He was interested in their manners and ethical ideas. This explains the emergence of the



epistolary novel genre. The lengthy and detailed letters of the heroes make it possible to judge their psychology, their inherent individual characteristics of the perception of others. Letters convey the emotional tension of the narrator, the world of his feelings.

The main feature of Richardson's novels, which made them popular is "sensibility". To read Richardson is to enter a moral universe in which the terms "virtue" and "honesty" are used, unironically, as synonyms for virginity. Richardson's puritanism was extreme even for his period. Richardson's wit and ability to conceive characters who feel "natural"—as he rather immodestly put it in the book's original introduction—enable the novel to outpace his own didactic intentions, to become something far more lifelike and original than a morality tale.

Richardson's three novels consistently describe the life of the lower, middle and upper class of society. The long works, on which his reputation rests; "Pamela; or, Virtue Rewarded" (1740), "Clarissa; or, the History of a Young Lady" (1748) and "The History of Sir Charles Grandison" (1754), in which the inner world of the character is shown. In his novels Richardson glorifies middle-class virtues as opposed to the immorality of the aristocracy. He makes his readers sympathize with his heroes. In each instance, the central story is a simple one.

Samuel Richardson published his masterpiece Pamela, or Virtue Rewarded in 1740. The publication of Pamela marked a defining moment in the literary history, the novel was not only a love story, but also a great masterpiece with a perfect layout, a study of ethics, female's psychology and as a case of depicting and recording the life and affection of ordinary people by delineating a lavish presentation of Pamela's private emotion and conditions of her everyday life.

The story is told in a series of letters from the heroine, Pamela Andrews. Pamela is a 15 year-old maid, her young master, the squire Mr.B takes a dishonorable advantage of her position, pursues her unremittingly. However, Pamela refuses him resolutely. She even leaves the estate. But Mr.B continuously aspires her, Pamela only has to escape from his stratagems and snares by resorting to her innocence and virtue. Finally, Mr.B was touched by her kindness and virtuous heart, he decides to marry her. After their wedding, Pamela suffers her married life with the burden of a profligate husband. Then, she behaved herself with honor pleasantness and humility that she made herself beloved of everybody including her husband's relatives who at first despised her. By rendering the struggle over Pamela's virtue in her own humble idiom, Richardson expresses his moral and aesthetic claim that the soul of a servant-girl is as important as that of the princess. The combination of a high moral tone with an elaborate

analysis of the heroine's emotions and state of mind made it irresistible to readers.

Clarissa Harlowe is, unquestionably, Richardson's most perfect book and among the greatest universal literary works. This realistic, sensitive, analytical, sentimental and social novel was admired by all European intellectuals. The combination of sensitive and sentimental elements, the practice of virtue and social justice, the character analysis and the reality of life in that period, is what makes this work unique. With regard to the epistolary genre, the work signified a considerable improvement on the previous novel. It tells the tragic story of a young woman, Clarissa Harlowe, whose quest for virtue is continually thwarted by her family. The Harlowes are a recently wealthy family whose preoccupation with increasing their standing in society leads to obsessive control of their daughter.

The novel was a huge success. People were absorbed in it, they pleaded Richardson not to let Clarissa die and, like Pamela, live happily ever after. However, the greatest impression on the audience made a demonic image of Lovelace. According to some estimates, Lovelace as a character is brighter than Clarissa.

"Clarissa" is a masterpiece of psychological prose. Moral duty in Clarissa's face was opposed to unprincipled Lovelace. Clarissa was good and moral, Lovelace was cynical and selfish. She was a victim, he was a predator. They are the opposite concepts of a person.

The third novel "The History of Sir Charles Grandison", undoubtedly the least accepted of Richardson's novels, despite enjoying the admiration of select minority circles, made a difficult appearance in England. Commonly called *Sir Charles Grandison*, first published in February 1753. The book was a response to Henry Fielding's *The History of Tom Jones, a Foundling*, which parodied the morals presented in Richardson's previous novels. The novel follows the story of Harriet Byron who is pursued by Sir Hargrave Pollexfen. After she rejects Pollexfen, he kidnaps her, and she is only freed when Sir Charles Grandison comes to her rescue. After his appearance, the novel focuses on his history and life, and he becomes its central figure.

The "History of Sir Charles Grandison" is interesting mainly as an artistic reflection of the positive concept of the moderate democratic wing in the English Enlightenment to which Richardson belonged. His hero, Sir Charles, rejects the aristocratic code of honor in the name of new, bourgeois ideals, professes the principles of enlightened tolerance for non-believers and foreigners, encourages the development of trade and manufactures, engages in philanthropy and carries out a number of bourgeois reforms in his family estates.

Sir Charles Grandison is the first ideal male image created by the novelist, which embodied the new social ideal



of the gentleman. Richardson here followed the views of contemporary liberal philosophers and theologians, especially Shaftesbury, with his idea of altruism inherent in human nature.

In the novel Sir Charles Grandison is presented as a handsome and intelligent man of his time not only externally, but also internally.

We can clearly see it in the following phrases, where the protagonist of the novel, Sir Charles Grandison, is described by the heroine of the novel, Miss Byron, in a letter to her friend Miss Selby:

“Sir Charles Grandison, in his person, is really a very fine man. He is tall; rather slender than full; his face in shape is a fine oval: he seems to have florid health; health confirmed by exercise.

His complexion seems to have been naturally too fine for a man: but as if he were above being regardful of it, his face is overspread with a manly sunniness that shews he has been in warmer climates than England: and so it seems he has; since the tour of Europe has not contented him. He has visited some parts of Asia, and even of Africa, Egypt particularly...I wonder what business for a man has for such fine teeth, and so fine a mouth, as Sir Charles Grandison might boast of, were he vain. In his aspect there is something great and noble, that shews him to be of rank, were kings to be chosen for beauty and majesty of person, Sir Charles Grandison would have few competitors”

In this work, the author shows the main hero from the other side. In one of the passages, we can see Sir Charles's careful attitude not only towards people, but also towards animals, such kind of character representation cannot leave the reader indifferent :

“His equipage is perfectly in taste, though not so much to the glare of taste, as if he aimed either to inspire or shew emulation. He seldom travels without a set, and suitable attend-ants; and, what I think seems a little to savour of singularity, his horses are not docked: their tails are only tied up when they are on the road. This I took notice of when we came to town.

But if he be of opinion that the tails of these noble animals are not only a natural ornament, but are of real use to defend them from the vexatious insects that in summer are so apt to annoy them.”²

CONCLUSION

Richardson is interested not only in the actions of people, but also innumerable hidden, barely perceptible movements of thought and feeling, indirectly manifested in action. He draws such a thin thread between the inner and outer worlds of the characters, his smooth transitions from one action to another give his works an increasingly strict

character. In the everyday, private existence of ordinary people of his time, Richardson reveals feelings of such extraordinary depth, spiritual experiences of such subtlety and complexity, which until recently seemed to be the exclusive privilege of the "high" heroes of chivalric pastoral novels and tragedies of classicism.

Richardson learned to know his characters, so intimately, so thoroughly, as to triumph over his prolixity, repetitiveness, moralizing, and sentimentality. Equally important was his development of the epistolary novel. Other writers had used letters as a storytelling device, but few if any of Richardson's predecessors had approximated his skill in recording the external events and incidents of a narrative along with the intimate and instant revelation of a character's thought and emotions in the process of their taking place, a method so flowing, so fluid, so flexible, as almost to anticipate the modern technique of stream of consciousness. Richardson's works, along with those of his three great contemporaries—Henry Fielding, Tobias Smollett, and Laurence Sterne—prepared the way for the great achievements of the nineteenth century English novel.

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MITIGATION OF HARMONICS IN POWER SYSTEM USING FILTERS

Komalika Gaikwad, Apoorva Manmode

ABSTRACT

In the new era, with the increasing use of power electronic devices, power efficiency along with system efficiency is playing an important role in the progress of power supply. The fundamental purpose of the electric utility is to provide a sinusoidal voltage at constant magnitude throughout the system. This objective is convoluted because of the non-linear loads present in the system which produce harmonic currents. Hence, our work aims to mitigate harmonics injected by non-linear load system. The mitigation technique utilized in this project is implementation of Harmonic Filters. According to the recommended IEEE 519 power harmonic standards, the total harmonic distortion must be less than 5%. Hence, to reduce the THD, suitable filter design is implemented in this work. The mitigation of harmonics can report significant benefits for industries in terms of installation cost and protection against equipment faults in the power system. The overall process of Harmonic analysis and mitigation is performed using MATLAB/SIMULINK.

KEYWORDS: Harmonics, Power electronic devices, Mitigation, non-linear load, Filters, THD, MATLAB.

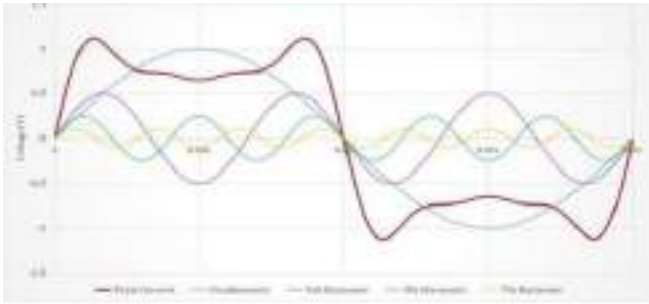
I. INTRODUCTION

Power quality problems are manifested in voltage, current, or frequency variations, which can cause sensitive equipment to malfunction [1]. An increase in non-linear and time-varying loads leads to voltage and current distortions in the system with a rapid increase in reactive power. Non-linear loads and switched devices are powered by sinusoidal sources or linear loads, and switched devices with non-sinusoidal sources produce harmonics in the distribution system. Currents flowing over long HVDC and HVAC lines and overloaded distribution transformers can cause line losses. In power electronics, saturated and arcing loads cause harmonics to increase the overall distribution loss. Switching from AC to DC injects lower order harmonics into the system. Harmonics affect energy quality and increase system losses by up to 20%. Smart grids with 1–8% THDV may lose 4.7–42.2% capacity [2]. Harmonics at the instrument and distribution levels can be cut and injected back into the system, resulting in a distorted waveform that leads to lower power quality. Harmonic orders can range from 2 to 100 (even more), although orders 2-25 are generally considered for harmonic analysis. Higher order harmonics are much smaller than lower order harmonics. Inter-harmonics are not integral modules of fundamental ranging from 0 to 600 kHz. The oscillation frequencies of the inter-field large and small signal power system vary from 0.2 to 4 Hz. Voltage fluctuations and sub-synchronous resonance frequencies often range from 20-40 Hz. Simultaneous voltage, current and frequency magnitudes as well as frequency deviation protection and controls affect the signal signals that the filter needs to start signal processing. Satisfactory operation of the system depends on

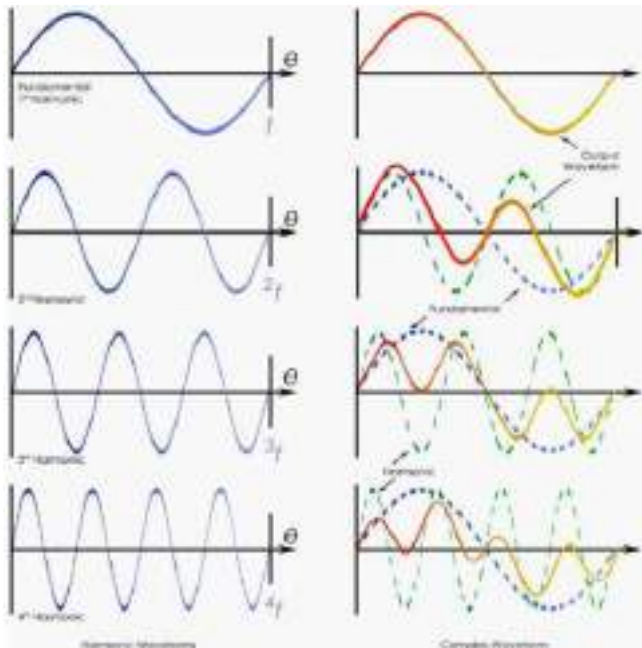
detecting interconnections, new loads, new production stations or their effects before installing new transmission lines. Since system impedance is a major parameter to consider when voltage distortions occur due to harmonic generating loads and the amount of harmonic current injected, harmonic currents can cause further problems such as tripping of circuit breakers, overloading in neutrals and power outages, Factor correction capacitors overloading etc [3]. To reduce the harmonics produced by specific components of the power system, such as non-linear loads, filters are installed.

II. HARMONIC ANALYSIS

The four main characteristics used to define the power quality of any power system are voltage, current, frequency and power imbalance. The distortion or imbalance of these features is called harmonics. In terms of supply voltage and current waveforms, this is a deviation from the ideal sinusoidal waveform. Harmonic analysis plays an important role in understanding and classifying the severity of harmonic problems. Harmonics can be caused by non-linear loads such as variable speed motors, switching mode power supplies and other devices that attract non-sinusoidal outputs. The load that attracts the non-sinusoidal current when excited by a sinusoidal voltage source of the same frequency is called the nonlinear load. The harmonic limit is rated at the common coupling (PCC) point between the power system load and the powerful system utility.



Harmonic analysis takes place while looking for a solution to an existing harmonic problem, such as installing large capacitor banks on power systems or designing harmonic filters. To reduce these harmonic distortions, harmonic mitigation techniques are used [4&5] One such technique is to install harmonic filters in a power system. In this paper, the quenching technique we used to reduce harmonics is to install a single tuned passive filter and a high pass filter. This filter is installed on buses with relatively high personal harmonic distortion factor compared to other buses and exceeds the standard IEEE limit.



III. METHODOLOGY

The process of harmonic analysis depends on whether the system already exists or is completely new. If this is an existing system, the process of calculating the harmonics takes place using the harmonic analyzers in the plant. The

whole process of harmonic analysis is performed using MATLAB or Power Quality Analyzer [6].

Step 1: - Establishing the purpose of the harmonic study, in other words, calculating the existing harmonics in the system or determining the source and extent of the problem in the existing system.

Step 2: - Next, we start the process by analyzing the load flow, thus determining the parameters such as active power, reactive power, voltage magnitude and phase angle. This is followed by a harmonic analysis, which determines the level of harmonics in the system and the total harmonic distortion factor, after which we compare the data to the range approved by IEEE 519-2014.

Step 3: - The data of the existing system is analyzed, in particular, its working conditions, problems and causes.

Step 4: - According to the analysis, the filters are applied. It is important to check the sensitivity of the results. To operate the filter, there are four main characteristics: fundamental frequency of operation (H), system voltage (V) in kV, reactive power requirements of the plant (P) and filter quality factor (Q.) The values of resistance (R), inductance (L), capacitance (C) are calculated using the given formula,

$$C = \frac{Q_c}{2\pi f V^2}$$

$$X = \frac{1}{2\pi f h C} = \sqrt{\frac{L}{C}}$$

$$L = X^2 C$$

$$R = \frac{2\pi f h L}{Q}$$

Step 5: - After the implementation of the proposed solution, studies will be conducted to monitor and verify the operation of the system and their harmonic parameters.

IV. CAUSES AND EFFECTS OF HARMONICS

Extensive population growth, energy demand, economic growth and emissions have made renewable energy sources popular. Renewable energy sources connected to the national grid at the distribution level through harmonic rich inverters that increase utility line losses. In power electronics, saturated and arcing loads increase the overall distribution loss of harmonics. For example, an inverter is the heart of a modern renewable energy system, providing DC to AC switching to synchronize renewable energy sources with an existing power grid network; Converting DC to AC introduces lower order harmonic injection into the power system. Integrating solar parks, wind farms and DC reserves into the national grid at the distribution level can lead to power quality issues such as harmonics, low power factor and voltage fluctuations. Converter-connected static PV or DC storage and dynamically distributed generation systems minimize traditional line losses but add harmonics losses due to asynchronous THDV. Harmonics are produced by non-linear loads and switched equipment, typically up to 40% of the utility load.

Harmonic currents increase hysteresis, eddy current and core damage in generators, transformers and induction

motors; Multiplying line losses in conductors and cables due to high frequencies; Due to malfunction of circuit breakers, fuses and protective relays and control systems. Harmonic currents increase the rms value causing joule loss. Distribution system with 10% THDV can experience 2-15% loss in transformer, 6% loss in generator and 15-16% loss in capacitor. Harmonics in wind power conversion systems can damage overall efficiency through torque pulsation, low power factor, overheating and increased stator winding losses. Harmonics affect energy quality and increase system losses by 20%, of which 27% are attributed to harmonics. Recent studies suggest that additional power losses in distribution networks may be in the range of 4-8.5% for different harmonic levels. Distribution system losses vary with non-linear loads and increase to 110% at 100% harmonic loads.

V. SIMULATION AND OBSERVATIONS

In this work, the DC converter from a three-phase AC with and without a passive shunt filter is simulated using the MATLAB / SIMULINK simulation. The system analyzes the total harmonic distortion as an indicator with and without passive filters. The circuit parameters used in the simulation are displayed in the following table:

Supply Voltage	220 V RMS
Source Inductance	1.06mH
Load (Resistive)	100 ohms
Transformer (three winding)	Yg/y/d1, 1200 VA, 220V/100V/100V

The system considered for harmonic analysis here consists of a three phase converter consisting of two 6 pulse bridges modeled to work as an uncontrolled rectifier. The schematic of the system is shown in the figure 5.1.

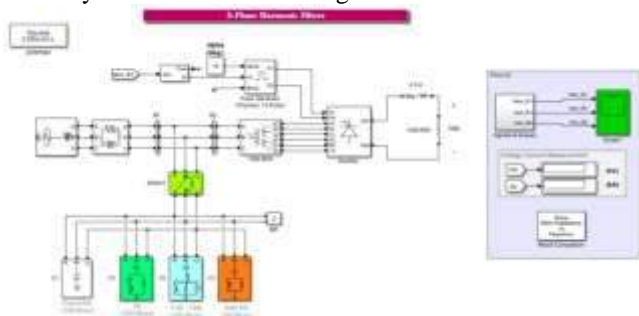


Fig. 5.1 Three Phase 12 Pulse Ac-Dc Converter

The FFT analysis windows of VS and Is are given in figure 5.1.1 and 5.1.2, which shows the percentage harmonics in the spectrum before the filters are incorporated. Since the

waveforms are distorted, it implies the presence of harmonics.

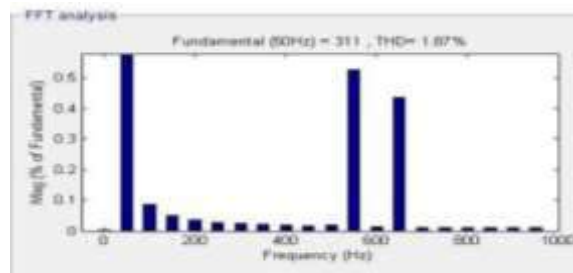


Fig.5.1.1

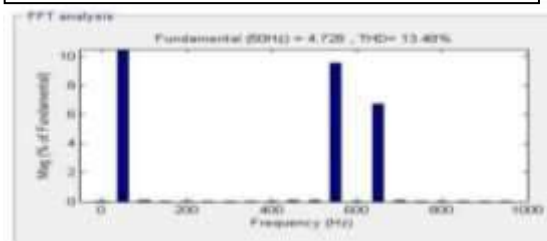


Fig.5.1.2

Without passive filters the total harmonic distortion of the current is above the range specified by the power quality standards. To follow the recommended IEEE 519 power harmonic standards the total harmonic distortion must be less than 5%. This can be obtained by connecting the passive filters to the system. For reducing the THD below 5% passive filters have been designed. There are three filters used, two of which are single tuned at 11th and 13th harmonic and the other is high pass filter for high order harmonics. The filters specifications for each type of filter are shown in the below

Harmonic Order	Capacitance (μF)	Inductance(mH)	Resistance (Ω)
11 th	165.1	50.71	0.04375
13 th	28.5	2.1036	0.21478
Higher order	39.3	2.1036	7.4775

After connecting the filters the three-phase supply currents become near to sinusoidal and harmonics are decreased below 5%. The FFT analysis windows of the source voltage and current are given in figure 5.2.1 and 5.2.2 respectively which shows the percentage harmonics in the spectrum with the filters incorporated.

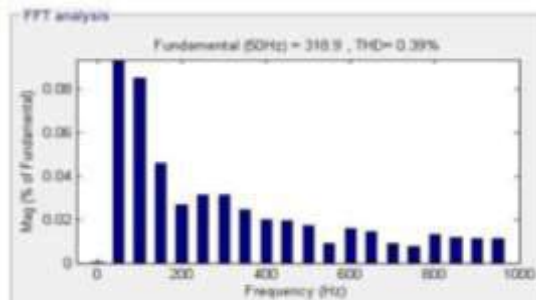


Fig.5.2.1

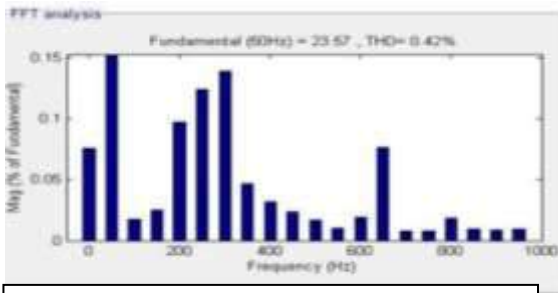


Fig.5.2.2

The resultant output waveform of the current harmonics is given in fig 5.3, Where I_{abcB_1} represents the line after the application of filters. The top most graph shows the voltage harmonics, the lower graph shows the current harmonics before filtration and the middle one is the current signal after the application of filters.

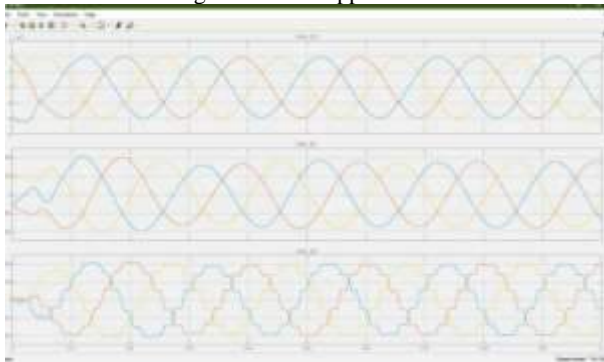


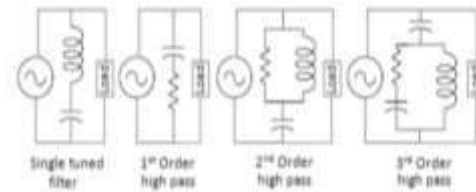
Fig.5.3

As observed from the graph, we can clearly infer that the harmonics present in the current source have been mitigated.

VI. MITIGATION TECHNIQUE

Filters are one of the solutions intended to overcome harmonic problems and keep them within safe limits. They provide a low impedance path or 'trap' for the filtered tuned harmonic, hence the term tuned (resonant) circuit. The purpose of the tuning process is to set the circuit to the maximum or maximum resonance frequency of the reactance. Then the circuit is said to be in resonant state.

Passive filters are arrangements of R, L and C elements that are connected in various combinations to achieve the desired relief of harmonics. This type of filter is used to remove harmonic currents from the line or to block their flow between systems by tuning the elements to create an echo at a selected frequency. . In addition, they provide reactive power compensation to the system and thus improve the overall power quality. Passive filters can be used to reduce the specific harmonic frequency, so the number of passive filters increases as the number of harmonics increases.



Passive harmonic filters.

Passive filters are further classified into two types:

6.1. Passive shunt filter-

These are classified further as single tuned, 1st order high pass, 2nd order high pass, 3rd order high pass.

6.1.1 Single tuned filters

The single tuned filter or the “notch” filter is the most common type of passive filter it can be attributed to the fact that it is also the most economical type of filter. The notch filter is series-tuned to present low impedance to a particular harmonic current and is connected in shunt with the power system. Thus, harmonic currents are diverted from their normal flow path on the line through the filter. Notch filters can provide power factor correction in addition to harmonic suppression. At the tuned harmonic, capacitor and reactor have equal reactance and the filter has purely resistive impedance.

The impedance vs frequency curve of this filter is shown in Figure

6.1.2 Double Band Pass Filters

A double Band Pass Filter is a series combination of a main capacitor, a main reactor and a tuning device which consists of a tuning capacitor and a tuning reactor connected in parallel. The impedance of such a filter is low at two tuned frequencies.

6.1.3 Damped Filters

These filters can be of 1st, 2nd, or 3rd order type, among which the most common is the 2nd order. A 2nd order damped filter consists of a capacitor in series with a parallel combination of a reactor and a resistor. It provides low impedance for a moderately wide range of frequencies. When used to eliminate high order harmonics (17th and above), a damped filter is referred to as High Pass Filter, providing a low impedance for high frequencies but stopping low ones.

6.2. Passive series filter

A series passive filter is connected in series with the load of the system whereas the inductance and capacitance are connected in parallel and are tuned to provide high impedance at a selected harmonic frequency. At fundamental frequency, the filter would be designed to yield low impedance, thereby allowing the fundamental current to flow with only minor additional impedance and losses.



Series filters are used to block a single harmonic current (such as the third harmonic) and are especially useful in a single-phase circuit where it is not possible to take advantage of zero sequence characteristics. The use of the series filters is limited in blocking multiple harmonic currents. Each harmonic current requires a series filter tuned to that harmonic. This arrangement can create significant losses at the fundamental frequency.

VII. DESIGN STEPS OF FILTERS

In design of the filter, the proper selection of the capacitor size is very essential from power factor point of view [11]. A series-tuned filters is a capacitor designed to trap a certain harmonic by adding a reactor such that $X_L=X_c$ at the frequency f_n .

To design series-tuned following step are followed:

- Determine the capacitor size Q_c in MVAR, say the reactive power requirement of the source.
- The capacitor reactance is

$$X_c = \frac{kV^2}{Q_c}$$

- Capacitance for filters is calculated by

$$C = \frac{1}{2\pi f X_c n}$$

Where n =number of filters to be designed

- The resonance condition will occur when capacitive reactance is equal to inductive reactance as:

$$X_L = X_C$$

- To trap the harmonics of order h , the reactance should be of size

$$L = \frac{1}{(2\pi h f)^2 * C}$$

- The resistance of filter depends on the quality factor (Q) by which sharpness of the tuning is measured.

$$R = \frac{\sqrt{L}}{Q}$$

Where Q is the quality factor and for series tuned is $30 < Q \leq 100$.

CONCLUSION

The main purpose of electric utilities is to distribute sinusoidal voltage in a constant amount throughout their

system. When substantial harmonic production loads are introduced into an industrial system, it is a convenient method to explain their effect on the electrical system by applying mitigation methods. When alternating loads are connected to buses, the source distributes harmonic currents throughout the load. The use of filters reduces these harmonic distortions that trigger compensating components in the system. The filter is designed with the help of a mathematical model of parameters before installation. It is clear from the results and observation in the paper that the harmonic levels are reduced after the filters are installed in a given power system and brought to an acceptable standard range thereby improving the reliability and power quality of the system and reduces damage. Load-ended devices such as adjustable speed drives, power electrical switching elements, synchronous machines, etc. We perform harmonic design analysis of the system at the initial stage of planning before modifying an existing power system or erection of a new power system and obtain simulation results for efficient implementation. Here, the practical and simulation values after the erection of the power system can be compared.

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THE ROLE OF TRADE UNIONS IN PREVENTING CHILD LABOR AND FORCED LABOR IN RENEWING UZBEKISTAN

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ABSTRACT

This article analyzes the work of trade unions in the prevention of child labor and forced labor in Uzbekistan, which is updated using periodicals and the Internet.

KEYWORDS: *Trade unions, federations, public organizations, labor protection, child labor, International Labor Organization, labor law, development strategy.*

INTRODUCTION

On the basis of the principle “From action strategy to development strategy” adopted at the initiative of the President of the Republic of Uzbekistan, the New Uzbekistan Development Strategy for 2022-2026 was developed to further improve the welfare of the population, ensure human rights and interests, and establish active civil society was released. This strategy is an important document that determines the development of our country.

We all know that today the development of Uzbekistan in the socio-economic and political spheres, the reforms being carried out in all spheres of state and society building will not leave anyone indifferent. Therefore, the huge reforms being carried out in our country, of course, require a radical change in the activities of public organizations, including trade unions. One of the historic events in the life of trade unions was the signing on December 6, 2019 by the President of the Republic of Uzbekistan of a new law “On Trade Unions”. The adoption of this law has allowed to bring the activities of trade unions to a new level and expand their powers.

METHODS

The Federation of Trade Unions of Uzbekistan, as a member of the General Conference of

Trade Unions, acts as an independent and equal social partner of the government in the field of labor protection, ensuring the rights and freedoms of workers. Indeed, as stated in Article 13 of the Constitution of the Republic of Uzbekistan, democracy is based on universal principles, according to which a person, his life, freedom, honor, dignity and other inalienable rights are the highest value. Therefore, the solution of this issue is in the first place in the activities of trade unions.

RESULTS AND DISCUSSIONS

In Uzbekistan, trade unions pay special attention to the prevention of child labor and forced labor, the protection of their legal interests, the full implementation of all provisions of international labor standards, including international labor conventions.

It should be noted that since 2013, the International Labor Organization (ILO) has been conducting research on the situation with forced labor and child labor in our country, in particular the cotton harvest. Significant progress has been made as a result of the practical work of government and public associations, including trade unions, in cooperation with this organization. In particular, the Resolution of the Cabinet of Ministers of May 10, 2018 “On additional measures to eliminate forced labor in the Republic of Uzbekistan” was an important tool in the fight against



forced labor in the cotton harvest. In general, a strong legal mechanism has been created in our country to prevent and prevent forced labor.

At present, the country has three organizational structures on prevention and suppression of child labor and forced labor, the Parliamentary Commission on Guaranteed Labor Rights, the Coordinating Council on Child Labor and Forced Labor in the Republic of Uzbekistan, the International Labor Organization conventions ratified by the Republic of Uzbekistan. It is also commendable that the Republican Interdepartmental Commission for its implementation is functioning.

At the 46th session of the UN Human Rights Council, President of the Republic of Uzbekistan Sh.M.Mirziyoev said: "We have worked hard with the International Labor Organization and the World Bank to eliminate forced labor and child labor. This has been one of our major achievements in reform".

The adoption of a new version of the Law of the Republic of Uzbekistan "On labor protection" in 2016 will also serve to increase the prestige and social role of the federation in the eyes of the public. The ratification of the ILO Convention on Freedom of Association and the Right to Organize and the accession of Uzbekistan to the Protocol to the ILO Convention on Forced Labor also played a positive role.

These documents gave the trade unions of Uzbekistan unprecedented rights and powers in the field of labor protection. This allows them to support and assist in the implementation of active reforms and changes in all spheres of life of the state and society.

Nowadays, the role of trade unions in Uzbekistan has risen to the highest level, even compared to the standards of the International Trade Union Confederation. And it can be said that in the new Uzbekistan, a fundamentally new legal mechanism for the protection of socio-economic rights of workers has been created, which indicates that the activities of trade unions have reached a new level. Article 31 of the Law of the Republic of Uzbekistan "On labor protection" stipulates that trade unions and other representative bodies of employees represent in the field of labor protection, as well as the rights and legitimate interests of employees.

Currently, more than 33,000 primary organizations are effectively operating in the system of trade unions in the country, as well as more than 6,500 employees and about 360,000 activists.

Currently, trade unions unite more than 5.5 million members and provide practical assistance in ensuring their labor rights and interests.

It is noteworthy that in order to protect the labor of employees, trade unions have studied the activities of about 16,000 enterprises and organizations, and more than 61,000 identified shortcomings have been eliminated.

As a result of the efforts of trade unions, the violated labor rights of about 14,000 employees were restored, and more than 3.6 billion soums were recovered.

In 2019, an employee of the labor protection service examined the activities of 1,080 primary trade union organizations and identified 6,294 deficiencies in compliance with the rules and requirements of labor protection. 740 proposals were submitted to employers to address these shortcomings, and the shortcomings identified in 697 applications were addressed with the intervention of trade unions.

The Federation of Trade Unions of Uzbekistan in cooperation with the Parliamentary Commission on Guaranteed Labor Rights and the Coordinating Council for Child Labor and Forced Labor in the Republic of Uzbekistan held a video conference on "Social partnership - a guarantee of decent work".

It was noted at the event that according to the results of systematic monitoring of child labor and forced labor in the cotton industry with the participation of the International Labor Organization and foreign experts, the world community recognizes the absence of child labor in our country and serious measures against forced labor.

It should be noted that the historic speech of the President of the Republic of Uzbekistan at the 72nd session of the United Nations General Assembly became the main historical point of these renewals and became the basis for the complete abolition of forced labor.

At the initiative of the President of the country, the Federation of Trade Unions is carrying out systematic work with the participation of social partners and international organizations, in particular, the



Federation of Trade Unions in cooperation with the International Labor Organization in April-May 2018 324 seminars on prevention and prevention of severe forms of child labor and forced labor were held.

In 2019, with the active participation of the Federation of Trade Unions in honor of June 12 "World Day Against Child Labor" in a total of 130 camps and 253 health centers across the country "Children should work in dreams, not in the fields!" 53,330 children took part in the event.

The event featured video slides on labor protection and children's rights in agriculture, competitions in chess, checkers, table tennis, football and other sports, drawing competitions, meetings with artists and other masters in other fields, as well as master classes were held.

In the development of a renewed Uzbekistan, trade unions should pay special attention to the following issues in the implementation of the huge tasks aimed at ensuring the legitimate socio-economic rights and interests of workers:

- Further improvement of specific mechanisms for the protection of socio-economic and rights and interests of employees;
- Use of effective means of employment, labor protection and safety;
- Ensuring decent wages, further increasing the effectiveness of social protection;
- Systematic implementation of practical work on the eradication of poverty, the perfect guarantee of human rights and freedoms;
- Ensuring gender equality in our country, ensuring that children and forced labor are not allowed;
- Continuous implementation of additional benefits for employees working in hazardous and harmful working conditions;
- The use of effective tools to further expand the participation of trade unions in the legislative process;
- Further systematic development of cooperation of the International Federation of Trade Unions with international organizations.

CONCLUSION

In conclusion, it should be noted that the participation of trade unions in the country in the field of lawmaking, promotion of employment, labor

protection, protection of socio-economic interests and labor rights of workers, especially youth and women, effective communication with the population. Only if we ensure that great changes will take place in our society and practical results will be achieved in building a new Uzbekistan. It is noteworthy that the trade unions also have important tasks in this regard.

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MAHALLA IS AN UPBRINGING ABODE

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ABSTRACT

In the article has been analyzed increasing process of the participation of citizens in the mahalla where they live, further strengthening direct contacts between government agencies and mahallas, introducing an effective mechanism for working with the population in mahallas, as well as further improving the digitalization process by the helping scientific literatures and archive sources.

KEYWORDS: *Government, mahalla, upbringing, process, population, digitalization, mechanism.*

INTRODUCTION

If we look at the history of Uzbek statehood, we can see that the mahalla institution has been one of the main links in the development of statehood. Today, the country is implementing a number of reforms to form a civil society, first of all, to increase the role of mahalla institutions. The mahalla institute, which has no analogues in the world, is historically shaped and deeply rooted for thousands of years and is a strong place that unites our people. In the process of transition to today's market relations, not losing our identity is more important than ever. It also shows the importance of the role of the mahalla as an educational institution in increasing the love of our youth for their country, uniting the population by preserving the customs, traditions and values of our people.

Therefore, the unique way of life, culture, national traditions, moral and spiritual values of the Uzbek people are historically passed down from generation to generation. The mahalla institute, which is the center of spiritual education, is developing as a lower level of administrative management, ie a self-governing body. Decree of the President of the Republic of Uzbekistan dated January 28, 2022 No.PD-60 on the Development Strategy, consisting of 7

directions, containing 100 goals, aimed at further development of the country in 2022-2026. found its reflection.

RESEARCH METHODS

The first direction of the strategy is to build a people's state through the development of a free civil society, to ensure human dignity and its legitimate interests. The first goal of the direction is to increase the efficiency of the mahalla institute, to make it a base link of public administration and control. In order to solve socio-economic problems in the regions on the spot, it is planned to expand the powers of mahallas, thereby strengthening their financial independence. Therefore, ensuring the independence of the mahalla institution as the following link in the system of state and public administration, as well as a guarantee of the well-being of society and the state.

RESULTS AND DISCUSSIONS

This means increasing the participation of citizens in the mahalla where they live, further strengthening direct contacts between government agencies and mahallas, introducing an effective mechanism for working with the population in mahallas,



as well as further improving the digitalization process and to alleviate the burden of the people, as well as to provide public and social services directly from the institution of the mahalla, which is a subordinate body [1].

Targeted training of highly qualified specialists in further development of mahallas, ensuring the well-being of the population, formation of management skills, banking, finance, land, land, livestock and poultry in all mahalla chairmen and assistant governors. Establish effective work of the institute of assistant district (city) governor on employment and poverty reduction through the development of entrepreneurship and handicrafts in the neighborhoods. We can feel the reforms and positive changes taking place in Uzbekistan in recent years. Consequently, such changes are also reflected in the activities of self-governing bodies. Consequently, due to the humanitarian policy pursued by the head of our state, large-scale reforms in all spheres have led to an increase in the participation of the population in governance processes. If we take into account the fact that in our country our people live mainly in the neighborhoods, we can see the active participation of the population in local self-government.

In the management of the state and society aimed at glorifying human dignity, first of all, it confirms the high role of the institution of self-government in the activities of the state and society. In this regard, the President of the Republic of Uzbekistan said: "... today the mahalla must emerge as a great social force. Because the activists in the neighborhood, the elders who have seen a lot, our experienced luminaries, if they want, together with the community, are able to solve any problem from the neighborhood, to guide the young people who made mistakes" [2].

Based on the principle "Reform is not for reform, but for the benefit of the people", which is fully reflected in life today, by deepening the reforms in the social sphere, to improve the living conditions of our people, the mahalla institute, self-government body as has its legal status. Law of the Republic of Uzbekistan "On citizens' self-government bodies", adopted on March 15, 2013.

Article 4 is as follows. The main principles of the activities of citizens' self-government bodies are: democracy; transparency; social justice; humanism;

independence in addressing issues of local importance; community-based mutual assistance [3].

Also, the articles of the Law on Citizens' Self-Government Bodies create democratic conditions for the regulation of our society. For the socio-economic development of the lower strata of society referred to in this article, the activities of public authorities and administration, in particular the government and parliament, shall ensure that other public authorities do not illegally interfere in the activities of citizens' self-government bodies. Such activities are firmly defined in the law and other normative acts and serve the development of our society. In addressing the problems in the mahallas, the head of state has developed new effective mechanisms for the mahalla institute and put them into practice.

Taking into account the socio-political functions of citizens' assemblies in Uzbekistan, as well as in developed countries, the role of local authorities in further liberalizing their participation in state and local government is recognized. Within the framework of these powers, citizens' assemblies make proposals for further improvement of the activities of state and local authorities and the elimination of identified shortcomings on the spot, that is, participate in the implementation of local governance.

L. Levitin and D. Carlisle, who studied the history and sociology of the mahalla for many years, wrote in the book "Islam Karimov - the new President of Uzbekistan" that the role of mahallas in Uzbekistan in the former Soviet Union was almost eliminated. He writes: "Family and friends have been and will remain the mainstay of neighborhood life. He is the cornerstone of personal relationships. They created a very important branch structure called the "dynasty" that unites and divides people. A community based on intimacy and based on the principles of genealogy is a place where Uzbeks are born, raised and spend their entire lives. In a neighborhood where friendship is a stable concept, inclination will be ingrained. There will be a propeller all around the neighborhood, personal loyalty will spread throughout the city, and sometimes it will cover the whole region. In such a situation, someone's experience immediately spreads beyond the scope of personal communication. A person can participate in the wedding ceremonies of members of the dynasty from



any distance. Colorful family ties are a cornerstone of everyday life outside the neighborhood, but they are not the same as in the neighborhood” [4].

It is noteworthy that it is aimed at strengthening the spiritual environment in the neighborhoods, strengthening interethnic friendship and solidarity, educating our youth in the spirit of devotion to the motherland and the national idea, further improving the effectiveness of social support for the poor.

It also requires the implementation of large-scale measures in the field of socio-economic strengthening of the population, employment of vulnerable groups. In addition, through the study of the activities of citizens self-government bodies in the implementation of legislation in the field, through the citizens' self-government bodies in order to widely disseminate the best practices of developed countries. In the field of targeted social support, in cooperation with the centers of employment and social protection, the norms on identification of low-income families, lonely elderly, pensioners and the disabled in need of social support, employment assistance, employment of citizens living in the territory of citizens' assemblies were introduced.

In addition to giving additional powers to exercise public control over citizens' self-government bodies, there is a separate article defining the forms of public control by citizens' self-government bodies and the guarantees of public control over citizens' self-government bodies serves to further develop the system.

In order to expand the scope of tasks performed by local authorities and citizens' self-government bodies, it is necessary to gradually transfer to them the part of state powers related to the mahalla system. Most importantly, it will serve as a basis for a more complete representation and protection of the interests of the professional and social structure of the population, as well as to enhance the rights and status of non-governmental, public structures. This is the essence of the political construction program “From a strong state to a strong civil society”. It is this approach that enables citizens to participate widely in the management and organization of their own lives and the lives of society as a whole. This is fully in line with the principles of civil society.

From the first days of our independence, an exhibition-seminar has been organized in the mahallas of Margilan to restore national traditions, help homeless elderly people, and organize low-cost wedding ceremonies. With the help of the population, a first-aid post was built and completed in the spread mahalla of the city, and the residents of the mahalla established a recreation area and a charity fund. Of course, it is good to organize such good deeds in rural areas. Our weddings are still lavish, expensive and wasteful. Local committees are not indifferent to the joys and sorrows of the residents of the neighborhood. It is fair that such problems have been neglected since the early years of independence [5].

It creates a favorable environment for the liberalization of state and society building in Uzbekistan. In order to create the necessary legal and organizational conditions for the President of the Republic of Uzbekistan in 2016 to further deepen reforms and implement the main priorities of social renewal, to liberalize large-scale reforms in the political and economic spheres in the field of state and society building, has set a course for development, and is serving as a program to protect Western countries from the negative vices of popular culture.

In the lives of Western countries today moral depravity, the disintegration of the family and society, the acceleration of which has led to innumerable problems, in addition to the loss of interest in life. The indigenous population of the developed Western countries is declining at an alarming rate as a result of the sexual revolution. Every year, countless people leave the world because of these diseases, the offspring are corrupted, people become weak and sick, and various mental and spiritual illnesses occur [6]. The President of the Republic of Uzbekistan said: support their participation, protect their rights and legitimate interests, as well as ensure their employment, increase their role in the socio-political life of the country, provide financial assistance and social support to the elderly and veterans, needy and low-income families, family and Decisions on wide involvement of private entrepreneurship, handicrafts and their efficient use of lands, improvement of logistics of citizens' assemblies and widespread introduction of modern information and communication technologies in the field support local



self-government bodies. contributes to the development of the island.

One of the main factors in the development of the state is the interdependence of different nationalities living in it and in the surrounding countries. It is known from the recent history of the Republic of Uzbekistan that in order to destabilize the society, they tried to sow discord and discord among some nations. One of the most effective means of combating such actions, which always threaten the peaceful development of society, is the consolidation of common sense forces in the neighborhood, the essence of the ongoing reforms, the gradual resolution of existing difficulties and objective public awareness among the general public. to promote the importance of harmony and to intensify the work in this direction [7]. Today's unrest in neighboring countries is unfortunate because of the growing hostility to one another in the clashes between nations. The most effective way to resolve such conflicts peacefully and fairly is to create a legal and equitable opportunity for citizens of all nationalities living in the neighborhoods.

CONCLUSION

In Uzbekistan, the mahalla institute has begun to gain ground. At the same time, the legal status of local self-government is being strengthened. Serious reforms are being carried out to make the mahalla a key institution of civil society. In addressing various socio-economic and spiritual issues today, the community began to be approached. In particular, citizens' assemblies, which are now self-governing, are an important institution in the formation of civil society as a self-governing body, and during the years of independence, attention has been paid to the further development of this institution. In this regard, attention has been paid to the revitalization of civil society institutions, and mechanisms have been developed to increase the legal and political knowledge of officials working in citizens' assemblies to build the rule of law and a just civil society. Problems in Buddhist families are being solved in the mahalla itself. Consequently, in the system of self-government bodies, as in all spheres, the process of digitization is gradually being transferred by reducing the human factor.

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THE PROBLEM OF TEXT AND SYNTACTIC DERIVATION

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ANNOTATION

The types of texts in the article are an example of the real use of linguistic methods in speech, which, in turn, is directly related to the concept of "system". theoretical views have also been shown to apply in practice. It is also argued that a macromat differs from a microtext in its semantic properties and syntactic nature, which can be seen primarily in the breadth of its semantic weight and the specificity of its syntactic formation.

KEYWORDS. *macrottext, microtext, syntactic derivation, system, structure, paragraph, derivative.*

INTRODUCTION

The concept of text is broad, and its expressive material can range from a simple grapheme to a large-scale work. Therefore, the use of the terms "micro" and "macro" in the linguistic interpretation of the text seems appropriate. In this case, the concept of "micro" can be used effectively in the interpretation of small texts, and the concept of "macro" in the interpretation of large texts.

It should be noted that the text, whether micro- or macro-, reflects an example of the actual use of language techniques in speech. This, in turn, is directly related to the concept of 'system', since the unit of language, whatever its size or appearance, is used in real speech, which at the same time indicates that the language system is also used in practice. Hence, we see that the language system is manifested in speech in any form of text. If the text format is small, the microsystem is active, and in large texts, the macrosystem is active in practice. All this is inextricably linked with the derivational features of the text event. In other words, the rules of derivation of microtexts are drastically different from the rules of derivation of macromatnas. In addition, when a microtext enters its composition as a component of a macromatne, it changes its status, and at the same time, the laws directly related to it also lose their practical force.

THE MAIN PART

It should be noted that a macromat differs from a microtext in its semantic properties and syntactic nature. We see this first of all in the breadth of its semantic weight and in the specificity of its syntactic formation. However, the concept of macromatn is also of a relative nature, since, from a paragraph of a text to a chapter and a specific work, lecture, project, article, and so on. k. All types can be considered macromatn according to their semantic and syntactic weight. Of course, we are not able to analyze all of these types of text at once. Therefore, in our work we are limited to paragraph analysis.

A paragraph is a unit of speech, which is formed at the request of the speaker (author of the work) in order to partially limit one semantic expression from another. M. As Hakimov rightly points out: "The division of any text into paragraphs marks the beginning of new messages based on a small topic. ... The author's correct division of ideas into paragraphs helps the reader to understand his emotional state»¹.

The formation of a paragraph and the expression of a particular semantic integrity are, of course, directly related to the chain connections of its constituent clauses and complex syntactic devices. In this case, each

¹ Hakimov M. X. Syntagmatic and pragmatic features of the Uzbek scientific text // Candidate dis. abstracts. - Tashkent 1993, 4 pages.



component of the paragraph, in addition to giving a specific idea, also serves for the general idea.

It should be noted that a paragraph is inextricably linked with the written form of the text and forms a certain part (part) of it. Even in the oral form of the text, it is possible to note semantically rounded passages bounded by pauses, but they cannot be equated with the semantic integrity conveyed by a paragraph. Because in the oral form of the text, the semantic boundary that occurs between two paragraphs is never observed.

According to the Czech scholar K. Gauzenblas, text is a category of speech, and this category is inextricably linked with the concepts of "speech process" and "product of the speech process." In this, K. Gauzenblas, as mentioned in part in the first chapter of our work, understands the speech process as oral speech, and the product of the speech process as written speech. However, the written form of the text (even the dialogic text) can meet the demand for scientific research. In its oral form, intermittent sentences, various repetitions (citation phenomenon), and incomplete sentences are undoubtedly causing more than normal difficulties in research work due to the frequent use of particle devices. However, this does not mean that the oral form of the text cannot be studied. Of course, a number of problems related to its oral form can be solved in the linguistic study of dialogic speech. Research has been done by our linguists in this regard as well. Today, when text linguistics is on the agenda, the issue is being taken more seriously.

It should also be noted that the paragraph we are currently focusing on is A. M. Peshkovsky and many other linguists understood it as a logical category, and as a result its linguistic interpretation has been largely ignored until now. However, in our modern linguistics, where text linguistics is a priority, the linguistic interpretation of the paragraph is legitimately on the agenda of our research.

Based on the above, in this work we recognize the paragraph as a macromat and focus on its linguistic interpretation.

As a macromattext, a paragraph can include a variety of syntactic devices - sentence, complex syntactic device, elliptical sentence, particle and application devices. In this case, they all come in place as a paragraph component.

The syntactic devices that come in a paragraph (regardless of size) interact with each other in the first place according to the semantic plan. Therefore, in almost all existing literature on text analysis, the text, including paragraphs, is studied as a product of speech related in this context. However, the syntactic relationship of text components has not yet been literally addressed in the linguistic literature. However, there is no doubt that the study of the syntactic relationship of text components is also important.

It should be noted that any type of text (all micro- or macromatnas) has a predicative sign. While the text is semantically whole, expressing a complete idea, it cannot be imagined without the concept of predicative.

It should be noted that there are types of text represented by a complex syntactic device, sentence, phrase, single word, or even a simple grapheme, and in this study it is not possible to comment on all of them. we go out

Up to the present stage of development of the science of derivatology, research has been conducted in the field of syntactic derivation on the basis of materials of phrases, simple and compound sentences. In other words, the culmination of the application of the syntactic derivation theory is still a joint statement. The question of the study of the derivational properties of speech units larger than speech has only just begun to be put on the agenda. Therefore, this study is one of the first works in the field of text derivation.

We have already mentioned above that the Polish linguist Eji Kurilovich first commented on syntactic derivation. However, he understands syntactic derivation in a much narrower sense. In his view, a derivative always relies on the lexical meaning of the base sentence, and the lexical units in the derivative should not differ from it. However, the final product of a syntactic derivation (derivative) may also differ in content from the base sentence, because in transformation the derivatives formed on the basis of the applicative model differ in content, even if they are semantically the same.

At this point, it seems appropriate to refer to the research of VS Khrakovsky. According to VS Khrakovsky, syntactic derivation means a sentence formed on the basis of a particular sentence, so that the



sentence is legally different from the previous one in terms of its grammatical status and content (Lola read a book - Lola began to read a book).

According to VS Khrakovsky's linguistic concept, in the process of syntactic derivation, the question of whether a sentence formed on the basis of a certain semantic task can be the basis for the formation of a sentence performing a second semantic function is of paramount importance. It is emphasized that the preceding sentence is a basal device¹.

In our opinion, the main focus of VS Khrakovsky's theory is on the expansion of the semantic and syntactic structures of speech. In addition, the word is currently referred to mainly in the chapter on the study of the problem of simple sentence derivation. This theory is not very suitable for the material of a compound sentence (complex syntactic device), because it considers not only one sentence, but more than one sentence. At present, it is mainly assumed that a particular device receives derivative activity on the basis of two or more devices. True, the issue that Khrakovsky is focusing on is directly related to the phenomenon of syntactic derivation. However, we are talking about a single model (applicative model) that creates a syntactic derivation. However, syntactic derivation also occurs on the basis of a transformational model.

The research of IP Raspopov and SN Sychyova in the study of syntactic derivation of sentences also provides exemplary information. They understand the syntactic derivation of a sentence by the transformation of one device into another through a derivative-forming morpheme. In this case, the content integrity of the basal device must be preserved². At the same time, the phenomenon of syntactic derivation is equated to transformation.

In the derivation theory of IP Raspopov and SN Sychyova, the nominalization of transformation, substitution and the transformation of active devices into passive devices are of paramount importance. However, this does not mention the type of derivation associated with the expansion of the syntactic form of the sentence. VS Khrakovsky does not equate transformation with the

phenomenon of derivation, but studies it separately as a creative theory³.

It should also be noted that when we talk about transformation, of course, we focus on the phenomenon of syntactic synonymy and see it in separate transformations. However, in some research works, for example, "Modern Russian" (1989) it is noted that there should be no basal or invariant and derivative concepts within syntactic synonyms. In the above-mentioned work "Modern Russian", too, syntactic derivation means the formation of a second sentence on the basis of a particular sentence. However, it also states that the product structure may be semantically more complex than the basal structure⁴.

S.D. Katsnelson discusses lexical and syntactic derivation at the same time and notes: "If in other aspects of language structure derivation is a source of information about the role of paradigmatic series elements, in syntax it is a means of branching language elements in a syntagmatic sequence chain.

In other words, syntactic derivation is a dynamic structure, not a static concept that determines the position of this or that unit in the language system⁵.

It is possible to fully agree with this consideration that, unlike lexical derivation, syntactic derivation is dynamic. This feature distinguishes syntactic derivation.

O.I. Moskalskaya understands the complexity of the grammatical structure of speech as a result of the introduction of new semantic elements in addition to syntactic derivation, and concludes: tools have not been well studied so far"⁶.

In the research of L.N. Murzin, the phenomenon of syntactic derivation is also studied in comparison with the transformation. At the same time, serious attention is paid to the issue of creating a product structure on the basis of a specific statement. The

³ See Khrakovskiy V.S. Transformation and derivation // Problems of structural linguistics -1972.- M.: Nauka, 1973.P. 489-507.

⁴ See: 78. Modern Russian language. - M.: Higher School, 1989. P. 674-675.

⁵ Katsnelson S.D. Typology of language and speech thinking. L.: Nauka, 1972. P. 8.

⁶ Moskalskaya O.I. Semantics of the text // Questions of linguistics, 1980, No. 6. P.32-42.

¹ . See Khrakovskiy V.S. Transformation and derivation // Problems of structural linguistics -1972.- M.: Nauka, 1973.P. 489-507.

² . See. Raspopov.



scientist interprets syntactic derivation as a formal phenomenon and emphasizes the following: "Syntactic derivation belongs to the formal (explicit) type of derivation. Its product differs from the original unit not only semantically, but also formally¹.

This view of L.N. Murzin, in our opinion, seems quite controversial. Moreover, this consideration of the scientist does not take into account the applicative model, which has creative power such as transformation. Of course, derivatives are also formed within the application model. But at the same time the derivative always differs from the basal structure in the breadth of its content.

Although L.N. Murzin's concept of derivation focuses on the principle of "product from product", it refers mainly to derivative devices that are the result of transformation. In our opinion, the primary product structure is formed from the base structure, and the base structure is formed from the primitive structure. Nevertheless, it is also necessary to take into account the expansion of the syntactic form of the sentence when deriving from the product. At the same time, in contrast to the transformation, the resulting structure differs in the breadth of the content of the basal structure.

Although L.N. Murzin acknowledges that the derivation process is relatively infinite, in his research he speaks only of the phenomena of contamination, conversion, and compression, which are manifestations of transformation. This, of course, begs the question. If compression requires a certain form of syntactic derivation, then why cannot the expansion of the form of speech have such a status? It is also possible to create infinite derivatives by expanding the form of speech.

It should also be noted that by compression or shortening the syntactic form of a sentence, we submit to the reverse method. In other words, in compression we move from the superficial syntactic structure of the sentence to the base structure, and from the base structure to the primitive structure. As a result, the smallest nuclear structure, not a derivative, is formed in the operation. In the form of a compression method, the derivation process ends when the base structure is reached. In our view, the derivation process should

always be associated with the formation of a derivative structure.

It should be noted that the study of the structure of the text, the main categories, as well as the process of its formation, in other words, the study of derivational features, is as important for text linguistics².

Approaching the structure of the text in terms of complex syntactic devices and the integration of other major components of the text along a horizontal line requires the study of its syntactic structure, in other words, the syntactic relationship of text components. This, in turn, is inextricably linked to text derivation. After all, a derivative approach to the text allows it to be studied as a structure-based, semantically shaped system. In general, each component of the text continues to activate its syntactic and semantic connection in sequence. The text forms a system that binds them together, forming an integral whole with respect to its constituent component.

The specificity of macromatnas is reflected in their size. We can expand the text as much as we want according to its size, but even so, it is not infinite, since the text will eventually be complete anyway.

It should also be noted that some linguists emphasize that there is no need for text linguistics to study the theoretical aspects of a text. In particular, T.B. Bulygina writes in this regard: "Despite some peculiarities in the connection of sentences in the text, in my opinion, the text does not form a special structure. At the same time, the features of the text do not go beyond the sum of the features of the sentences in it"³.

We find a similar idea in the views of Daskal and Margalit. In their view, there is no need to shape text theory. Because the grammar of a sentence, as long as it is fully developed, can also express all the features of the text⁴.

In our opinion, it is impossible to agree with these views, of course. Such an approach to the issue can lead

² See: Turniyozov N., Yuldashev B.- Textual linguistics.- 2006, pages 29-30.

³ Bulygina T.V. about the boundaries between a complex unit and a combination of units. - In the book: Units of different levels of the grammatical store of the language and their interaction. M., 1967.

⁴ Dascal M., Margalit A. A New Revolution in Linguistics! Texts-Grammars' vs «Sentence-Grammars». - In: Theoretical Linguistics, 1974, v.1, N 1/ 2.

¹ Murzin L. N. Fundamentals of derivatology. – Prem, 1984, p. 26.



to the misconception that the sentence structure and the text structure are exactly the same. In fact, just as the whole and its parts never have the same position, it is also incorrect to assume that the text consists only of the sum of the properties of the sentences it contains.

It should also be noted that the text, whether small or large, is subject to a general rule in the form of a system. In other words, any type of text also consists of a set of elements that interact as a specific system.

Although the system is a rounded object of interconnected language elements, it is, in turn, discrete (divisible). This reality is one of the most basic and important aspects of any system¹.

Importantly, an integral connection is formed not only between the structures of the text components and the macrostructure, but also between the macrosystem in the text template and the microsystems of its components. So, while one of the concepts of system and structure is real, the other is required to exist as well. Therefore, it is difficult to imagine them in isolation. In the words of Prof. Yu. Stepanov, a system is a whole made up of interconnected elements. The interrelationships between these elements form the structure of the system. In other words, the structure of language means the reality that consists of the relationship between a phoneme, a morpheme, a word, a phrase, and a sentence.²

In our opinion, it is possible to agree with Yu. Stepanov's comments on the system and structure. But the inclusion of phrases and sentences in the set of means that make up the structure of language is controversial, since both of them are formed in speech. The concepts of system and structure within the context of the text discussed above also find expression in speech. In other words, at the text level we see a new expression of the concepts of system and structure that arise as a result of the transfer of language to speech. The concepts of system and structure are used in language in the same way as in speech. However, the material of their expression changes in speech.

CONCLUSION

As we studied text derivation, we encountered many difficulties, of course. These include, first of all, the definition of the derivation operator, the definition of the basic structure, the study of the principles of syntactic formation of the text, the identification of aspects of text derivation as opposed to the derivation of speech. The interpretation of all these issues has to be approached independently.

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AGRA DISTRICT: AN ANALYSIS OF THE GROUNDWATER QUALITY RESEARCH AND POTENTIAL MANAGEMENT

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ABSTRACT

This present investigation is just an attempt to present the quality of potable water in the Agra district. Its purpose is to analysis the groundwater in the Agra district in the present and subsequent perspective based on its physical and chemical quality and its potable characteristics based on standards. Where it is not potable, attention has been drawn to related initiatives and suggestions. In the present research paper, an in-depth study has been done considering the basis of different blocks of the Agra district. In which reference has been taken to Jal Nigam Agra, Government of India Annual Report 2019, various national/international research papers of various repute, as well as primary, secondary, and tertiary data and samples of various dailies, etc. have been used. The water samples have been analyzed as per LBL approved standard date (APHA 2005). Regional Chemical Laboratory of CGWUB, Lucknow standard methods have been followed and adopted for chemical analysis of various constituents in water samples.

INTRODUCTION

Agra is a famous city, district, and tehsil in Uttar Pradesh province. It is situated on the banks of river Yamuna at 27.18°N 78.02°E. This city held a special place in Indian history. Agra is also very famous for its historical buildings. Its average elevation above sea level is about 171 m (561 ft). It is surrounded by Mathura in the north, Dholpur in the south, Firozabad, Shikohabad in the east, Fatehabad in the southeast, and Bharatpur in the west. Agra is the third-largest city in Uttar Pradesh. The Taj Mahal is a special identity of Agra, which is situated on the banks of the river Yamuna. Agra is one of the major tourist destinations in entire India including Uttar Pradesh.

Life is not possible without water. Water is the basis of life. We mean water in our daily life in its liquid state. It is the largest amount in the human body. Except for fat, water content is the highest in the body. About 70 percent of the human body is water. Various studies have revealed the hard fact that only 1% of the water on earth is potable.

About three-quarters of our earth is surrounded by water. But 97 percent of the water is not potable. Due to the pressure of the increasing population, the problem of potable water is going to emerge in front of us in the future. If we do not become aware of it soon or in time, then our life can be in trouble. In the present research paper, there is only an attempt to overcome the drinking water crisis of the increasing population. Groundwater will naturally be able to overcome the future water crisis. There is hope for the possible future possibilities.

STUDY AREA

Agra is very famous for the Taj Mahal and the city of love. The famous second-century AG geographer Ptolemy also marked it as Agra on the world map. Agra district is located in western Uttar Pradesh, India in the city category Agra, Uttar Pradesh, India with GPS coordinates of 27° 10' 36.0120" N and 78° 0' 29.0592" E. Its height is 169 meters above sea level. And Agra has situated on the banks of river Yamuna.

It is situated at a distance of 378 km west of state capital Lucknow, 206 km south of national capital Delhi, 58 km south of district Mathura and 125 km north of Gwalior.

Agra is one of the most populous cities in Uttar Pradesh. It is the 24th most populous city in India. Its area is 10863 sq km, with a population of 4418797 in which 2364953 male and 2053844 female population. Language Hindi, Total village is 906. District Agra is divided into six tehsils and 15 development blocks.

Mainly the economy of Agra is based on agriculture, while the main basis of the economy of Agra city is small-scale industry, commerce, and trade. Wheat, Paddy, Bajra, Potato, Mustard, Petha, etc. are the major crops. About 40 percent of the total economy of Agra is dependent on industry directly and indirectly.

OBJECTIVES

The objective of the present paper is to make an in-depth



study of the quality of groundwater available in the Agra district and its potable characteristics from the present and future perspectives. At the same time, efforts have been made to explore those possibilities which will make groundwater potable. Efforts have also been made to identify those efforts which help resolve the related problems and in its overall development.

DATABASE AND METHODS

In the presented research paper, at the block level of Agra district, Jal Nigam Agra, Regional Pollution Board, Uttar Pradesh, Municipal Corporation Agra, Annual Report 2019, references to various research papers, primary, secondary and tertiary samples of various daily national/international newspapers, etc. have been used.

Determination of pH, EC, CO₃, HCO₃, Cl, F, NO₃, SO₄, PO₄, SiO₂, T.H., Ca, Mg, Na&K.

Water samples were analyzed according to NABL-accredited standard methods (APHA 2005)

Regional Chemical Laboratory of CGWB, Lucknow. Adherence to Standard Methods (Table-1)

It has been adopted for the chemical analysis of various components in water samples.

TDS cal = EC * 0.65 mg/l for Total Dissolved Solids

(TDS)

where EC is in $\mu\text{S}/\text{cm}$ at 25° C method

Mohr's method for Chloride (Cl)

Nitrate (NO₃) Spectrophotometric method

Total Hardness (T.H.) Titrimetric method

Calcium (Ca) Titrimetric method

Magnesium (Mg) Evaluation from TH and Ca

Sodium (Na) Flame emission photometric method

Potassium (K) Flame emission photometric method

RESULT AND DISCUSSION

It is known that groundwater is the source of 60% of irrigation water and about 85% of drinking water in India. In such a situation, the rapidly falling level of groundwater is emerging as a big challenge.

Considering the results obtained from the above tests, there is a need for more corrective measures for groundwater so that it can be made irrigation and potable.

The guidelines set by BIS (2012) for parameters in various analyses to make water potable, minimum, maximum, mean, and standard deviation of various components determined during chemical value analysis is shown by the following table :

TABLE - 1 Hydro-Chemical Data of Ground Water in Uttar Pradesh (an overview)

S. No.	Constituents	Minimum	Maximum	Average	Std. Dev.
1	pH	7.2	8.95	7.98	0.31
2	EC $\mu\text{S}/\text{cm}$ at 25 °C	165	21410	817	1182.82
3	CO ₃ mg/l	nil	144	7.3	21.16
4	HCO ₃ mg/l	12	793	281	84.32
5	Cl mg/l	7.0	5602	87.88	325
6	F mg/l	nd	5.9	0.45	0.5
7	NO ₃ mg/l	nd	246	9.9	21.85
8	SO ₄ mg/l	nd	2240	44	324.53
9	PO ₄ mg/l	nd	1.082	0.3	0.14
10	TH (as CaCO ₃) mg/l	50	7550	262	379.43
11	Ca n1g/l	2	840	41	45
12	Mg n1g/l	1.3	1308	38	68
13	Na mg/l	4	1340	74	112
14	K mg/l	0	860	6.8	31

The various blocks of the Agra district exhibiting high values of E.C. (>5000 $\mu\text{S}/\text{cm}$ at 25°C) are tabulated in following Table-

TABLE -2 The blocks exhibiting high values of E.C. (>5000 $\mu\text{S}/\text{cm}$ at 25°C $\mu\text{S}/\text{cm}$)

SI.No.	District	Block	Conductivity in $\mu\text{mho}/\text{cm}$ at 25°C
1	Agra	Achbcnra	6900
2	Agra	Alcola	9104
3	Agra	FatehpurSikari	9419

Total Dissolved Solids (TDS):

A total load of dissolved solids in water is determined theoretically by taking into account the EC of that particular water body.

Thus,

TDS cal = EC * 0.65 mg/l

where EC is in $\mu\text{S}/\text{cm}$ at 25° C



According to the report released by Agra Jal Nigam, 3500 samples were taken from 200 villages of 15 development blocks in the last 11 months. Of them, 80 percent had fluoride of more than 2-2.5 ppm as against 1-1.5 ppm, while 50 percent were found to have almost double the arsenic content, which was 1-1.25 ppm as against .5 ppm.

Even the Total Dissolved Solids (TDS) were found at 2000-2200 ppm, while the maximum permissible limit was 1600 ppm. In some villages, the hardness of water was found to be 1.25-1.5 times more than acceptable.

The various blocks exhibiting high values of Cl(>1000 mg/l) are tabulated in the following table below-

TABLE-3 Blocks exhibiting high values of Cl (>1000 mg/l)			
SI.No.	District	Block	Cl (mg/l)
1	Agra	Achhnera	2163
2	Agra	Akola	2765
3	Agra	Etmadpur	1312
4	Agra	FatehpurSikari	3049

Nitrate (NO₃):

The concentration of Nitrate has been found to vary widely. Water samples fall within the permissible limit of 45

Source: Jal Nigam Agra, UP Chloride (Cl):

The chemical data reveals that the concentration of chloride ions ranges from 7.0 to 5602mg/l with an average value of 88 mg/l. From Table no it is clear that 95 % of water samples fall within the acceptable limit prescribed by BIS (2012) and only 1.3 % of samples exhibit Chloride values > 1000 mg/l.

mg/l (BIS 2012) and the samples have a higher level of Nitrate concentration with the highest value of 49 mg/l recorded at Achhnera and Fatehpuri Sikari block of Agra District.

The various blocks exhibiting high values of nitrate concentration (>45 mg/l) are tabulated in the following table

TABLE -4 Blocks associated with high values of nitrate (>45 mg/l)			
SI.No.	District	Block	NO ₃
1	Agra	Achhnera	49
2	Agra	FatehpurSikari	49

Total Hardness (T.H.):

The concentration of Total Hardness has been found to vary widely. Water samples fall within the permissible limit

of 600 mg/l (BIS- 2012). The highest value of 3050mg/l was recorded at the Fatehpuri Sikari block of Agra district.

The various Blocks exhibiting high values of T.H. concentration (>600 mg/l) are tabulated in table below-

TABLE -5 Blocks exhibiting high values of Total Hardness (>600 mg/l)			
SI.No.	District	Block	Hardness as CaCO ₃
1	Agra	Achhnera	1500
2	Agra	Akola	2500
3	Agra	Bichpuri	650
4	Agra	Etmadpur	650
5	Agra	FatehpurSikari	3050
6	Agra	Jagner	650

Calcium (Ca):

The concentration of Calcium has been found to vary widely. The water samples fell within the acceptable limit of 75 mg/l (BIS- 2012) and the only samples has a higher

level of calcium concentration. Only water samples exhibited calcium values >200 mg/l recorded at the Fatehpuri Sikari block of Agra district.

The only Blocks exhibiting high values of Calcium concentration (>200 mg/l) are tabulated in following table

TABLE -6 Blocks exhibiting high values of Calcium (>200 mg/l)			
SI.No.	District	Block	Ca Hardness (mg/l)
I	Agra	Fatehpw-Sikari	460

Magnesium (Mg) :

The main sources of magnesium in groundwater are (i) rainwater (ii) evaporate deposits & (iii) weathering of magnesium silicate minerals. The source of magnesium in

igneous rocks is olivine, pyroxenes, amphiboles, dark-colored micas, etc. Among the sedimentary rocks, the sources are chlorite, serpentine biotite, amphiboles, staurolite, etc. Mg is one of the constituents responsible for the hardness of the



water. The lower concentration of Mg is not harmful but a higher concentration is laxative. The concentration of Magnesium has been found to vary widely. It ranges from 50 mg/l to 492 mg/l in water samples falling within the

acceptable limit of 30 mg/l (BIS- 2012). The water samples exhibited Mg values >100 mg/l with a maximum value of 456 mg/l recorded at Fatehpur Sikari block of Agra district

The various Blocks exhibiting high values of Magnesium concentration (>100 mg/l) are tabulated in the following table-

TABLE-7 Blocks exhibiting high values of Magnesium (>100 mg/l)					
SL.No.	District	Block	Sample Location	Source	Mg Hardness in mg/l
1	Agra	Achhnera	Block Office	H/P-IM-II	288
2	Agra	Akola	Block Office	H/P-IM-II	492
3	Agra	Bichpw-i	Block Office	H/P-IM-II	120
4	Agra	Fatehpw-Sikari	Block Office	H/P-IM-II	456
5	Agra	Jagner	Block Office	H/P-IM-II	108
6	Agra	Saiyan	Block Office	H/P-IM-II	108

Sodium (Na):

It is found in varying concentrations in all natural waters. It is found in evaporates and seawater in high concentrations. It occurs among silicate minerals in feldspar, mica, amphiboles, and pyroxenes. The main sources of sodium in groundwater are (i) rainwater, (ii) evaporate deposits, (iii) weathering of rock minerals present in the soil and (iv) disposal of sewage and industrial wastes containing sodium. The higher concentration of Na in drinking water is

harmful, especially to those suffering from cardiac, and renal diseases in the circulatory system of the human body. The analysis result of shallow groundwater indicates that sodium ranges from 400 mg/l to 900mg/l. Water samples exhibit sodium concentration up to 100 mg/l and 1.22% of samples were found to be associated with extremely high levels of Na concentration >500 mg/l with a maximum value of 900 mg/l recorded at Akola block of Agra district.

The various Blocks exhibiting high values of Sodium concentration (>500 mg/l) are tabulated in the following table-

TABLE-8 Blocks exhibiting high values of Sodium (>500 mg/l)			
Sl.No.	District	Block	Na in mg/l
1	Agra	Akola	900
2	Agra	Etamadpur	815
3	Agra	Fatehpur-Sikari	780

Potassium (K):

Although potassium is more abundant than sodium in sedimentary rocks, its concentration in natural waters is quite low due to greater resistance to weathering of potassium-bearing minerals. The main sources of K in natural waters are (i) rainwater, (ii) weathering of Potash silicate minerals, and (iii) potash fertilizers. K enters into the structure of clay and clay-bearing minerals during weathering. In Illite, K ions are incorporated in spaces between crystal layers where these are not removable by further ion-exchange reactions (Buckman & Brady, 1960). Usually, the concentration of K in water from a natural source is small but a high concentration of this ion if present may be attributed to pollution.

Potassium is an essential plant nutrient. It plays an important role in the maintenance of cellular organization and in keeping the protoplasm in a proper degree of hydration by stabilizing the emulsions of highly colloidal particles. K deficiency causes water imbalance. The carbohydrate metabolism is also affected by inadequate supplies of potassium.

The analysis result of shallow groundwater indicates that Potassium ranges from 0 to 860 mg/l. The samples were found to be associated with the extremely high level of K concentration >30 mg/l with a maximum value of 860 mg/l recorded at the Achhnera block of Agra district.

TABLE-9 Blocks exhibiting high values of Potassium (>30 mg/l)			
Sl.No.	District	Block	K in mg/l
1	Agra	Achhnera	860
2	Agra	Fatehpur-Sikari	39

CONCLUSION

Overall, the groundwater was found suitable for drinking based on tests and analysis done in the Agra district.

Because water is the basis of life. There is a need to be aware of the increasing population and the need to make food

and water potable to meet the needs. This more effective step needs to be taken by the government and scientists. In the future, groundwater will be the biggest reservoir to meet the needs. Its quality and conservation need to be made effective.

By and large, the chemical quality of groundwater in the phreatic zone in Uttar Pradesh is found to be suitable for



drinking purposes as per available analyzed chemical parameter data (as per BIS 2012). The presence of some constituents beyond the permissible limit at some locations renders the water unfit for public water supply.

Considering the parameters responsible for the suitability of groundwater of Agra, Uttar Pradesh it is observed that it is generally fit for irrigation purposes as per Electrical conductivity, Residual Sodium Carbonate, Sodium Adsorption Ratio except at a few places where corrective measures are to be taken before agricultural usage.

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ANALYSIS OF COVID-19 IN INDIA

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ABSTRACT

COVID-19 arose in the city of Wuhan in China. The situation started to be more critical when numerous number of person started to get infected which in turns increases the number of death cases. The novel coronavirus (COVID-19) that was first reported at the end of 2019 has impacted almost every aspect of life as we know it. This paper focuses on the incidence of the disease in India Using three simple machine learning algorithms—the linear regression model, polynomial regression and Support Vector machine, we model the daily and cumulative incidence of COVID-19 in the country during the early stage of the outbreak, and compute estimates for basic measures of the infectiousness of the disease including the active cases, death cases, growth rate, mortality rate and recovery rate. Estimates of the growth factor is calculated using the new confirmed, recovered and death cases divided using the previous confirmed, recovered and death cases. The growth factor above 1 indicates the increase in corresponding cases. The growth cases below 1 indicate the trending downward which indicates the sign of exponential growth. The predictive ability of the polynomial regression model was found to give a better fit and simple estimates of the daily incidence.

I. INTRODUCTION

COVID-19 arose in the city of Wuhan in China. The situation started to be more critical when numerous number of person started to get infected which in turns increases the number of death cases. The government started documenting each and every case having symptoms like Pneumonia. The cases started to rapidly increases about 40 spans in 30 days. In the previous years the virus had a history in china known as SARS disease. The SARS disease took the lives of around 770 people in the year 2002 and 2003.

The corona virus is transmitted and spread in the following cases the first one is the person who in contact with the secretions of sneezing or coughing and float during the respiratory diseases. The second one is having physical contact with the affected person through the hands. Therefore in order to decrease the risk of the spreading corona virus doctors advised to wash the hand and avoid touching the infected person in order to eliminate the risk in case a person is exposed to it accidentally. In order to overcome from the corona virus the vaccine has to be developed. But the history tells that it took decades to develop penicillin and polio vaccine. COVID-19 is one of the pandemic elements across the world. It is a disease spread by Coronavirus whose vaccine has not yet been discovered. Therefore, COVID -19 has become one of the pandemic elements in the leading Nordic countries. In this situation, the best approach every one needs to follow is stay sterile and maintains a social distance and stay enlightened about the situation.(WHO, 2020b).

About 87% of the population uses social media, and in the current situation, this percentage has increased. The general public prefers to stay at home the social media is a major source of information and info emic. Humans, in curiosity, try to stay updated and therefore are more gripped to be associated with social media. In the process, the data are encountered from various sources which could be appropriate or unsound in the same way.

Steven Taylor in his psychology book has predicted the world might experience a new pandemic in the upcoming years and people would prefer to stay at home as much as possible. The number of cases of the individual has increased rapidly which in turn created pressure on the medical services as healthcare. The healthcare providers test and diagnose the infected individuals. In addition to the medical services offered many cases trying to control covid 19 have led to the backlog for and deprivation of many medical procedures. The healthcare providers trying to balance the conflicts that may arise between the two notes which in turn change the nature of healthcare. The COVID 19 restrictions have led to much anxiety and distress which lead to an increase in psychiatric diseases. COVID 19 may have a long-term negative impact on the mental health of each and every individual.

The restriction due to COVID 19 has made non-essential business to get closed due to pandemic situations. This has impacted the national economics with much business being permanently closed. The permanently closing of business has significantly increased in unemployment. The travels have



been severely affected the tourism and travel industries. The environment has limited on the business that have been able to continue operating in the pandemic time. This has led to possible improvements in the environment in terms of reduction of pollution. The two main countries affected due to COVID 19 are Europe, Spain and Italy. The majority of the literature review mainly focuses on the clinical aspect of the diseases. The review has only one limited number of exploring the prevalence of the diseases. The main contributions focus on modeling the incidence of the COVID 19 in several countries. The second one is provide the estimate of basic measure of the infectiousness and severity. The third one mainly focuses on predictive ability of the mathematical models. And finally forecast the incidence of COVID 19 in different countries.

II. LITERATURE REVIEW

The COVID 19 at present has affected over 49 million cases of infected individuals. The cases have been conformed in 180 countries with in excess of 1 million deaths [1]. The foundations of disease are very similar to the SARS. The SARS virus was initially found in Asia in 2003. SARS virus has spread much more easily and still there exist no vaccine.

The analyses of diseases in North and South America have similar classical methods. The model produces a progressive outbreak in the United States until the end of the 2021[13]. The countries like Brazil and Peru used a logistic growth model and machine learning techniques [14]. United States analysis completely used spatial log and error models. The spatial log and error models where able to estimate the number of deaths in the United States. The number of death was calculated using the modified logistic fault dependent detection methods [15]. The infected rate across the different states in United States was calculated using a sample selection model. The Sample selection model creates a relationship between the social media communication and the incidence in Colombia. The relationship between the social media and the incidence were calculated using the non-linear regression models [17].

The countries like Africa mainly focus on the method of stimulation and predict the spread of the diseases in different countries using a modified susceptible exposed infectious recovered model [19]. The West African mainly used predict the spread of the diseases using the deterministic susceptible exposed infectious recovered model [20]. The East African countries used to predict the spread of disease using each and every individual travel history and the personal contact in Nigeria. The spread of disease using the travel history is predicted using the ordinary least square regression method. The Auto regressive integrated moving average model is used to forecast the prevalence of COVID 19 in East Africa [22]. The real time forecasting of the daily confirmed cases in Saudi Arabia uses the logistic growth and susceptible infected recovered models. The above models were able to generate the real time forecasting of the confirmed cases [23].

The lead lag regression model is used to identify the relation between the cumulative numbers of daily cases of COVID 19 in various countries. In various countries the method of forecasting the future incidence is done using several machine learning techniques. This helps the countries in classifying the early middle and the later stage of the outbreak [24].

The number of cases increased has created a pressure on the medical services. In addition to the normal medical services that are offered by many health care providers. Trying to control COVID has led to backlog for and deprivation of medical procedures [25]. The health care providers trying to balance the conflicts that may arise between the two notes which in turn change the nature of healthcare. The COVID 19 restrictions have led to much anxiety and distress which lead to an increase in psychiatric diseases. COVID 19 may have a long-term negative impact on the mental health of each and every individual .

III. MODULE DESCRIPTION

3.1 MORTALITY RATE

The equation [1] represents the mortality rate. Mortality rate is calculated based on the number of death cases divided by the number of confirmed cases.

$$\text{Mortality rate} = (\text{death cases/confirmed cases}) * 100 \quad [1]$$

3.2 RECOVERY RATE

The equation [2] represents the recovery cases. The recovery cases can be calculated using the formula total number of recovered cases divided by the total number confirmed cases.

$$\text{Recovery rate} = (\text{recovered cases/confirmed cases}) * 100 \quad [2]$$

3.3 FACTOR OF GROWTH

The growth factor is calculated using the new confirmed, recovered and death cases divided using the previous confirmed, recovered and death cases. The growth factor above 1 indicates the increase in corresponding cases. The growth cases below 1 indicate the trending downward which indicates the sign of exponential growth.

3.4 ACTIVE CASES

The equation [3] represents the active cases. The active cases can be calculated using the formula number of confirmed cases subtracted from the number of recovered cases subtracted from the number of death cases. Increase in the number of cases indicates the recovered cases or death cases number is dropping in comparison to number of confirmed cases drastically.

$$\text{Active Cases} = \text{Number of Confirmed Cases} - \text{Number of Recovered Cases} - \text{Number of Death Cases} \quad [3]$$

3.5 CLOSED CASES

The equation [4] represents the closed cases. The closed cases are calculated using the formula number of recovered cases added with the number of death cases. Increase in number of cases indicates either more patients are getting recovered from the disease or more people are dying because of the covid disease.

$$\text{Closed Cases} = \text{Number of Recovered Cases} + \text{Number of Death Cases} \quad [4]$$



3.6 LINEAR REGRESSION MODEL

The linear regression model is the easiest and the popular machine learning algorithms. The linear regression model is a statistical method mainly used for predictive analysis. The model makes predictions based on continuous or numeric values. The linear regression model represents the relationship between the dependent and independent variables. The model finally provides a sloped straight line.

The sloped line represents the relationship between the variables. The linear regression uses the Mean Squared Error cost function. The cost function is calculated by taking the average of squared error occurred between the predicted values and the actual values. The cost function determines how the regression fits for the set of observations. The process of finding the best model from the various models is called optimization.

3.7 POLYNOMIAL REGRESSION MODEL

The Polynomial regression model represents the relationship between the dependent and independent variables. The polynomial model makes use of linear regression model to fit the complicated and nonlinear functions and the dataset. The initial step in the polynomial regression model is data pre-processing. The data preprocessing is very similar to the linear regression model except the model will not use the future scaling method and will also not split the dataset into training and test set. The training and the test data set is not splitted because the model contains very less information and the model will not be able to find the correlations between the variables. The second step involved is building a linear regression model and trying to fit the model into the dataset. The third step is building a polynomial regression model and trying to fit the model into the dataset. Finally, the result is visualized for linear regression and polynomial regression model.

3.8 SUPPORT VECTOR MACHINE

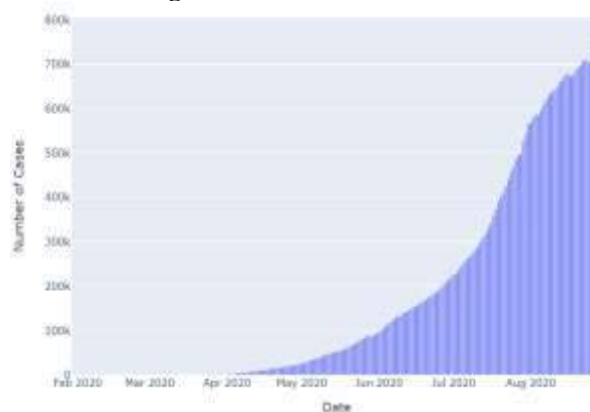
Support vector machine is one of the most popular supervised learning algorithms. The support vector machine is mainly used for the classification and the regression model. The major goal of the model is to create a best line that can segregate the dimensional space into the classes. Once the data is segregated it can be easily put the new data points into the correct category of classes. The support vector machine algorithm chooses the extreme points that help in creating a hyper plane. The dimension of the hyper plane depends on the features. If there are only 2 features then the hyper plane will be a straight line. If there are three features then the hyper plane will be a 2 dimension plane. The hyper plane is always created with the maximum margin. Maximum margin means the maximum distance between the data points. Support vector machine is classified into two types they are linear and nonlinear svm. The linear svm model is mainly used for linearly separable data. Linearly separable data means the data set can be classified into two classes by using a single straight line. The nonlinear svm is mainly used for nonlinearly separable data. The dataset cannot be classified

by using a straight line, then such data is termed as non-linear data and classifier used is called as Nonlinear svm Classifier.

RESULT AND DISCUSSION

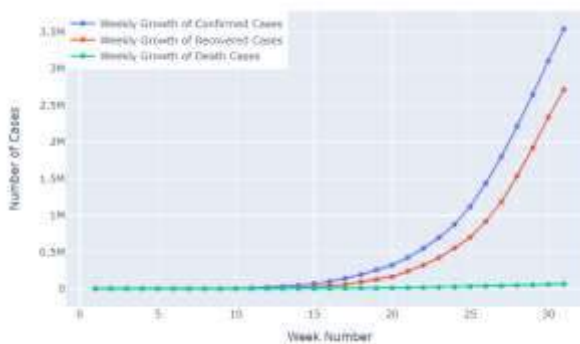
The following figure 4.1 represents the distribution of active cases in India. The active cases are calculated using the number of confirmed cases subtracted from the number of recovered cases subtracted from the number of death cases.

Figure 4.1 Active Cases in India

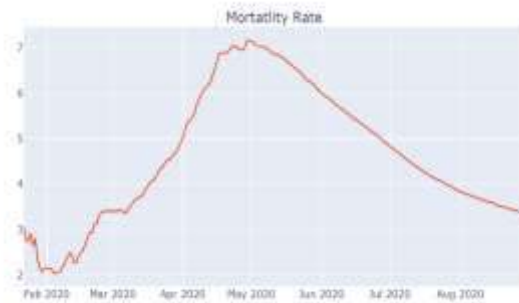


The following figure 4.2 represents the closed cases. The closed cases are calculated using the number of recovered cases added with the number of death cases. The graph is plotted against the number of cases vs week number.

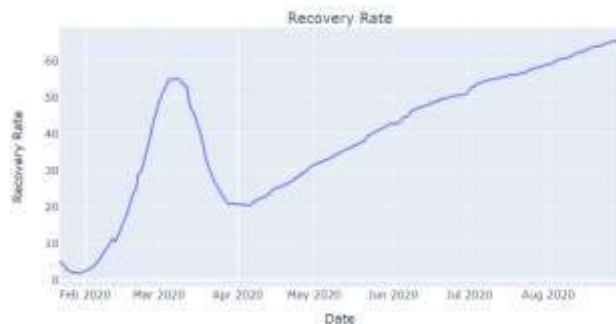
Figure 4.2 Closed Cases



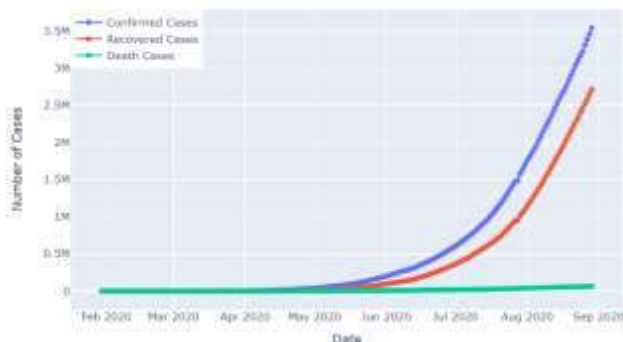
The following figure 4.3 represents the mortality rate. The mortality rate is calculated using the number of death cases divided by the number of confirmed cases. The mortality rate is considerable for a long time which is a positive sign. The graph is plotted against the mortality rate vs the dates.

Figure 4.3 Mortality Rate

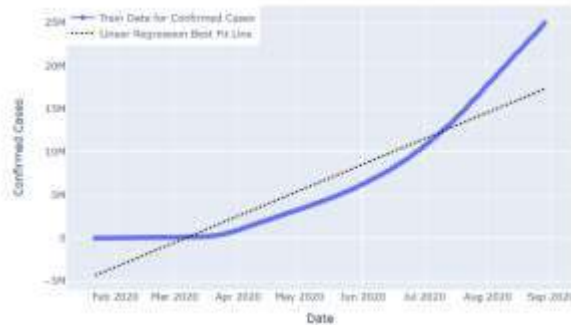
The following figure 4.4 represents the recovery rate. The recovery rate in the graph is plotted against the recovery rate and the dates in which the person has recovered. The recovery rate has picked up with a good sign.

Figure 4.4 Recovery Cases

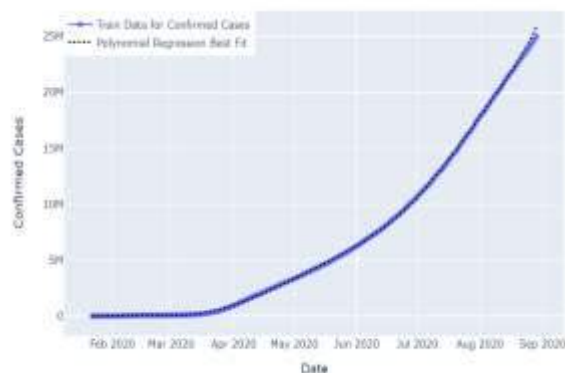
The following figure 4.5 represents the growth factor against the confirmed cases, recovered cases and death cases. The growth factor is calculated using the formula new confirmed, recovered and death cases divided using the previous confirmed, recovered and death cases.

Figure 4.5 Growth factor

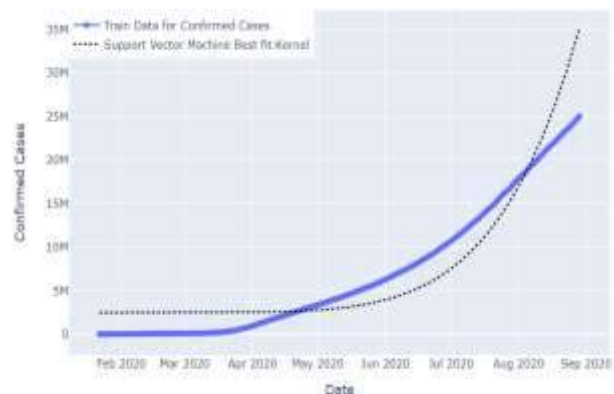
The following figure 4.6 represents the confirmed cases using the linear regression model. The linear regression model which predicted the output is falling apart. The graph is plotted against the confirmed cases and the dates. The linear regression model shows a clear view that the trend in the confirmed cases is absolutely not a linear model.

Figure 4.6 Confirmed Cases using Linear Regression

The figure 4.7 represents the confirmed cases using the polynomial regression model. The final output is compared using the linear regression model. Predict () method is used for the comparison of the linear and polynomial regression model. The predicted output for the polynomial regression is much closer to the real value.

Figure 4.7 Confirmed Cases using the Polynomial Regression

The following figure 4.8 represents the confirmed cases using the support vector prediction model. The support vector model has not provided a better result. The output that is predicted is either very high or very low than what expected.

Figure 4.8 Confirmed cases using the Support vector Machine



V. CONCLUSION

In this paper, we have provided a simple statistical analysis of the novel Coronavirus (COVID-19) outbreak in India. The novel coronavirus (COVID-19) that was first reported at the end of 2019 has impacted almost every aspect of life as we know it. This paper focuses on the incidence of the disease in India Using three simple machine learning algorithms—the linear regression model, polynomial regression and Support Vector machine, we model the daily

and cumulative incidence of COVID-19 in the country during the early stage of the outbreak, and compute estimates for basic measures of the infectiousness of the disease including the active cases, death cases, growth rate, mortality rate and recovery rate. The predictive ability of the polynomial regression model was found to give a better fit and simple estimates of the daily incidence.

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ULTRA PERFORMANCE LIQUID CHROMATOGRAPHIC METHOD DEVELOPMENT AND VALIDATION FOR THE DETERMINATION OF GLECAPREVIR IN PHARMACEUTICAL DOSAGE FORMS

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ABSTRACT

Glecaprevir is an antiviral drug used in combination with other drugs includes sofosbuvir, ribavirin, and interferon, depending on the virus type to treat cirrhosis caused by hepatitis C (HCV). Several methods have been found for quantification, but those are not cost-effective, and they are time-consuming. The present study developed a simple, precise, accurate and cost-effective UPLC method to determine Glecaprevir quantity in tablet dosage forms. A simple and selective UPLC method is described for the determination of Glecaprevir. Chromatographic separation was achieved on a Acquity BEH C18 (50 × 3.0mm, 1.7 μm) using a mobile phase consisting 0.1% of Orthophosphoric acid: Acetonitrile in a ratio of 60:40 v/v with detection of 248 nm. Linearity was observed in the range 50-150 μg/ml for Glecaprevir ($r^2 = 1.000$). The amount of drugs estimated by the proposed method was in good agreement with the label claim. The proposed method was validated as per ICH guidelines and applied for the determination of the cited drug in the dosage form.

KEYWORDS: Glecaprevir, UPLC, Hepatitis (HCV) virus

INTRODUCTION

Glecaprevir is chemically dimethyl N, N'-([1,1'-biphenyl]-4, 4'-diylbis{1H-imidazole-5,2-diyl-[(2S)-pyrrolidine-2,1-diyl][(2S)-3-methyl-1-oxobutane-1, 2-diyl]}) dicarbamate. Glecaprevir has molecular weight: 738.89 g/mol and molecular formula: C₄₀H₅₀N₈O₆. It is an antiviral drug used in combination with other medicaments to treat hepatitis C (HCV). The other medicines used in combination include interferon, sofosbuvir, and ribavirin, depending on the virus type 1. The dose of Glecaprevir present in the formulation was determined by using the Ultra Performance Liquid Chromatography method. UPLC has greater sensitivity, resolution, and speed of analysis.

UPLC operates at high pressure than HPLC, and fine particles, i.e., less than 2.5 μm are used, and mobile phases at high linear velocities decrease the length of the column, reduces solvent consumption, and save time².

The UPLC is based on the use of a stationary phase consisting of particles less than 2.5 μm whereas the HPLC column is typically filled with 3-5 μm particles. The principle of this evolution is governed by the Van Deemeter equation, which is an empirical formula that describes the relationship between the linear velocity of flow rate and plate height^{3,4}.

$$H = A + B/v + Cv$$

Where; A, B and C are constants, v is the linear velocity, the carrier gas flow rate.

*The A term is independent of velocity and represents "eddy" mixing. It is the smallest when the packed column particles are small and uniform.

The B term represents axial diffusion or the natural diffusion tendency of molecules. This effect is diminished at high flow rates, and so this term is divided by v.

*The C term is due to kinetic resistance to equilibrium in the separation process. The kinetic resistance is the time lag involved in moving from the gas phase to the stationary packing phase and back again. The greater the flow of gas, the more a molecule on the packing tends to lag behind molecules in the mobile phase. Thus the term is proportional to v.

Therefore it is possible to increase throughput and thus the speed of analysis without affecting the chromatographic performance.



The advent of UPLC has demanded the development of a new instrumental system for liquid chromatography, which can take advantage of the separation performance (by reducing dead volumes) and consistent with the pressures (about 8000 to 15,000 PSI, compared with 2500 to 5000 PSI in HPLC). Efficiency is proportional to column length and inversely proportional to the particle size^{5,6}.

This technology has the advantage of chromatographic principles to run separations using a packed column with similar particle sizes less than 2.5 μm are used with high flow rates speed gives superior resolution and sensitivity.

MATERIALS AND METHODS

Chemicals and Reagents: The drug standard of Glecaprevir was kindly supplied by Madras Pharmaceuticals, Chennai, with certified purity of 99.97 ± 0.512 . Daklinza 10 mg Tablets were purchased from apollo pharmacy, Hyderabad. HPLC grade acetonitrile, water, and methanol were obtained from Rankem. Analytical grade Potassium Dihydrogen orthophosphate, Dipotassium hydrogen orthophosphate and O-Phosphoric acid were obtained from Merck.

A Shimadzu (UV-1800) double beam UV-Vis spectrophotometer with 1cm quartz cuvette connected to a personal computer loaded with UV probe 2.21 software was used.

Chromatographic Method:^{7, 8} Chromatographic separations were achieved by UPLC-agilent 1290 infinity with a quaternary solvent manager, with autosampler injector and photodiode array detector, coupled with Empower software for data acquisition. Acquity BEH C18 (50×3.0 mm. $1.7 \mu\text{m}$) was used as the stationary phase for the development of the chromatographic separation, optimization, and method validation. Isocratic elution was conducted using a mobile phase 0.1% Orthophosphoric acid: Acetonitrile (60:40) v/v.

The flow rate was set at 0.5 mL/min. Column temperature was adjusted at 30 °C, and samples were injected at 10 μL injection volume with a run time of 5 min at a temperature 10 °C and determined at a wavelength of 248 nm. Glecaprevir 1 mg/mL stock solution was prepared for the UPLC method by dissolving 100mg of Glecaprevir in 100 mL of the mobile phase.

Preparation of 0.1% Ortho Phosphoric Acid: Taken 1 mL of orthophosphoric acid and transferred in to a 1000 mL of water & filtered through 0.45 μm filters to remove all fine particles and gases.

RESULTS AND DISCUSSION

UPLC Method Development: The main target of the proposed UPLC method was to achieve separation of Glecaprevir within short runtime. To determine the stationary phase (Acquity BEH C18 (50×3.0 mm. $1.7 \mu\text{m}$)) column was chosen because it provided better peak symmetry. For organic modifier, a different ratio of orthophosphoric acid and acetonitrile were checked. It was found that orthophosphoric acid found better resolution. Mobile phase ratio was found to be a mixture of orthophosphoric acid: acetonitrile 60:40 v/v.

Flow rate at 0.5 mL/min was selected as the optimum flow rate. The optimum wavelength for detection was 248 nm. The retention time was

1.190 min, respectively. According to the ICH guidelines, the system sustainability tests should be carried out prior to analysis. Several parameters were studied, including tailing factor, retention time, height equivalent to theoretical plates, and RSD% of peak area for repetitive injections were studied. In all deliberately varied chromatographic conditions, the chromatogram of solution showed satisfactory resolution, as shown in **Fig. 1** and results are shown in **Table 1**.

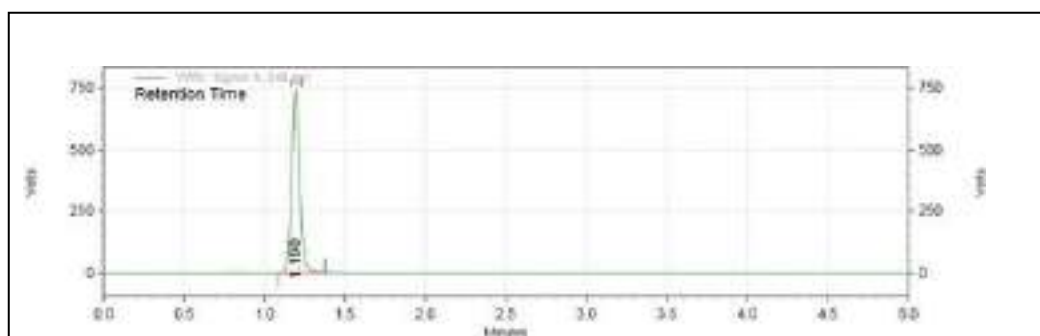


FIG. 1: UPLC CHROMATOGRAM OF GLECAPREVIR

TABLE 1: UPLC CHROMATOGRAM OF GLECAPREVIR

S. no.	Name	RT	Area	TP	TF
1	Daclatasvir	1.190	44113817	2652	1.2



Validation of Proposed Methods: The developed method was validated as per ICH guidelines.

Linearity and Concentration Range: ⁹ Aliquots equivalent to 50-150 µg/mL of working solution (1mg/mL) of Glecaprevir were transferred into a 10 mL volumetric flask, and the volume was diluted with the mobile phase. The linearity values were summarized in **Table 2**.

TABLE 2: LINEARITY DATA OF GLECAPREVIR

S. no.	Concentration (µg/mL)	Area
1	50	21720461
2	80	34167231
3	100	44035624
4	120	52943892
5	150	67035271

The correlation coefficient R^2 was determined and was found to be 1.00 for GLECAPREVIR were given in **Table 3**. The linearity graph shown in **Fig. 2** and the chromatograms are shown in **Fig. 3-7**.

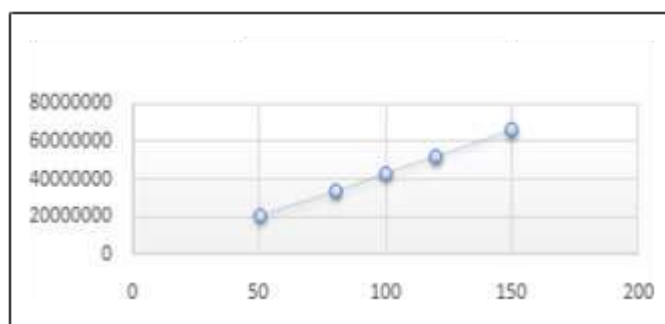


FIG.2: GRAPH FOR LINEARITY DATA OF GLECAPREVIR

TABLE 3: LINEARITY RESULTS OF GLECAPREVIR

S. no.	Parameter	Glecaprevir
1	Correlation coefficient	1.000
2	Slope	455392.02
3	Intercept	1558706.27

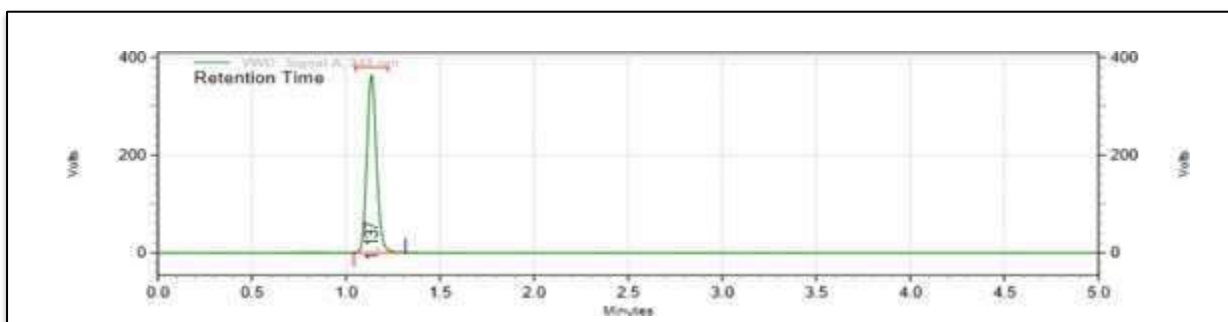
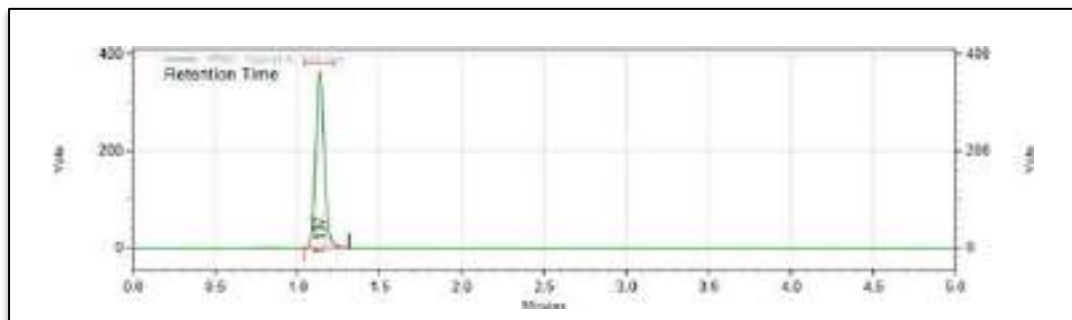
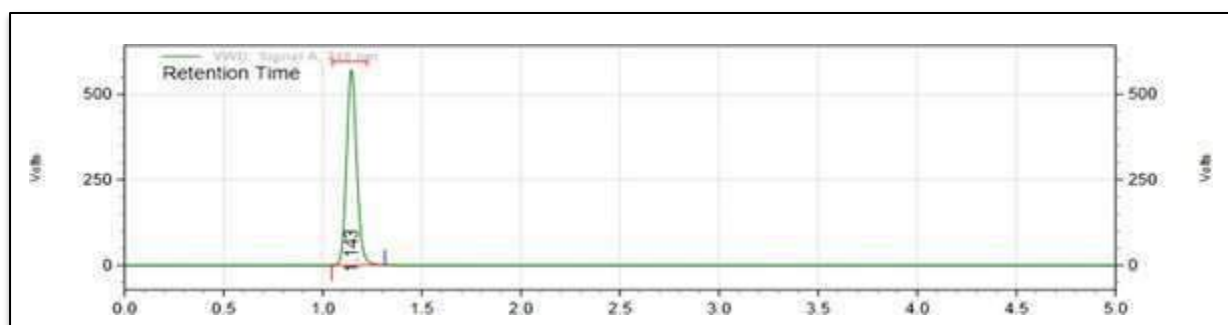
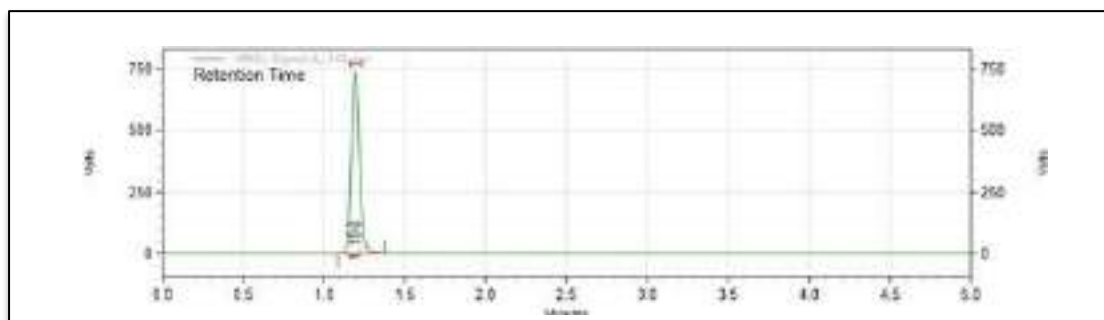
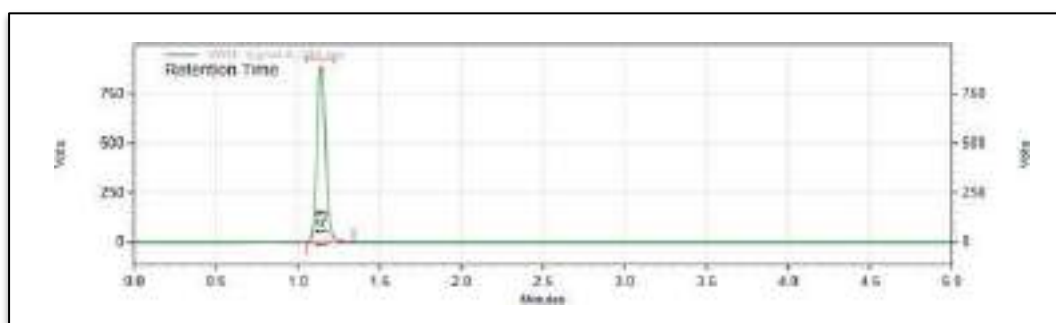


FIG. 3: CHROMATOGRAM OF LINEARITY FOR PREPARATION 1

**FIG. 4: CHROMATOGRAM OF LINEARITY FOR PREPARATION 2****FIG. 5: CHROMATOGRAM OF LINEARITY FOR PREPARATION 3****FIG. 6: CHROMATOGRAM OF LINEARITY FOR PREPARATION 4****FIG. 7: CHROMATOGRAM OF LINEARITY FOR PREPARATION 5**

System Suitability and Method Precision:¹⁰ The system suitability was evaluated by giving Glecaprevir injection six times, and the chromatograms were recorded.

The results were summarised in **Table 4**. The plate count and tailing factor results were found to be within limits.

The method precision chromatograms were recorded, and the results were summarized in **Table 5**.



TABLE 4: RESULTS FOR SYSTEM SUITABILITY OF GLECAPREVIR

Injection	RT	Peak area	Theoretical plates (TP)	Tailing factor (TF)
1	1.192	44125114	2560	1.2
2	1.193	44176891	2421	1.1
3	1.193	44165637	2676	1.3
4	1.190	44147346	2706	1.2
5	1.187	44105682	2704	1.1
6	1.190	44102411	2786	1.2
Mean	1.191	44137180	-	-
SD	0.023	31102.11	-	-
% RSD	0.2	0.1	-	-

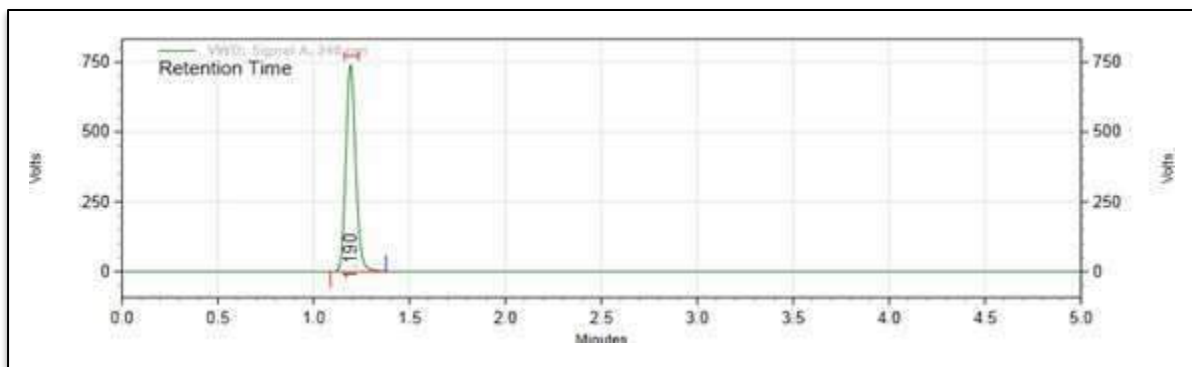


FIG. 8: CHROMATOGRAM OF METHOD PRECISION-01

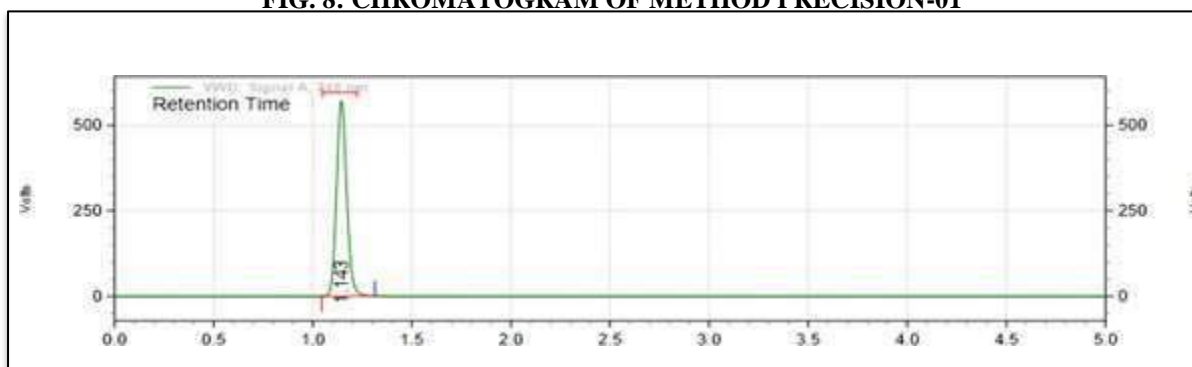


FIG. 9: CHROMATOGRAM OF METHOD PRECISION-02

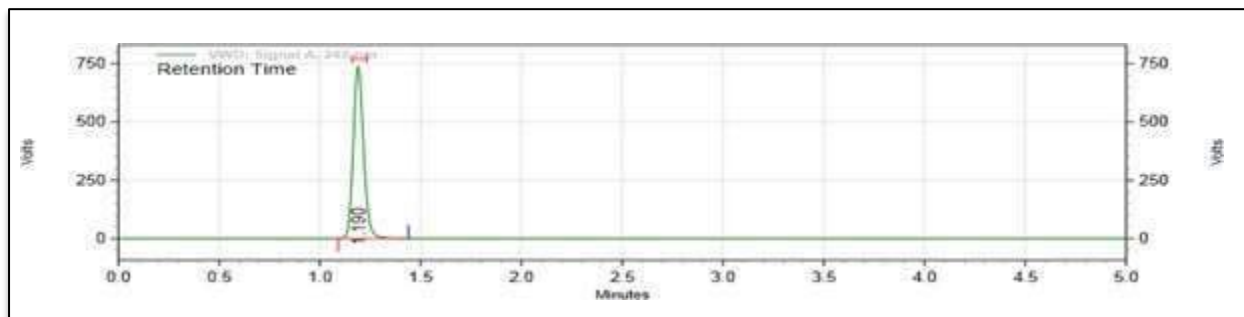


FIG. 10: CHROMATOGRAM OF METHOD PRECISION-03

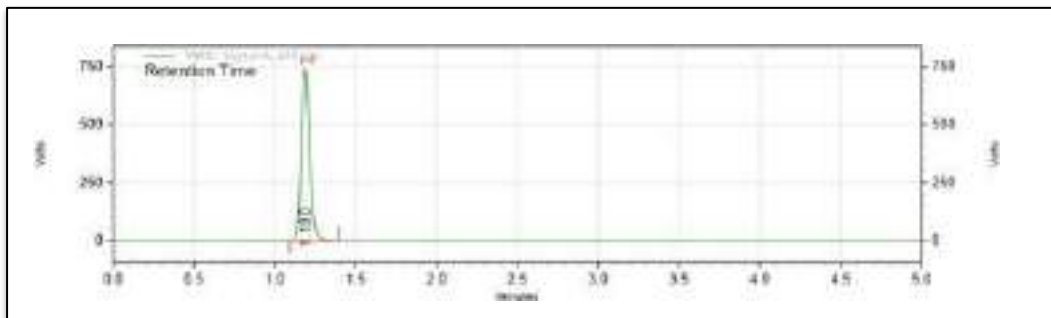


FIG. 11: CHROMATOGRAM OF METHOD PRECISION-04

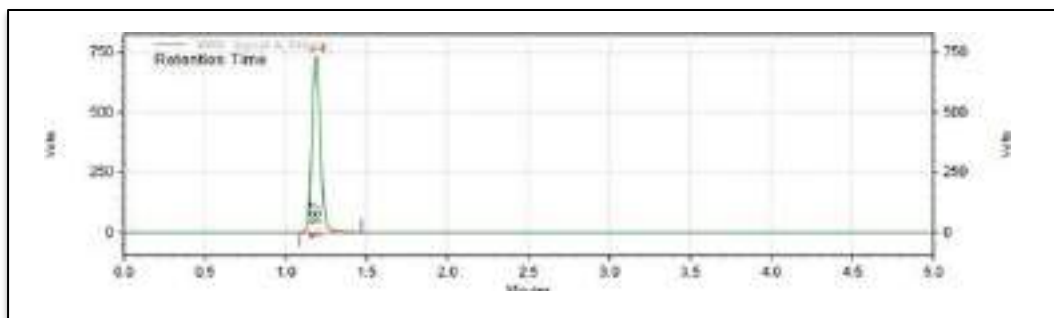


FIG. 12: CHROMATOGRAM OF METHOD PRECISION-05

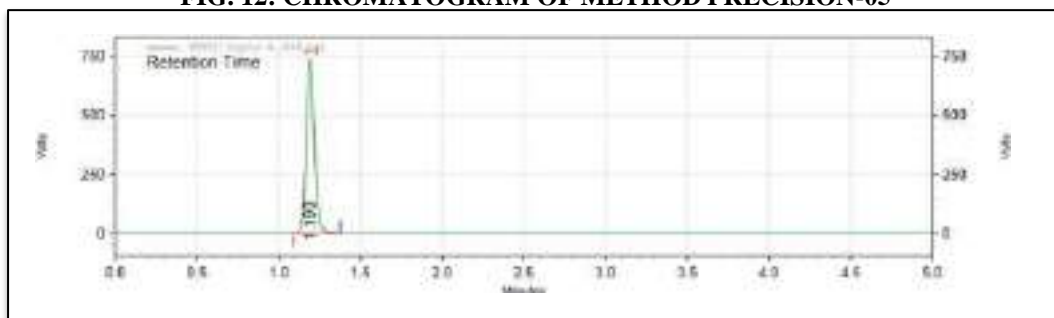


FIG. 13: CHROMATOGRAM OF METHOD PRECISION-06

TABLE 5: METHOD PRECISION RESULTS FOR GLECAPREVIR

Injection	Glecaprevi	
	Area	% Assay
1	44113817	98.9
2	44176366	98.7
3	44078346	98.4
4	44150181	98.7
5	44008775	98.9
6	44025521	98.0
	Average	9666992
	SD	2938.097
	%RSD	0.030383

Specificity: A chromatogram of blank and placebo solutions had shown no peaks at the retention times of Glecaprevir. It indicates that diluent or excipient peaks do not interfere with the Glecaprevir peak. The chromatograms are shown in **Fig. 14** and **Fig. 15**.

Accuracy: The accuracy of the proposed method were determined by analyzing three different laboratory preparations of Glecaprevir in different ratios within the linearity range. The values of mean percentage recoveries were shown in **Table**



6. The chromatograms are shown in Fig. 16-24¹¹.

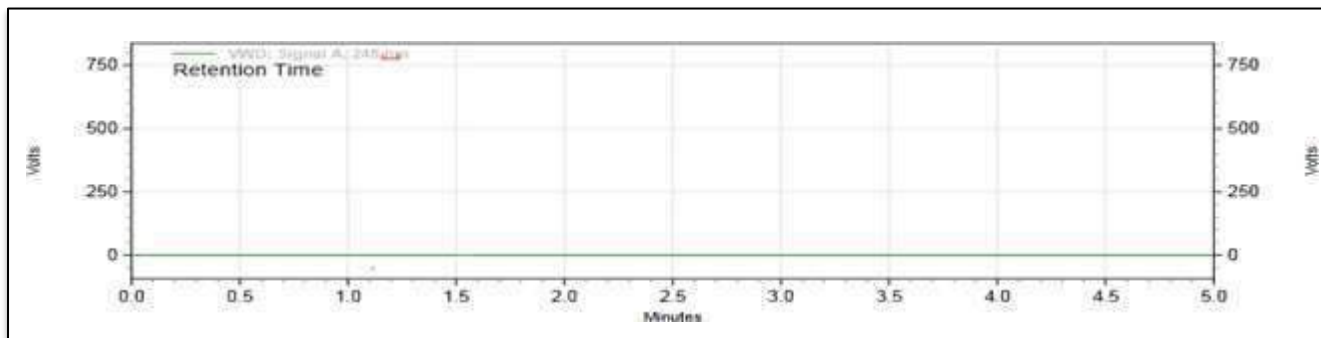


FIG. 14: CHROMATOGRAM OF PLACEBO

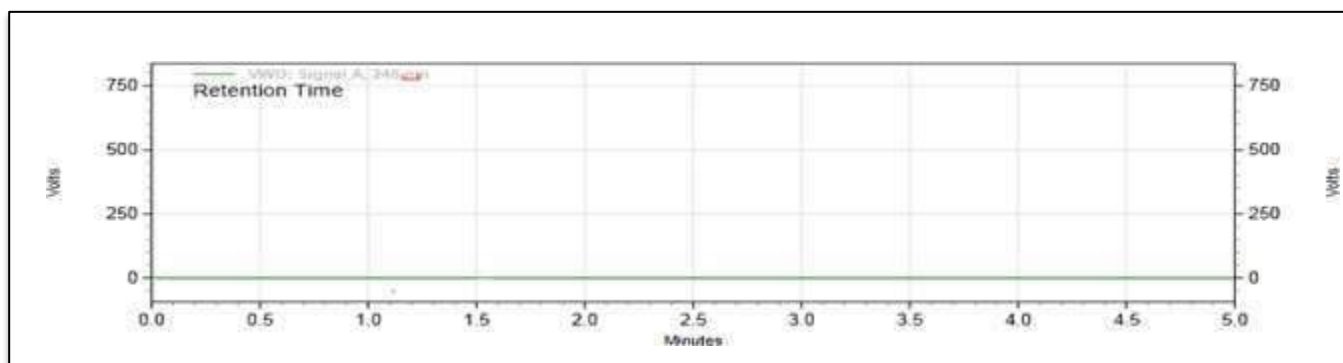


FIG. 15: CHROMATOGRAM OF BLANK

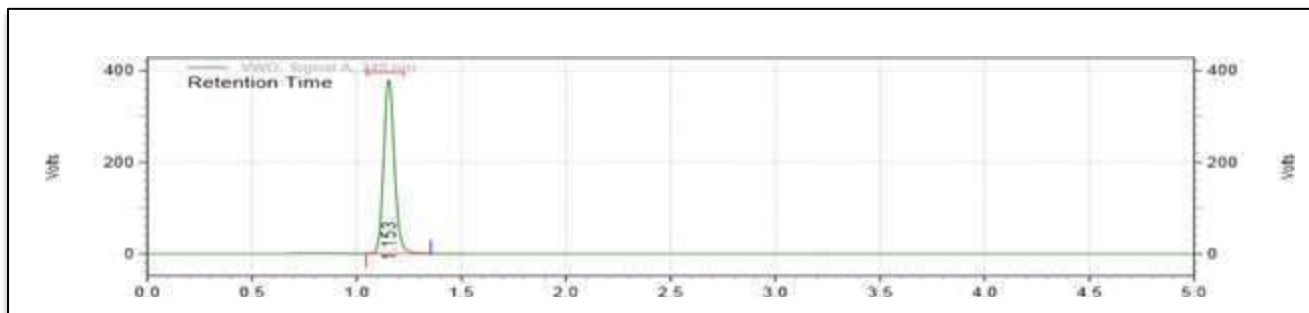


FIG. 16: CHROMATOGRAM OF 50% RECOVERY-1

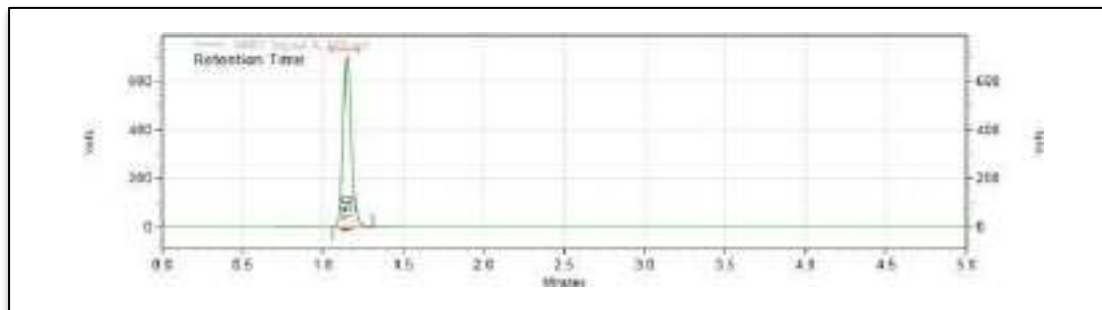


FIG. 17: CHROMATOGRAM OF 100% RECOVERY-1

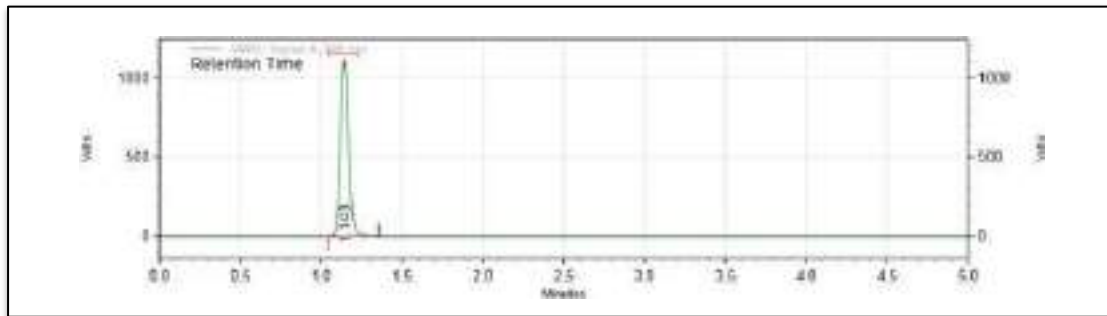


FIG. 18: CHROMATOGRAM OF 150% RECOVERY-1

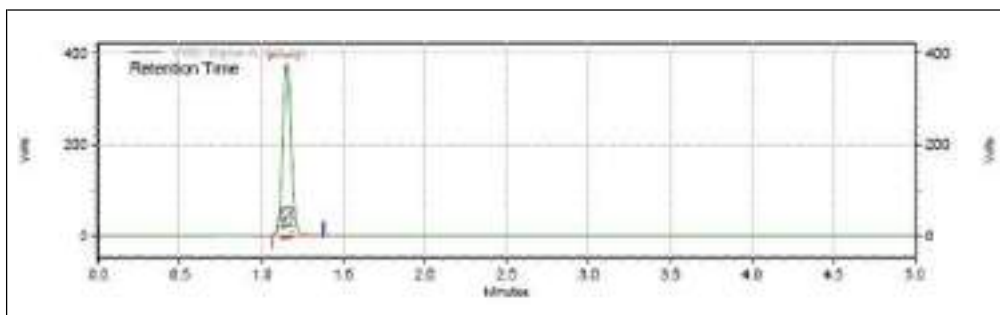


FIG. 19: CHROMATOGRAM OF 50% RECOVERY-2

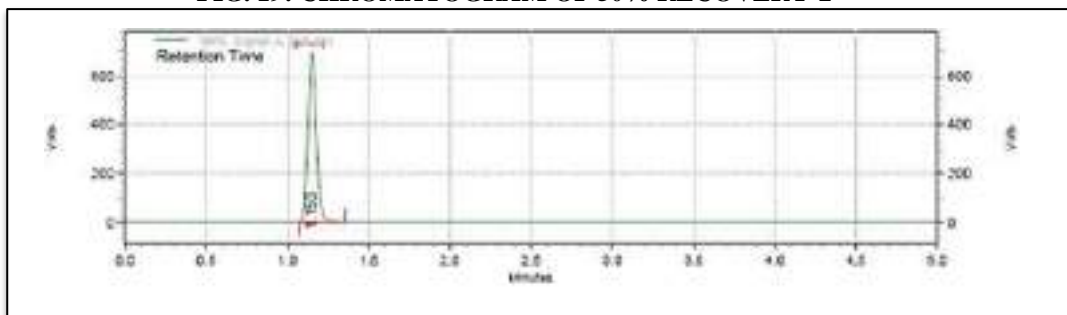


FIG. 20: CHROMATOGRAM OF 100% RECOVERY-2

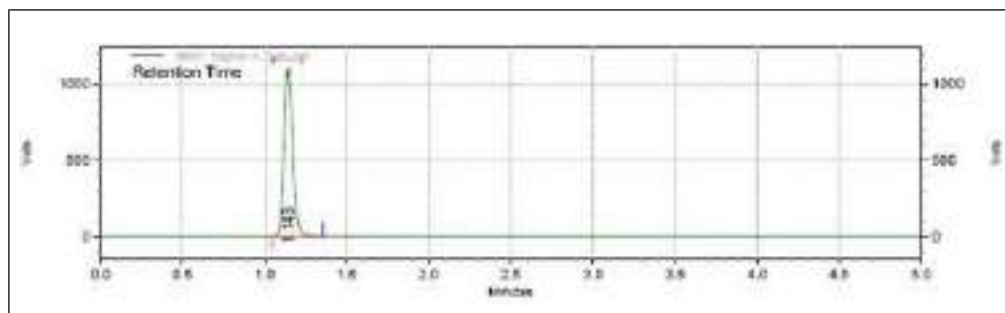


FIG. 21: CHROMATOGRAM OF 150% RECOVERY-2

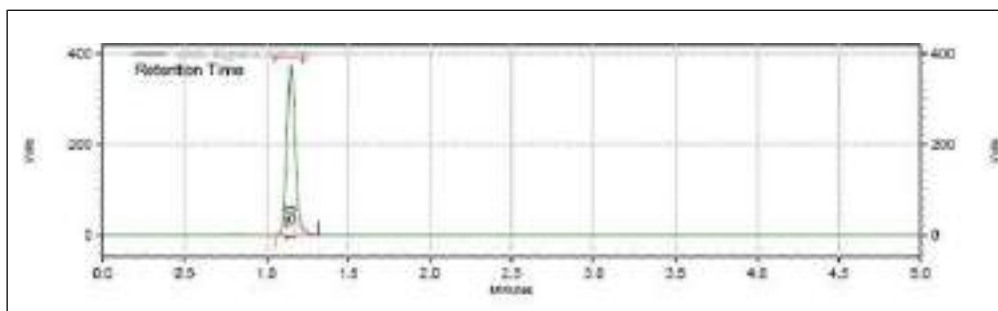


FIG. 22: CHROMATOGRAM OF 50% RECOVERY-3

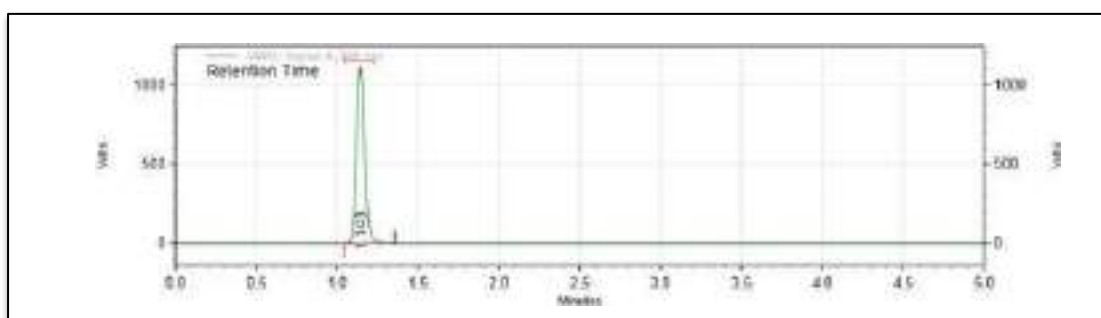


FIG. 23: CHROMATOGRAM OF 100% RECOVERY-3

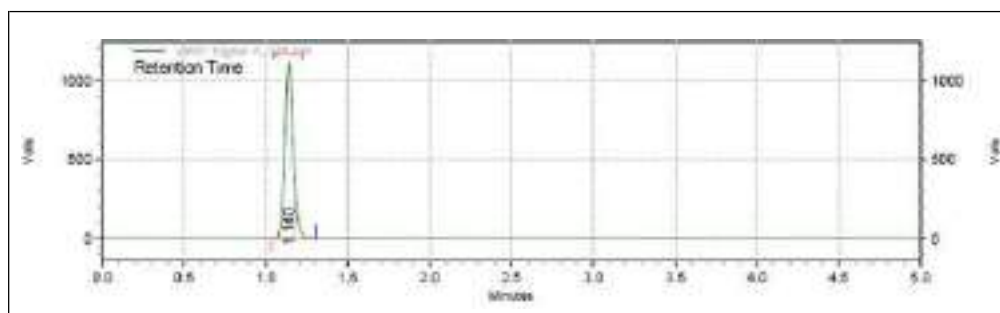


FIG. 24: CHROMATOGRAM OF 150% RECOVERY-3

TABLE 6: RESULTS FOR RECOVERY OF GLECAPREVIR

% Recovered	Area	Concentration Added	Concentration Recovered	% Recovery	Average
50% _01	7004575	250	252.18	100.9	100.5
50% _02	7020900	250	252.77	101.1	
50% _03	7002470	250	252.11	100.8	
100% _01	13910853	500	500.83	100.2	99.7
100% _02	13902676	500	500.53	100.1	
100% _03	13701006	500	493.27	98.7	
150% _01	21010188	750	756.42	100.9	100.6
150% _02	21026894	750	757.02	100.9	
150% _03	21021825	750	756.84	100.9	

Limit of Detection (LOD) & Quantitation (LOQ): ^{12, 13} According to ICH guidelines LOD and LOQ can be calculated using the standard deviation of the response and the slope. $LOD = 3.3 \times \sigma/S$

and $LOQ = 10 \times \sigma/S$. Where, σ = the standard deviation of the response and S = the slope of the calibration curve. LOD and LOQ of the drug were found to be 35.14 μ g/mL and 106.48 μ g/mL, respectively.



Robustness:¹⁴ The Robustness of the method was determined. The chromatograms are shown in **Fig. 25-28**. The results obtained by deliberate variation in method parameters are summarized below in **Table 7**.

TABLE 7: RESULTS FOR ROBUSTNESS OF GLECAPREVIR

Chromatographic changes		Retention time(min)	Tailing Factor	Theoretical Plates
Flow rate	0.4	1.473	1.1	2942
(mL/min)	0.6	0.933	1.2	2047
Temperature	25	1.143	1.2	2467
(°C)	35	1.137	1.1	2496

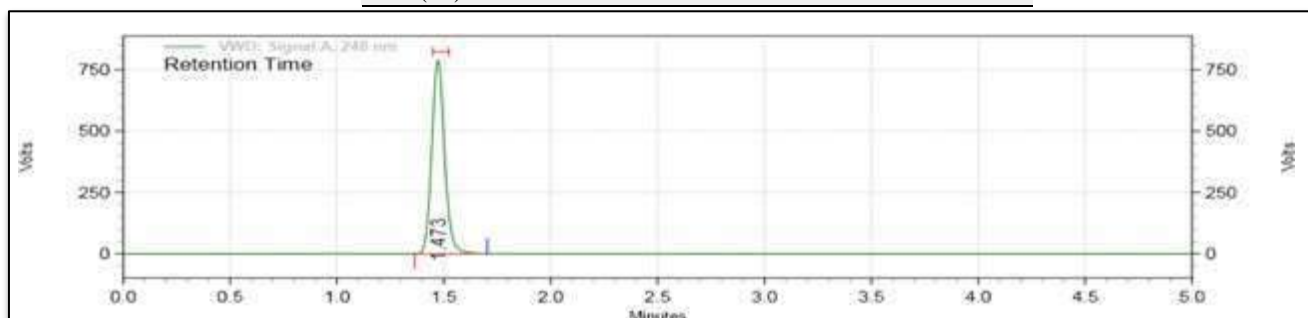


FIG. 25: CHROMATOGRAM OF FLOW RATE FROM 0.5mL/min TO 0.4mL/min

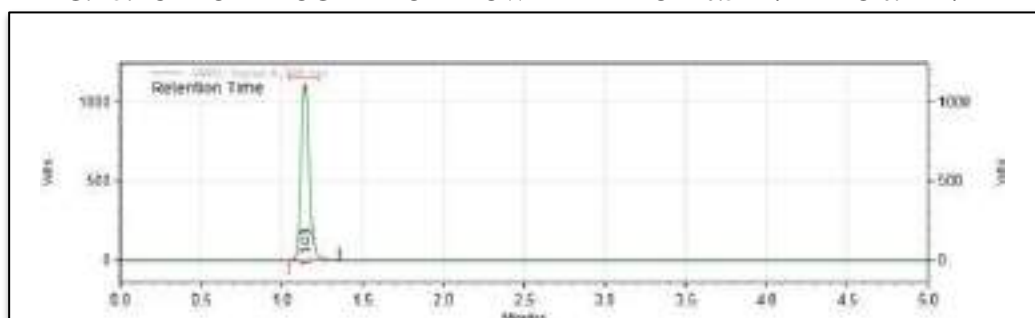


FIG. 26: CHROMATOGRAM OF FLOW RATE FROM 0.5mL/min TO 0.6mL/min

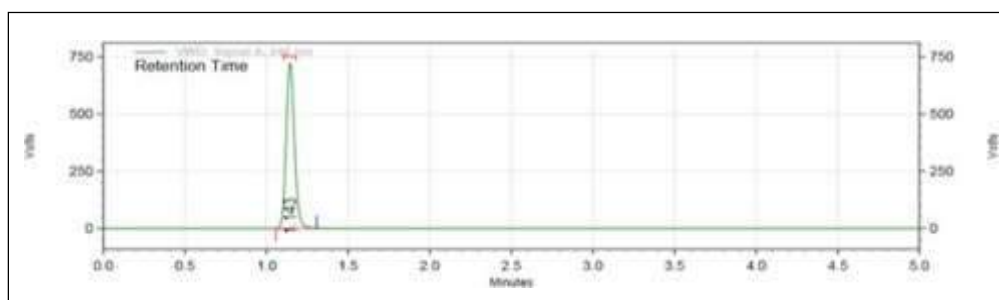


FIG. 27: CHROMATOGRAM OF TEMPERATURE FROM 30 TO 25°C

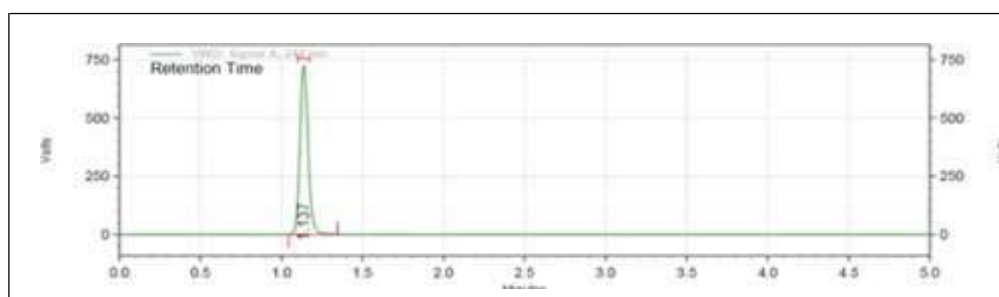


FIG. 28: CHROMATOGRAM OF TEMPERATURE FROM 30 TO 35°C



Ruggedness: The ruggedness of the method was studied by determining the analyst-to-analyst variation by performing the Assay by two different analysts. The chromatograms are shown in **Fig. 29-32**.The method is rugged, and the results are summarized in **Table 8**

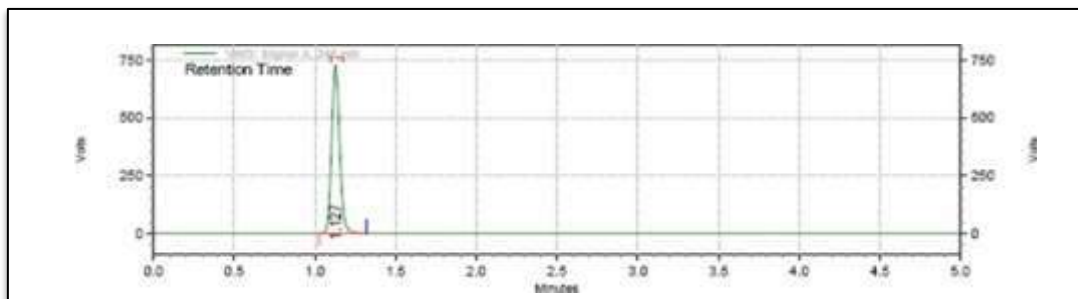


FIG. 29: CHROMATOGRAM OF ANALYST-01 STANDARD

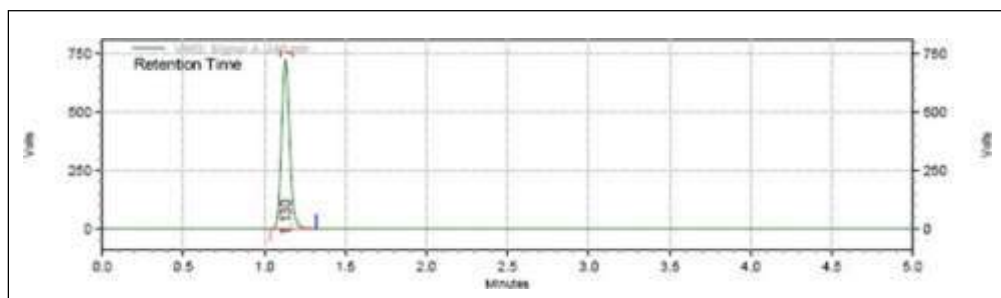


FIG. 30: CHROMATOGRAM OF ANALYST-01 SAMPLE

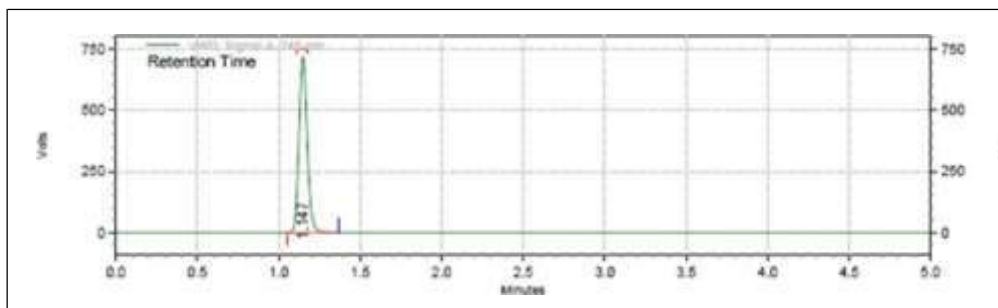


FIG. 31: CHROMATOGRAM OF ANALYST-02 STANDARD

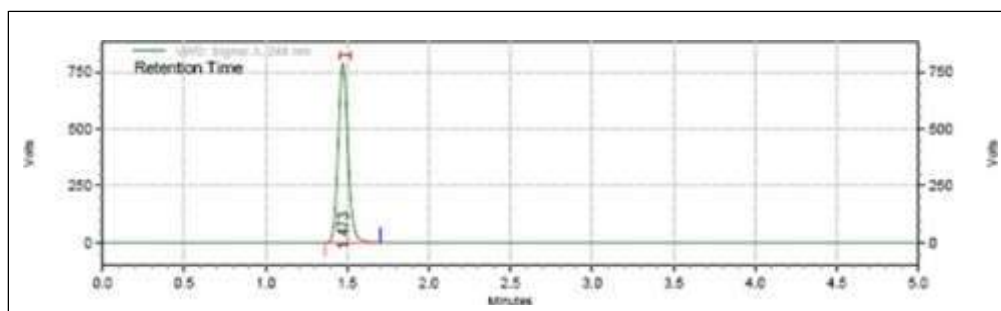


FIG. 32: CHROMATOGRAM OF ANALYST-02 SAMPLE

**TABLE 8: RUGGEDNESS RESULTS OF GLECAPREVIR**

<u>Glecaprevir</u>	<u>%Assay</u>	<u>Glecaprevir</u>	<u>%Assay</u>
Analyst 01	98.8	Analyst 01	98.9
Analyst 02	98.9	Analyst 02	98.1
%RSD	0.18	%RSD	0.28

Analysis of Pharmaceutical Dosage Forms: ¹⁵ The proposed method was applied for the determination of Glecaprevir in pharmaceutical dosage form Daklinza 10 mg tablets, without interference from the excipients, and good recoveries were obtained by applying the standard addition technique. The results were summarized in **Table 9** and **10**.

TABLE 9: RESULTS OF DAKLINZA DOSAGE FORM

<u>Glecaprevir</u>		
	<u>Standard Area</u>	<u>Sample Area</u>
Injection-1	44049957	43312224
Injection-2	44176366	43309599
Injection-3	43965547	43398270
Injection-4	44027772	44329833
Injection-5	43915825	44358634
Average Area	44027093.4	43741712
Standard deviation	551274.21	
%RSD	0.22	
Assay (%purity)	99.35	

TABLE 10: RESULTS OF ASSAY

<u>Drug</u>	<u>Label claim (mg)</u>	<u>Amount found (mg)</u>	<u>% Assay</u>
DACLATASVIR	10	9.87	98.7

CONCLUSION

A new precise, accurate, rapid method has been developed for the estimation of Glecaprevir pharmaceutical dosage form by UPLC. The cited drug was analyzed without any interference from excipients indicates the selectivity of the method. The proposed method is highly sensitive, precise, and accurate, as indicated by % recovery, % mean recovery and % RSD values.

From the results, it indicates that the UPLC method is applicable to assay of this antiviral drug with minimum sample preparation, cost, and time effectiveness with a satisfactory level of accuracy and precision. Hence, it is successfully applied for the quantification of API content in the commercial formulations of Glecaprevir in educational institutions and Quality control laboratories. UPLC method is economical, faster, consumes less mobile phase than HPLC; it indicates it is faster and eco-friendly.

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CONFLICTS OF INTEREST: The authors declare that there are no conflicts of interest. All authors contributed the work equally and worked together in the preparation of abstracts, experimental work and writing the paper.

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ASSESSMENT OF EARLY CHILDHOOD EDUCATORS' ATTITUDE AND UTILIZATION OF INFORMATION AND COMMUNICATION TECHNOLOGY IN RIVERS STATE, NIGERIA: Implication in COVID-19 Era

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ABSTRACT

This study assessed the attitude and utilization of information and communication technology by early childhood educators in Rivers State. The study adopted the descriptive survey research design. The population of the study consist of 42,417 early childhood educators in private schools in Rivers State. Taro Yamane formula was used to draw a sample of 396 early childhood educators from the population. Three research questions were used to guide the study. Data for the study was collected using an 18-item inventory developed by the researchers. The instrument was validated by experts in early childhood education. To establish the reliability of the instrument, the test-retest method was used and a reliability coefficient of 0.73 was obtained. Mean and standard deviation were used for data analysis. Results revealed that educators had a positive attitude, while there was a low extent of utilization of ICT facilities. Furthermore, the result showed that some factors militating against the utilization of ICT in early childhood education include inadequate training and the high cost of ICT tools. Based on the result, it was recommended among others that pre-service and in-service teachers should be given target training on the effective utilization of ICT tools in early childhood education contexts.

KEYWORDS: *Early childhood education, utilisation, attitude of early childhood education, ICT*

INTRODUCTION

Twenty-first-century students need competencies that enable them to adapt to a new type of individual information and individual-knowledge relationship. Therefore, the education system should contemplate new ways for learners' development in accordance with this so-called information and knowledge society (Bas, et al., 2016). In the light of the foregoing, educational systems and centres need to include new learning theories, methodologies, materials, resources and devices to replace the traditional classroom with digital classrooms where students can acquire competencies appropriate to this century's network society. No better time can this be achieved than at the early stages of education, especially in an era where face to face teaching/learning has been hindered to a high extent by the COVID -19 pandemic.

Empirical research suggests at least three reasons why ICT integration is important in early childhood education. First, ICT already affects the people and environments that surround

young children's learning. Second, these technologies offer new opportunities to strengthen many aspects of early childhood education practice. Third, there is support and interest across the whole education sector for the development and integration of ICT into education policy, curriculum, and practice. However, there is a clear consensus in the literature that the introduction and use of ICT in early childhood education should be grounded in a clear understanding of the purposes, practices, and social context of early childhood education. One such context is understanding teachers' attitudes and expertise to use them, their ability to apply them at the service of new communication scenarios, and their skills to adapt them to their students' cognitive and social characteristics. This is because teachers play a major role in all educational reforms and innovations since they are the ones in charge of adapting their classrooms to whichever elements they are offered, ICT being one of them. Thus, training in these technologies is crucial to ensure their implementation (Cabero, 2014).



The importance of ICT competencies for early childhood educators is publicly recognized and supported in most countries around the world. Recent research from Turkey shows that early childhood educators use ICT to prepare their daily plans, but they do not use ICT that often in children's activities, and if they use it, it is mostly for music activities and as rare as one or two times a week (Konca, et al. 2016). Similarly, results from Sweden showed that in addition to the above uses, educators perceive ICT as a supplement to existing activities and not as an integral part of the early childhood and preschool curriculum (Masoumi, 2015). Additionally, a recent study from Greece (Nikolopoulos & Gialamas, 2015) suggests that to successfully integrate ICT into educators' daily practices, ICT needs to be perceived as a mode of learning that should be embedded in the curriculum. Most recent findings suggest that it is necessary not only to support educators' positive attitudes toward ICT but also to seek their suggestions on how to use ICT in kindergarten. Al-Zaidiyeen (2010) pointed out that successful utilization of ICT in schools is dependent on the attitude of teachers. Attitude is defined as the way teachers accept or reject the idea of teaching and learning with the use of ICT tools in the classroom, while they are preparing instruction that needs to be implemented during the course of teaching in the classroom and while they are learning to better equip themselves to bolster delivering better educational instructions to the students in a learning environment. Furthermore, Kreijns (2013) stated that attitude is a person's overall feeling of how favourable or unfavourable the result of exhibiting a particular behaviour. For Ajzen (2005), a negative attitude is practically a barrier to the integration of ICT with education in the process of teaching and learning.

These educators need to be encouraged to use ICT for educational activities, while in-service training (that involves technical knowledge and skills as well as the effective and appropriate use of ICT in specific teaching activities) might be an approach to link their own technical and pedagogical expertise with the ICT-supported curriculum. Current realities have shown that ICT is massively adopted in all areas of life including education. It is for this reason that research into the attitude of teachers and utilization of ICT has taken centre stage. These are reflected in the study of Ndibina (2004) who investigated the attitude of teachers towards ICT as a pedagogical tool which showed that teachers do not use digital learning tasks to enable teaching and educational practice. Teachers are also more positive about their perspective concerning computers and the intention to utilize them than their feelings about the usefulness of computer and their control over it. Similarly, Oladosu (2012) found a high level of pessimism in the use of ICT in educational teaching and learning.

However, the study of Yusuf (2012) revealed a positive attitude from the teachers and willingness to use ICT though there was low use of the resources made available to the high schools in the state where the study was conducted. Martin, et al. (2019) also found that pre-service teachers had a favourable attitude towards the use of ICT but do not have digital

competence or sufficient ability to use ICT in their academic life or professional future.

As recognized and defined by many authors, ICT refers to "anything which allows one to get information, to communicate with each other, or to have an effect on the environment using electronic or digital equipment" (Preradovic, et al, 2017). As applied to early childhood education, ICT include computer hardware and software, digital cameras and video cameras, the Internet, telecommunication tools, programmable toys, and many other devices and resources. There is a growing recognition of the many different ways that ICT can contribute to, or transform, the activities, roles, and relationships experienced by children and adults in early childhood education settings (Brito, 2010). In the wake of the Covid-19 pandemic, it became imperative for educators globally to rely on ICT tools for teaching and learning due to the enforcement of social distancing. This brought to bear the relevance of the utilization of ICT in the educational system.

One of the challenges highlighted as militating against the integration of ICT in teaching and learning is the lack of government commitment to the development of adequate policy on ICT in early childhood education (Gbadegesin, et al. 2018). To foster students' development of digital competencies after completing their schooling, exposure to ICT tools should start from the early school years. Although ICT is frequently used in early childhood education, they are neither integrated into daily classroom activities nor applied to develop content associated with the teaching units that are underway, their use being more recreational than educational. To be precise, they are mostly used at specific times rather than as regular tools in the teaching-learning process (Asorey & Gil, 2009). It is therefore important that the knowledge, attitude and utilization of ICT by early childhood educators be investigated.

Statement of the Problem

For over twenty-five years, ICT has been introduced into the Nigerian educational system with the goal of integrating it into the teaching and learning process. Despite contributions/collaborations from the private and public sectors to support ICT usage in the educational system, the integration of ICT in education is yet to yield substantial results, especially in its utilization in teaching and learning. The effect of the integration of ICT in teaching has not been felt nor seen vividly, to say the least among early childhood educators. This was very glaring at the peak of the COVID- 19 pandemic, when most educational institutions (at early childhood, primary and secondary levels) in collaboration with private organizations and state ministries of education, embarked on the use of audio/visual (radio/television) channels to teach learners. Some private schools resorted to crash virtual training for teachers to enable them to prepare virtual materials for their pupils/students. Literature provides evidence that educators in some countries have been using ICT in early education programmes for over a decade. In Finland, 66% of kindergarteners use a computer daily as part of their



regular programme for already 13 years, while in Hong Kong parents expect children to acquire the ICT skills in the kindergarten environment (Kankaanranta & Kangassalo, 2013; Lueng, 2003). However, there is no concrete data on the extent of utilization of ICT in early childhood education in Nigeria, specifically in Rivers State.

When there is no effective usage of ICT in education, it defeats the expected benefits that the technology can offer. For some teachers, they only use ICT tools for administrative, self-development, class note preparation and student management purposes rather than for pedagogical purposes. The fact that attitude towards a particular technology is deemed to be at a positive level does not translate to acceptability or utilization for teaching and learning, talk less of constructivism approach in education. Therefore, the educators' professional development represents a crucial factor in stimulating the ICT use that surpasses teaching basic ICT skills. Certain conditions or strategies must have to be put in place to motivate a teacher to accept technology and eventually apply the same in teaching and learning.

Educators' professional judgment and ICT competencies are necessary to determine whether and when to use technology that is age-appropriate for a child and suits his individual, linguistic and cultural needs. The educators of young children have experience and knowledge about the children's development, individual interests, as well as the social and cultural context in which children live. The impact of technology in early childhood education depends on educators and their use of the same for developmentally appropriate policies and practices that guide their use of printed materials, content and all other tools for teaching young children. The last few decades had witnessed the rapid development, growth and adoption of Information and Communication Technologies (ICT) in virtually every sector of human society. This has led to major changes in many areas including education. Choosing not to recognize these changes and failing to integrate them into the educational system in Nigeria would not only be a serious mistake but a big disservice to students who are expected to be future drivers of innovation and creativity (Barrantes, et al. 2014).

To tackle the issue and aid proper response, there is a need to probe the factors affecting the effectiveness and use of ICT as an educational tool within the early childhood education context. While various factors have been associated with the knowledge, attitude and utilization of ICT in education, this study will shed more light on the attitude, the extent of utilization and challenges militating against the integration of ICT into teaching and learning by early childhood educators in Rivers State. It will also contribute to literature to fill the gap in the dearth of data on the extent of integration of ICT in early childhood education in Nigeria, precisely in Rivers State.

Purpose of the Study

The purpose of this study is to assess early childhood educators' attitudes and utilization of ICT in the teaching and learning process. In specific terms, the objectives of this study include:

1. To ascertain the attitude of early childhood educators towards the integration of ICT in the teaching and learning process in Rivers State.
2. To ascertain the extent of utilization of ICT in the teaching and learning process in early childhood education in Rivers State.
3. To determine the challenges militating against the effective utilization of ICT in the teaching and learning process in early childhood education in Rivers State.

Research Questions

The following research questions were raised to guide this study:

1. What is the attitude of early childhood educators towards the integration of ICT in the teaching and learning process in Rivers State?
2. What is the extent of utilization of ICT in the teaching and learning process in early childhood education in Rivers State?
3. What are the challenges militating against the effective utilization of ICT in the teaching and learning process in early childhood education in Rivers State?

METHODOLOGY

Research Design: This study adopted the descriptive survey research design as it investigated the attitude and utilization of ICT by early childhood educators in the teaching and learning process. This design was considered appropriate because the research seeks to describe the current status of things without manipulating any of the variables.

Population of the Study: The study population consisted of 42,417 (Source: Universal Basic Education (UBE), Rivers State, 2022) early childhood educators in Rivers State. Whose primary role involves educating learners less than 5 years from all private schools in Rivers State.

Sample and Sampling Technique: From the population of early childhood educators in private schools in Rivers State, 396 were drawn using the Taro Yamane formula as the sample used in the investigation through simple random sampling techniques.

Instrument for Data Collection: An instrument titled: "Attitude and Use of Information/Communication Technology Inventory" (AUICTI), developed by the researchers was used to collect data. The instrument was constructed after a detailed review of related literature and consultation with experts in early childhood education. The inventory consists of two sections: labelled A and B. Section A is concerned with information on demographic variables, while section B consists of 18 items. These items were presented to respondents to indicate the level of agreement or disagreement on a 4-point modified Likert Scale.



Validity of the Instrument: The face and content validity of the instruments was determined by expert judgment. For face and content validity, copies of the instrument were given to experts in the Department of Early Childhood Education. Thereafter, their suggestions were reflected in the final version of the instrument.

Reliability of the Instrument: To establish the reliability of the instrument, the test-retest method of internal consistency was used. A sample of 20 teachers who were not part of the final selected sample was drawn for reliability testing. While the instrument was administered twice on the sample. The scores from both administrations were analyzed using Pearson Product Moment Correlation. The coefficient obtained was 0.73. This value indicates that the instrument possessed a suitable level of reliability.

Method of Data Collection: The instrument was administered to the respondents using the direct delivery method. Before administering, effort was made to explain orally the purpose of the study, the importance of their contributions and instructions for filling. Thereafter the instrument was administered and collected on the spot after completion.

Method of Data Analysis: For answering the research questions posed for the study, mean and standard deviation were used. All analysis was done using the Statistical Package for Social Science (SPSS).

RESULTS

Research Question One: What is the attitude of early childhood educators towards the integration of ICT in the teaching and learning process in Rivers State?

Table 1: Attitude of early childhood educators towards the integration of ICT.

	ITEM	\bar{X}_1	SD	Decision
1	Computer use makes me so much more productive	3.03	0.73	Agree
2	Teaching with ICT tools improves pupils' learning	3.08	0.73	Agree
3	ICT is a supplement to existing classroom activities	2.58	0.84	Agree
4	ICT is indispensable in early childhood education	3.03	0.73	Agree
5	Using ICT tools saves time and effort	2.93	0.81	Agree
6	I would rather do teaching by hand than use a computer	2.09	0.66	Disagree
7	Computers provide a faster means for information sharing and dispensation	3.10	0.71	Agree
	Grand Mean	2.83	0.74	Agree

The result in Table 1, revealed that except for item 6 (I would rather do teaching by hand than use a computer) with a mean and standard deviation: ($\bar{X} = 2.09$, $SD = 0.66$), items 1, 2, 3, 4, 5 and 7 with mean values greater than 2.50 showed that these items were accepted. Furthermore, a grand mean value of 2.83 ($SD = 0.74$) was obtained which suggests that early childhood

educators have a positive attitude towards the integration of ICT in the teaching and learning process in Rivers State.

Research Question Two: What is the extent of utilization of ICT in the teaching and learning process in early childhood education in Rivers State?

Table 2: Extent of utilization of ICT in the teaching and learning process

	To what extent do you use the following tools in the teaching and learning process	\bar{X}	SD	Decision
8	I assist my pupils to connect with ICT tools during classroom training	1.81	0.74	Disagree
9	ICT tools are used for the recreational purpose	2.74	0.61	Agree
10	I use ICT tools to prevent my pupils from being distracted	2.58	0.84	Agree
11	ICT tools have enabled my pupils to learn new things	2.01	0.69	Disagree
12	I use ICT to gather the information I use for classes	2.12	0.75	Disagree
13	I use ICT tools when am compelled by the headteacher	2.72	0.60	Agree
	Grand Mean	2.33	0.71	Disagree

The result displayed in Table 2 on the extent of utilization of ICT in teaching and learning in early childhood education, revealed that items 8, 11 and 12 were rejected with a mean and standard deviation ($\bar{X} = 1.81$, $SD = 0.74$), ($\bar{X} = 2.01$, $SD = 0.69$), and ($\bar{X} = 2.12$, $SD = 0.75$) while items 9, 10 and 13 were

accepted ($\bar{X} = 2.74$, $SD = 0.61$), ($\bar{X} = 2.58$, $SD = 0.84$) and ($\bar{X} = 2.72$, $SD = 0.60$) respectively. A grand mean of 2.33 ($SD = 0.71$) was obtained which indicate a low level of ICT utilization among early childhood educators in Rivers State.



Research Question Three: What are the challenges militating against the effective utilization of ICT in the teaching and learning process in early childhood education in Rivers State?

Table 3: Challenges militating against the effective utilization of ICT in early childhood education

	ITEM	\bar{X}	SD	Decision
14	Lack of effective government policies and interventions on early childhood integration.	2.97	0.76	Agree
15	Lack of adequate training of early childhood educators in the integration of ICT	2.98	0.81	Agree
16	High cost of ICT tools	3.01	0.81	Agree
17	Lack of commitment on the part of school administrators to integrate ICT	3.00	0.75	Agree
18	Inadequate knowledge in utilization of ICT tools and integration in teaching/ learning	3.01	0.81	Disagree
	Grand Mean	2.99	0.79	Agree

The result in Table 3 indicate that on the challenges militating against the effective utilization of ICT in early childhood education, all items; 14, 15, 16, 17 and 18 with mean and standard deviation ($\bar{X} = 2.97$, $SD = 0.76$), ($\bar{X} = 2.98$, $SD = 0.81$), ($\bar{X} = 3.01$, $SD = 0.81$), ($\bar{X} = 3.00$, $SD = 0.75$) and ($\bar{X} = 2.17$, $SD = 0.70$) were accepted as challenges militating against the effective utilization of ICT in the early childhood education.

DISCUSSION OF FINDINGS

The result obtained from the answer to research question one revealed that teachers in early childhood education have a positive attitude towards the use of ICT in the teaching and learning process. This result is not surprising and might be attributed to the increased availability of information and communication tools in every aspect of modern societies. Furthermore, it is possible that this result might be due to the increased level of education that early childhood educators might be exposed to, unlike in the past when education is basically executed using the analogue method. This result is in tandem with that obtained by Ndibina (2004) who found that teachers had a positive attitude towards the use of ICT as a pedagogical tool. This is contrary to the findings of Oladosu (2012) who revealed that teachers are pessimistic about the use of ICT. The current study affirms that early childhood educators acknowledge that ICT enhances their level of productivity as well as in speedy dissemination of information.

From research question two, it was revealed that despite the positive attitude of early childhood education teachers towards the use of ICT in the teaching and learning process, there is a low level of utilization of ICT in early childhood education settings. This result was deduced from the mean value obtained in Table 2 which was less than the criterion mean (2.50) of the study. This result might be attributed to early childhood educators' low level of competence in the use of ICT tools. This is affirmed by the findings of Konca, Ozel and Zelyurt (2016) that early childhood educators do not often use ICT for pupils' activities rather they use it for music activities

which are also rare. This might be due to some of the challenges faced by early childhood educators highlighted in the study such as inadequate training in the integration of ICT for teaching, inadequate knowledge in utilization of ICT tools and integration in teaching and learning. This result is in agreement with that of Martin, Gonzalez and Panalvo (2019) who established that pre-service teachers had a favourable attitude towards the use of ICT but do not have digital competence or sufficient ability to use ICT in their academic life or professional future.

The result from research question three which sought to investigate the challenges militating against the effective utilization of ICT in the teaching and learning process in early childhood revealed among others that lack of effective government policies and interventions in early childhood, inadequate training of early childhood educators in the utilization of ICT and the high cost of ICT equipment were substantial challenges hindering the utilization of ICT tools. The result is in line with that of Gbadegehin, Alabi and Omodun (2018) who showed a lack of government commitment to the development of adequate policy on ICT in early childhood education.

Implications in the COVID-19 Era

The world is still grappling with the unending emergence of different strains of the COVID-19 virus. Though the rate of infection and transmission seems to be abating globally, there are still concerns about the deadly nature of the virus with no cure in sight. To sustain the downward slope of the COVID-19 curve the protocol associated with its control must be adhered to especially in an environment prone to large gatherings such as educational institutions. Teacher educators need training in the utilization of ICT tools in teaching and learning because they can only transmit the knowledge that they have acquired. Therefore, if pre-service and in-service teachers are not adequately trained to integrate ICT in teaching/ learning it would be difficult to raise digital competent pupils as well as to adapt to the new normal of virtual teaching/learning.



It is therefore expedient that stakeholders, state and the federal ministries of education embark on extensive training on the integration of ICT in teaching/learning for teacher educators, pre-service and in-service teachers. The time to act is now. This would boost the confidence of teachers to raise digitally literate pupils who would not contend with the use of ICT tools in learning as they continue on future academic pursuits and endeavours even with their peers globally. The results from this study imply that teachers might have faced a lot of challenges in virtual teaching and learning during the COVID-19 pandemic. Hence, those who had the short end of the stick in the process were learners.

Recommendations

1. The federal and state governments should give priority attention to the provision of technological facilities for instructional delivery especially in higher education to enable teacher educators to train pre-service teachers adequately on the utilization of ICT tools in teaching/learning.
2. Stakeholders such as Parents Teacher Association (PTA) and non-governmental organizations should join hands with the federal and state governments in the provision of ICT facilities so that the needed technological gadgets would be adequate for the teaching and learning at early childhood care and educational centres.
3. The state government should collaborate with the National Association of Proprietors of Private Schools (NAPPS) to embark on intensive training and re-training of early childhood education teachers on the preparation/ integration of ICT tools in the teaching and learning process.
4. A course on the utilization of ICT facilities for teaching at the early childhood stage should be introduced into the academic programme for pre-service early childhood education teachers.

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ENRICHING FIRE DETECTION THROUGH MULTI-CLASSIFIER AND DEEP LEARNING MODEL

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ABSTRACT

Fire is one of the most destructive forces that have been a double edged sword, while it is very useful and generates energy when controlled in an effective manner, it can be quite deadly if left unchecked. The fire is combustion and a conversion and release of energy which is violent and has the ability to unleash massive amounts of destruction. This is highly undesirable circumstance that could lead to a potentially catastrophic occurrence. It has been evident in the recent years with the large number of devastating wildfires that caused a large scale loss of life and property, a large number of species of flora and fauna were extinct which one of the most deadly occurrences. The main problem is the lack of an effective and useful fire detection approach. Therefore, this research article defines an effective multi-classifier approach for fire detection that identifies the color of the fire, shape of the fire and the movement of the fire, along with the detection of smoke by using the convolution neural network. This approach has been one of the most effective techniques for the fire detection which is evident through the extensive experimental results that signify the superiority of the proposed multi-classifier fire and smoke detection approach.

KEYWORDS— Convolution neural network, Multi-classifier, Image Morphology, Temporal effect

I. INTRODUCTION

Fire safety seems to have become a primary priority in our current lifestyles, though there are still fire risks that may result in significant property and personal loss. As a consequence, the use of a fire suppression system was essential in both preparedness and response to the fire. The main purpose of both automatic fire detection solutions would be to identify a fire, appropriately notify and transmit messages to inhabitants, and to consult and provide knowledge among first emergency personnel. The precise conditions – including the norm of the geographic region in issue – decide how these aims are achieved.

Across the other end, detection systems are not revolutionary; they have been available for quite long period of time. In the early 1800s, many of the earliest alarms was created. Dual fire alarm systems, one with a telegraphic key and another with a lever, made up the mechanism. If a fire was found in a home or business, someone would have had to approach inside one of the devices and crank the lever to issue a warning to a neighboring alarm station. The signal would be sent to a coordinator at the facility, who would then notify the fire brigade for help. It was a multi-phased procedure that took a long time. As technology progressed ever since, the fire detection system has improved as well.

Fire alarm systems have traditionally been regarded as among the most major components in everyday life. In the long term, it will be among the main objectives of smart home

control technology. A fire alarm system has components that operate with each other to recognize and alert the user using audible and visual ways when smoke, fire, or other risks develop. It may also call the emergency services to have all of the fire detection systems in the area monitored. That is the situation as it is right now. A fire alarm system is amongst the most prevalent systems that must be installed in every home and business in various countries. The technology can help homeowners be notified of a potential fire and receive advance notice.

The technology must be able to summon emergency services and contacts right away, cutting down on the time it requires for the fire department to respond. It is also possible that false fire alarms will be reduced as a result of this. This is accomplished by pinpointing the particular problem in the event of a malfunction, which can drastically limit fire damage to structures. Unlike other things, fire has a vibrant structure and is a dramatic yet uncommon optical sight.

Because of the recurring form and size fluctuations, computational vision-based fire detection systems depend on multi-feature-based techniques. The goal of such techniques is to identify a combination of traits that, when seen together, rule out fire as a probable cause. To mention a few low-level properties of fire, consider color, velocity, shape, progression, flaring, and smoke patterns. Spectral, geographical, and temporal factors are frequently utilized to identify fire zones in addition to these defining criteria.



The Literature Survey section of this research paper examines previous work. Section 3 delves into the approach in depth, while section 4 focuses on the outcomes evaluation. Finally, Section 5 brings this report to a close and gives some hints for future research.

II. LITERATURE SURVEY

For surveillance footage, K. Muhammad et al. [1] offer a cost-effective fire detection CNN architecture. The framework is depending on the GoogleNet architecture and has been fine-tuned to reduce computing complexity and improve detection accuracy. Experiments show that the proposed architecture outperforms both existing hand-crafted features-based fire detection methods and the AlexNet architecture-based fire detection methods. In comparison to state-of-the-art fire detection systems, the suggested framework strikes a balance between fire detection accuracy and computing complexity, as well as reducing the frequency of false alarms. Therefore, the presented approach is better suited for early flame detection during monitoring to avert massive fire disasters.

J. Widodo et al. estimated backscattering using ALOS-2 PALSAR-2 horizontal-horizontal polarisation data and simulated backscattering using an impedance model in this study. Mac Pearson's correlation coefficient was used to fit this model. The correlation between simulation backscattering using an impedance model and simulation using ALOS-2 data is strong, at 0.8, with a coefficient determinant of 0.6 and a root mean square error of 1.4. It means that utilizing ALOS-2 data, the observation of a peatland risk fire zone was successful [2]. A dry peat area with a low dielectric constant is illustrated by the ALOS backscattering coefficient. The hazard of a peat fire is linked to places with dry peat and a deep groundwater table. Because of the cross-checking in each other, the combination of the novel impedance model technique and DInSAR methods, as well as other research advances, provides an advantage in the form of correct analysis findings.

G. Xu et al. propose an end-to-end amenable structure for smoke detection that depends on two state-of-the-art fast detectors, the single-shot multi-box detector (SSD) and the multi-scale brine convolutional neural network (MSCNN), and uses annotated synthetic smoke photos. To adapt a detector model that has been trained on synthetic smoke photos to real-world circumstances, an adversarial training approach is utilized [3]. To merge pose assessment and unmasking at the same level utilizing convolutional layers, a set of convolutional branches are introduced to chase the attribute layers in the fast detector for domain adaption. A category score is assigned to each projected box, indicating the chance that the box belongs to one of the two categories: smoke or non-smoke. The domain branch forecasts domain category scores, which reflect the likelihood that a given box

corresponds to one of two domain categories (synthesis or reality).

Traditional techniques have trouble distinguishing thin and microscopic smoke in time because smoke is overlaid on the backdrop and has a diversity of morphologies during the rising and expanding phases. LBP-TOP+SVM, for example, is a common technique for splitting smoke images and identifying the cumulative motions of these blocks [4]. S. Luo et al. presented DNN, which is superior to previous techniques for examining smoke form features and morphological changes. This study also employs the partitioning strategy, which reduces network complexity while improving detection accuracy. Furthermore, movies are compressed into images, resulting in a smaller dynamic characteristic network. Finally, the two-stage structure is useful for finding thin and minor smoke.

Z. Lin et al. developed an active fire-detection technique that might be utilized with data from China's FengYun-2G geostationary satellite [5]. There have been several active fire-detection algorithms established in the past, but only a few are intended for geostationary data and even fewer for Chinese satellite data. FengYun-2G is a functioning satellite that delivers 5-km spatial resolution data to researchers every hour. High temporal aspiration and time series analysis helps characterize pixels and prevent inaccuracies originating by coarse spatial resolution since the spatial analysis approach helps remove many unrelated pixels. It's critical to fully realize the possibilities of time-series scanning. Data preparation, geographical analysis, and temporal scanning are the three primary processes of the proposed approach. A universal approach for processing full-disk pictures is presented, which would substantially improve the efficiency of subsequent calculations, particularly in studies where the attention may be centered on specific local locations. During the spatial analysis, prospective fire tests are used in conjunction with a combination of fixed and dynamic criteria to reject non-fire pixels to the greatest degree possible.

To address the advanced forest fire smoke identification complication, Y. Cao et al. present a new awareness intensified bidirectional LSTM network (ABi-LSTM). The authors explore the spatiotemporal representation of a smoke candidate patch utilizing a CNN and a bidirectional long short-term memory network in both forward and backward time. This is the first study to use an attention mechanism to recognize forest fire smoke from video. In the presented implementation, a soft attention technique is utilized to automatically emphasize motion particulars in the temporal domain, allowing an attention network to self-adaptively focus on discriminative frames [6]. To amplify the experiment's dependability, the authors create increasingly difficult forest fire smoke data sets. Experiments manifest that the suggested strategy outperforms the existing technique for detecting forest fire smoke.



To investigate image-type fire flare identification, X. Huang et al. employed a support vector machine and semantic similarity theory. In reality, the RS technique is susceptible to noise and has poor automatic failover and generalization performance, whereas the SVM approach has high antinoise and generalization capabilities [7]. This study developed a fire flame photo recognition classifier using an RS-SVM fire flare identification approach. This study employed additional feature variables as the criterion, represented the static and dynamic aspects of flames, selected and extracted the most efficient feature subsets, fused the features of fire flame pictures extracted, and decreased the amount of training necessary to detect and extract flame areas by developing a model with SVM and optimizing the parameters.

H. Yang et al. developed a non-temporal lightweight fire detection approach using CNN. Because a fire object varies from other objects in terms of properties, notably color, the authors recommend using a channel multiplier to boost the color aspects in their network. Because fire is a deformable object, they also use SE-Depthwise modules to enhance the representation of depthwise separable convolution to capture the global features of fire effectively [8]. Furthermore, despite traditional CNNs' strong classification performance, inferences take a long time because of the large number of parameters. They address this issue by reducing network complexity, allowing CNN to be used in embedded devices with limited computing capability.

C. Fan et al. present an inconspicuous wearable system that depends on a wireless body area network that consists of a smartphone and a wristwatch to identify smoking episodes. The system makes full use of the rich motion context of both ubiquitous gadgets and can anticipate smoking occurrences in real-time on the phone. Furthermore, an end-to-end trainable unified learning model that fully utilizes both the VAE and random forest properties is provided. In this model, the VAE is used to learn the latent representations and true distribution of the imbalanced input data. The neural decision forest, a differentiable random forest that uses the representations as input to create the final prediction, is then utilized [9]. The presented system surpassed a variety of comparative approaches in terms of accuracy and efficiency, and it attained state-of-the-art performance, according to thorough testing data.

Y. -J. Kim et al. developed a reliable building fire detection mechanism for fire safety in particular building contexts using simulation-based learning. We initially provided modeling and simulation methods using structural, state, and event representations to produce artificial training data that reflect actual physical buildings. Then, MEDNet was created to identify fire incidents and forecast divergences among real input data and all simulated training data using a model complexity [10]. By applying the data-independent knowledge-based technique in a timely way, the dissimilarity prediction enables the functioning of the switching measure to

prevent erroneous predictions, which can arise if unexpected circumstances are encountered.

M. D. Nguyen et al. propose a video-based fire detection algorithm for use in a fire-alarm system that is set up early. This technique analyses fire flames in both the spatial and temporal domains by combining a CNN and an LSTM network. Their system outperformed previous methods by combining the benefits of CNNs and LSTM in computer vision applications. Unlike existing systems that apply fire classifiers to complete pictures, missing minor flames, the proposed method includes a fire candidate extraction stage, allowing the system to identify a variety of fire sizes [11]. Furthermore, because the CNN-LSTM model uses tiny cropped fire pictures as input, the introduced technique can be quick.

For smoke detection, a CNN-17 deep convolutional neural network with dark channel pictures as input was built. The dark channel transformation of photos might accentuate the smoke aspects [12]. Weighted softmax loss and a range of data augmentation approaches were utilized to mitigate the effects of unbalanced data and inadequate training samples. Extensive comparison tests indicate that the presented solution for detecting smoke outperforms existing algorithms. CNN17's smoke detection performance might be improved by using dark channel input, weighted softmax loss, and data augmentation approaches, all of which have lower computational complexity than traditional CNNs.

D. Sheng et al. presented a system that combined SLIC-DBSCAN with convolutional neural networks to develop a novel smoke detection method that incorporates a sophisticated background interference splitter and a robust smoke feature extractor. SLIC-DBSCAN is used to segment and rebuild smoke pictures with complicated backgrounds [13]. The potential pure smoke images are then trained using the convolutional neural network for feature extraction and classification. The results of the experiment suggest that the present approach is capable of identifying smoke images with increased accuracy, making it suitable for use in smoke detection. Combining SLIC with DBSCAN to deal with smoke images with complex backgrounds may be a good option based on past studies. The CNN model is used to identify fire situations because of its excellent capacity in fire and smoke picture feature learning and pattern recognition.

III. PROPOSED METHODOLOGY

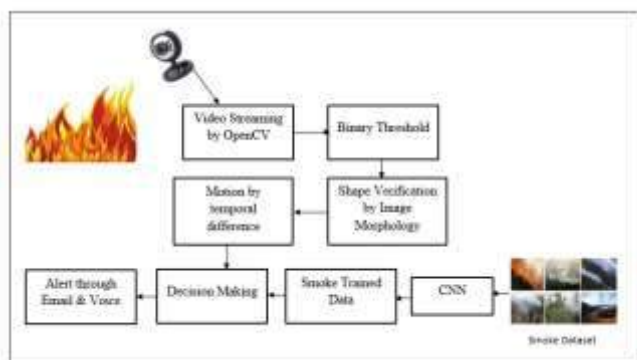


Fig. 1: Proposed model Overview

This part of the research paper mainly concentrates on revealing the details of the proposed model that is incorporated for the deployment of the fire detection model using the multi-classifier model and CNN supervised model. The steps that are undertaken for the deployment system are narrated below in depth.

Step 1: Video streaming - This is the primary step that focuses on streaming of images from the deployed web camera to the developed system. For the ease of development the proposed system installs the java based open CV to integrate the existing camera hardware with the developed project source code. With the extensive help of the opencv video is streamed from the camera into the instance media player. Then a for every set timings a frame is grabbed and stored in the specific location and also into a instance queue.

Step 2: Binary Threshold (Color classifier) - In this step an image frame is being fetched from the queue by an instance thread to evaluate for the fire color. Here in this process every pixel of the image is being traversed to extract the pixel's signed integer value, which is unique for each existed color. This signed integer value is utilized to extract the respective RGB values by right shifting 16, 8 and 0 bits respectively. The obtained RGB value for the respective pixel is subjected to estimate their average values. If the obtained average value is greater than a said threshold value, then the pixel is converted into white color by assigning the values of the RGB to (255,255,255). On the other hand pixel is turned down to black color by assigning the values of the RGB to(0,0,0). This is due to the fact that, bright pixels in the image like fire are always having a value of RGB nearer to 255, else 0. After conversion of pixels into white and non-white in the image, fire pixels looks like white and all other pixels are in black. This process yields a binary image in black and white. The Mentioned technique is denoted in the algorithm 1 below.

ALGORITHM 1: Binary threshold for Fire detection using color component

// Input: Video Frame **F**
 // Output: Fire detected image

- Step 0: Start
- Step 1: Get Image path.
- Step 2: Get Height and width of the Image **F** (L*W).
- Step 3: FOR **i=0** to width.
- Step 4: FOR **j=0** to Height.
- Step 5: Get a Pixel at (i, j) as signed integer.
- Step 6: Convert pixel integer value to Hexadecimal to get R, G, and B.
- Step 7: **AVG=(R+G+B) /3**
- Step 8: **IF AVG >T** (T is Threshold)
- Step 9: Pixel at (i,j) is FIRE
- Step 10: **ELSE**
- Step 11: Pixel at (i, j) is NOT FIRE
- Step 9: End of inner for
- Step 10: End of outer for
- Step 11: Stop

Step 3: shape verification- The obtained binary image which in turn indicates fire as white pixel and the rest in black pixels are utilized to form a coaxial ratio array to indicate the shape of the fire. In this process every white pixel position with respect to a particular axis is estimated for its ratio to obtain an array for the fire shape of a particular frame. This array of instance frame is compared with the array of the next frame to measure the change of the shape of the fire. If the changes in the shape array or co-axial array is greater than the set threshold, then the instance frame is being considered to have a positive fire. The morphology or co-axial ratio can be represented by the equation 1 and 2. This frame is then being subjected to estimate the fire motion in the next step

$$M(x) = \sum_{i=1}^N P(i, j, [255,255,255])/WIDTH \quad \text{---(1)}$$

$$M(y) = \sum_{i=1}^N P(i, j, [255,255,255])/HEIGHT \quad \text{---(2)}$$

Where M(x) – Morphology vector related to X axis.
 M(y) – Morphology vector related to Y axis.
 P(i,j) – Pixel at position i and j
 N – Number of pixels in the image

Step 4: Motion by Temporal Effect- This is the third step of the color classification for the identification of the fire

through motion. In this process the instance frame is listed for the fire pixel position, this list is being compared with the past list to get the absolute difference. If the difference is more than the set threshold then the frame is labeled as the fire. This process is denoted in the below algorithm 2.

Algorithm 2: Fire Detection by motion

```
// Input: Time T, Frame Fc, Frame Fp, Threshold Fire pixels Th
// Output: Fire Detection through motion
Step 0: Start
Step 1: WHILE (TRUE)
Step 2: for each time T
Step 3: Fp → Fc
Step 4: calculate pixel positions of Fp in an vector Vp
Step 5: calculate Pixel positions of Fc in an vector Vc
Step 6: IF ABSOLUTE DIFF ( Vp - Vc ) > Th
Step 7: Label Frame for Fire
Step 8: END IF
Step 9: END WHILE
Step 10: Stop
```

Step 5: Convolution Neural Network (CNN) for Smoke – A data set of images from the URL: <https://github.com/DeepQuestAI/Fire-Smoke-Dataset> is used for the purpose of the training the dataset using the convolution neural network. This training is done for the three classes like Fire, Neutral and smoke with the below mentioned architecture for the CNN in the table 1.

Layer Parameters	Activation Function
32 x 3 x 3 2D	ReLU
MaxPooling2D (3x3)	
Dropout (0.25)	
64 x 3 x 3 2D	ReLU
64 x 3 x 3 2D	ReLU
MaxPooling2D (3x3)	
Dropout (0.25)	
128 x 3 x 3 2D	ReLU
128 x 3 x 3 2D	ReLU
MaxPooling2D (2x2)	
Dropout (0.25)	
Flatten	
Dense (1024)	ReLU
Dropout (0.50)	
Dense (2)	Sigmoid

Table 1: CNN Architecture

After the completion of the training dataset through the python programming language, the obtained results are stored in the .h5 file, which is further will be used by the decision making model of the next step.

Step 6: Decision making- The obtained results for the instance frame through color, shape and motion classification is labeled with the weight of numerical value. This frame is then tested with the trained data with respect to the stored.h5 model file of CNN for the presence of the smoke. Based on this result a decision is taken to announce the instance image as fire or non-fire along with its intensity as VERY LOW , LOW, MEDIUM, HIGH and VERY HIGH using the IF-then Rules.

This result is then utilized to intimate the premises owner who installed this fire detection system with an email and fire event snap.

III. RESULTS AND DISCUSSIONS

The presented approach has been realized using the Java programming language through the utilization of the NetBeans Integrated Development Environment as the standard IDE. The proposed approach has been evaluated for its effectiveness and for this purpose an extensive evaluation metrics have been realized through the following tests given below.

The evaluation of the system has been performed on the publicly available fire images that are downloaded from the URL:<http://mivia.unisa.it/datasets/video-analysis-datasets/fire-detection-dataset/>.

Different types of the images are been set to identify the fire by our system as shown below.

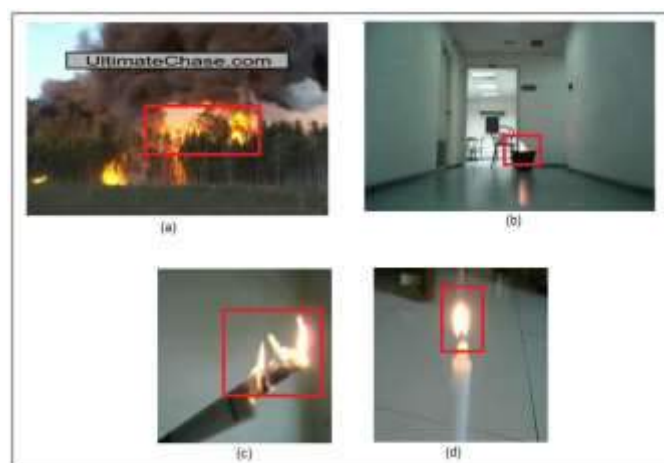


Figure 2: (a) and (b) images shown detection of fire and they are taken from the datasets. (c) And (d) images showing the detection of fire which are collected form the live streaming the videos from our camera.

As the fire is a subjective and requires the observation by an actual human being to realize the authenticity of the fire. This is useful in understanding the accuracy of the approach in identifying the occurrence of fire. Therefore, the paradigm of MRR or Mean Reciprocal Ratio is being deployed. Through this approach the human perfection can be realized in the presented approach.

Through the use of the MRR approach, the user assigns a rank to the output image based on the perfection achieved. This rank is in the range of 1 to 6, where the rank of 1 signifies highly accurate identification of the fire, whereas the rank of 6 defines the lowest precision achieved by the presented approach. The rank of 1 is depicted as 1, the rank of 2 is being depicted as 1/2, a rank of 3 as 1/3, then 1/4 and lastly 0.

Therefore, for a set of images containing fire are subjected for evaluation and the resultant outcomes are provided a rank which is then utilized in the equation 3 and 4 given below.

$$S = \sum_{i=1}^n 1 / (Rank_i) \text{ _____ (3)}$$

$$MRR = S/N \text{ _____ (4)}$$

Where n – Number of input images

The Mean Reciprocal Ratio is evaluated for 25 images of different kinds and the outcomes for the same are illustrated in the table 2 given below.

S. no	Fire Image Type	MRR
1	Office	0.79
2	Forest	0.9
3	Building	0.76
4	Corridor	0.85
	Mean	0.825

TABLE 2: Recorded MRR

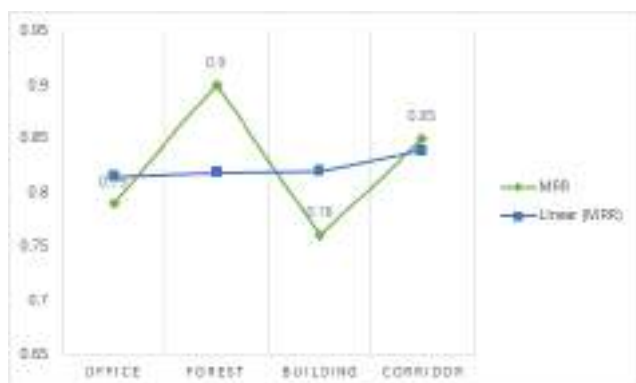


FIGURE 3: MRR COMPARISON FOR DIFFERENT TYPES OF IMAGES

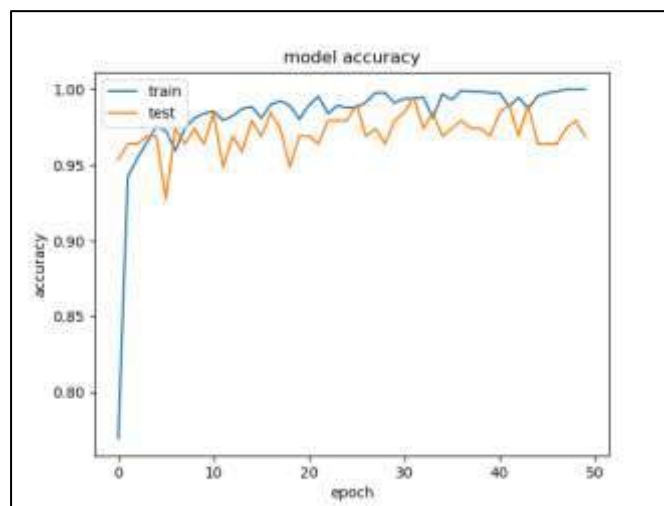
The graph stipulated in the figure 3 above dictates the superiority of fire detection displayed by the proposed methodology. The Average MRR achieved by this technique is 0.82. This is a highly satisfactory outcome that indicates an extremely accurate implementation of the multi-classifier fire detection approach.

Model Accuracy and Model Loss for training and testing of Convolutional Neural Networks

For the purpose of smoke detection the proposed approach deploys the Convolutional Neural Networks that are trained and tested extensively on the dataset achieved from the URL - <https://github.com/DeepQuestAI/Fire-Smoke-Dataset>. This dataset consists of images of 3 different classes, namely, Fire, Neutral and Smoke. The python programming language has been utilized for this purpose. The training and testing has been performed for 50 epochs for dry testing and the resulting model accuracy and the Model loss achieved are displayed below.

Figure 4: Model Accuracy

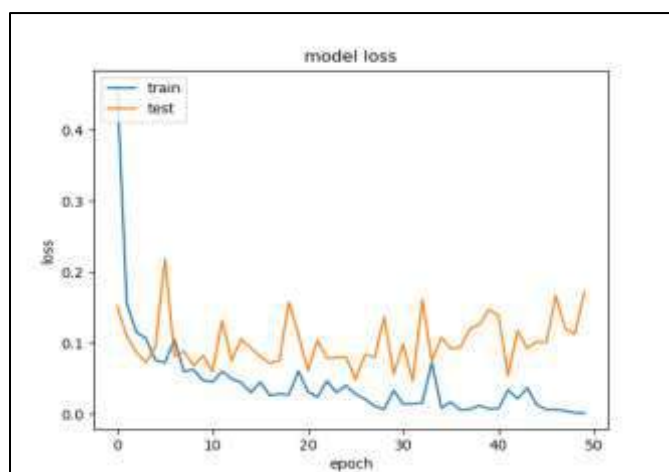
The smoke detection supervised system has also been evaluated for its accuracy achieved by the smoke detection approach. The training has been performed for 50 epochs



which has led to the generation of the accuracy vs number of epochs graph as shown in the figure 4 given above. This graph indicates that the accuracy of the model increases sharply in the initial epochs while training and then stabilizes with quite accurate results.

Figure 5: Model Loss

The model loss is also evaluated and the resultant graph for 50 epochs is shown in the figure 5 given above. As evident from the graph given above, the model loss decreases sharply



in the initial epochs for the model execution. This results in a sustained lower loss over 50 epochs which indicates an exceptional training and testing performance which translates quite well to the real world performance for the multi-classifier fire and smoke detection.

V CONCLUSION

The presented approach for fire and smoke detection has been defined in detail in this research article. There have been increased incidences of fires that have been extremely deadly which have led to the increased loss of life, biodiversity and also billions of dollars' worth of property. This is undesirable phenomenon which can be quite difficult to mitigate before it's too late. Therefore, for this purpose an effective and timely detection of fire is paramount to reducing these occurrences considerably. For this purpose an effective multi-classifier approach has been defined in this research article which identifies the fire as well as the smoke to achieve timely detection of the fire. The approach utilizes a video stream to achieve the frames in which the fire needs to be detected. These frames are utilized for color detection through binary threshold, after which the temporal difference is evaluated for the identification of the motion of the fire and finally the shape of the fire is verified using morphology. This multi-classifier approach is augmented by the smoke detection approach that is achieved through the implementation of Convolutional Neural Networks. The extensive evaluation techniques have been crucial in displaying the superiority of the proposed approach.

The future direction for research can be to deploy this approach in cameras of lower resolution in areas such as thick rainforests and other critical areas for detection of the wildfire.

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