ANALYSIS OF ATTITUDE TOWARDS YOGA AMONG COLLEGE STUDENTS USING CLUSTERING TECHNIQUES

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ABSTRACT

Yoga is an ancient practice involving physical, mental and spiritual practices. Yoga was first mentioned in the Rigveda. Yoga is seen to bring positive and holistic changes in human lives. Yoga strengthens body and relaxed the mind and hence is appreciated for its multifarious benefits. The benefits of Yoga, can be best proven on the students, looking after its memory and concentration increasing ability, developing good physic and calm mind. Present work deals with the attitude towards yoga practice of undergraduate college students of Purulia district of West Bengal, India. Response from 570 UG students is taken by a scale of attitude towards yoga. Four independent variables like Gender, Location of College, Residence of Students and Streams; and one dependent variable score of the questionnaire (attitude towards yoga practice) are considered for this study. Data Clustering is the task of grouping a set of objects in such a way that objects in the same group are more similar to each other than to those in other groups. Two-Step cluster analysis is done and five clusters are formed to take up the present study.

KEYWORDS: *Two-Step cluster Analysis, Undergraduate Students, Yoga, Attitude*

INTRODUCTION

Man has stepped into the twenty-first century. Medical science and men are working with many better technologists to offer better health care. World health organization is engaged in taking stock of global health status and taking necessary steps to raise the health standards. Hi-tech medical facilities with fascinating advances in spare-part surgeries, although have made life more comfortable, with a life expectancy of greater than seventy years, the expected quality of life, with harmony and peace seems to be far from reality. Problems of stress, stress related ailments, unrest, breaking up families, are all on an exponential rise. Health professionals who started by giving relief to their suffering sick fellow beings, through medicines and surgeries, are now faced with such newer questions because of the need of the hour. Most of the common health and social problems cannot be solved through germ theories, antibiotics or surgeries. The advent of fascinating diagnostic tools has started pointing to the role of mind on matter. Biochemical, psycho-neuro physiological, immunological researchers are all recognizing the role of mind, the life style, suppressed emotions, stress etc. in the causation of many of these challenges of the millennium. Several research publications on the value of positive thinking, prayer, spiritual healing, mind-body medicine, yoga, acupuncture, energy medicine are being poured into medical journals in spite of the resistance from hard core matter-based pharmaceutical and surgery oriented researchers.

The National Institutes of Health assorts Yoga, the 3000 years long-established tradition, to be a holistic, integrated approach and a form of Complementary and Alternative Medicine (CAM). Manifested for the calmness it shoulders, Yoga is imputed to endorse flexibility, greater self-control, strength, compassion, facilitates friendliness and endurance. Uninterrupted and seasoned rehearse dole out paramount culmination in life perspective, improved sense of energy and self-awareness. Yoga perpetuates a poise of the body and mind, and truncates stress.

Yoga can judiciously be called a configuration of mind-body fitness, since it comprises the structured use of muscles, engendering in reduced chronic body pains, increases in serotonin levels, increases blood flow and levels of hemoglobin and decrease the risk of heart attack and stroke. Apart from having capitalization in curing physical health complications, Yoga gravitates to alleviate mental health problems such as anxiety, depression, insomnia and stress.

Yoga lifts up students cognitive, psychological, physiological and social aspects. Cognitive skills contribute to equip one with attention, focus, concentration, mindfulness, problem solving, self-awareness, critical thinking and creativity, decision making etc. It keeps the students at ease and aids to be in a mindfulness state. This in turn improves concentration and memory power, which is much needed in academics. Yoga cater the physiological skills in a student making him/her flexible, strong, balanced, with ameliorate respiratory functions, dignified self-regulations, physical well-being, inducing acceptable health care and hygiene practices, balanced diet, suited sleep habit etc. Social skills too are an important arena in a student's life which include inter-personal relationship, collaborative team work, social awareness, effective communication, etc. which can be boosted through Yoga.Man has stepped into the twenty-first century. Medical science and men are working with many better technologists to offer better health care. World health organization is engaged in taking stock of global health status and taking necessary steps to raise the health standards. Hi-tech medical facilities with fascinating advances in spare-part surgeries, although have made life more comfortable, with a life expectancy of greater than seventy years, the expected quality of life, with harmony and peace seems to be far from reality. Problems of stress, stress related ailments, unrest, breaking up families, are all on an exponential rise. Health professionals who started by giving relief to their suffering sick fellow beings, through medicines and surgeries, are now faced with such newer questions because of the need of the hour. Most of the common health and social problems cannot be solved through germ theories, antibiotics or surgeries. The advent of fascinating diagnostic tools has started pointing to the role of mind on matter. Biochemical, psycho-neuro physiological, immunological researchers are all recognizing the role of mind, the life style, suppressed emotions, stress etc. in the causation of many of these challenges of the millennium. Several research publications on the value of positive thinking, prayer, spiritual healing, mind-body medicine, yoga, acupuncture, energy medicine are being poured into medical journals in spite of the resistance from hard core matter-based pharmaceutical and surgery oriented researchers

LITERATURE REVIEW

Govindasamy and Velmurugan (2018) conducted research on Analysis of Student Academic Performance Using Clustering Techniques. Here various clustering algorithms are discussed and by using these algorithms, students' performance is evaluated. In this research work, clustering algorithms k-Means, k-Medoids, FCM (Fuzzy C Means) and EM (Expectation Maximization) were examined and compared based on the performance of the algorithms using student data set.

Educational Data Mining & Students' Performance Prediction was studied by Saa (2016). This study explores multiple factors theoretically assumed to affect students' performance in higher education, and finds a qualitative model which best classifies and predicts the students' performance based on related personal and social factors. (Sample size 270)

Natek and Zwilling (2014) focuses on the study of Student data mining solution-knowledge management system related to higher education institutions. Study concludes that the use of these techniques in real life situations is useful and promising and can provide administrators with precious tools for decision.

Borgavakar & Shrivastava (2017) conducted research on Evaluating Student's Performance using K-Means Clustering. This paper evaluates student performance on basis of class test, mid test and final test, as we get cluster of student on this basis of student marks.

Clustering is used by Campagni, Merlini, & Verri (2014) for analyzing data concerning the evaluation of courses taken by students, linked to their results in the corresponding exams with possible correlation between the evaluation of a course and the

corresponding average results as well as regularities among groups of courses over the years.

Dutt et al. (2015) reviews different clustering algorithms applied to educational data mining context in this research article Clustering Algorithms Applied in Educational Data Mining.

Xinpeng Ji W. C. et al. (2020) reported that results of the cluster analysis show that the students of different categories in four universities had different performances in living habits and learning performance, so the university can learn about the students' behavior of different categories and provide corresponding personalized services, which have certain practical significance.

Schreiner (2006) used Cluster Analysis to elaborate typologies of 15-year-old students in relation to their interest in science and Science Education.

RESEARCH QUESTIONS
- Are there any similar patterns of attitude towards Yoga represented by the students?
- Are their attitudes depending on the location of the institution, sex, residence and stream of study?

METHODOLOGY
Clustering is a process of grouping objects, be it physical or abstract, into classes of similar objects. Thus a cluster can aptly be called a collection of data objects similar to each other constituting into the same cluster, but are dissimilar to the objects present in other clusters. Data clustering can be termed as an unsupervised learning and statistical data analysis. (Govindasamy & Velmurugan, 2018).

Data Clustering can be called unsupervised and statistical data analysis technique. It is used to classify the same data into a homogeneous group. It can also be used to work on a large set of data to discover hidden pattern and relationship helps to make decision quickly and efficiently. In a word, Cluster analysis is used to segment a large set of data into subsets called clusters. Each cluster is a collection of data objects that are similar to one another are placed within the same cluster but are dissimilar to objects in other clusters. (Shovon & Haque, 2012)

SCALE
Attitude towards Yoga Practice Scale (Saha 2021) was used for the purpose of data collection. This is a five-point Likert type scale consists of 38 items. Computed value of reliability in terms of Cronbach's Alpha is 0.793.

SAMPLE AND SAMPLING
570 samples were selected by simple random sampling technique.

Table 1: Sample profile

Variable	Strata	N
Sex	Male	192
	Female	378
location of college	Panchayet	490
	Municipality	80
Residence of Students	Rural	369
	Urban	201
Stream of study	Arts	472
	Science	67
	Commerce	31

STATISTICAL TECHNIQUE
Two-Step Cluster analysis is used to form different clusters.

RESULTS AND DISCUSSIONS

Table 2: Descriptive statistics of the variables

Variable	Strata	N	Mean	SD
Sex	Male	192	148.57	17.034
	Female	378	147.53	16.030
location of College	Panchayet	490	147.22	16.385
	Municipality	80	151.95	15.752
Residence of Students	Rural	369	146.91	16.615
	Urban	201	149.67	15.788
Stream of study	Arts	472	147.15	16.225
	Science	67	148.42	16.204
	Commerce	31	157.81	16.098

Means and standard deviations of attitude towards yoga for different variables according to their strata are presented by table 2. It is evident from table 2 that means and standard deviations of male and female students differs slightly but the difference for location of college i.e. panchayet region vs municipality region is remarkable. Means and standard deviations differ remarkably when rural and urban are taken into account. Mean of commerce students appreciably greater than both science and arts students.

Figure 1: Cluster sizes of different cluster groups
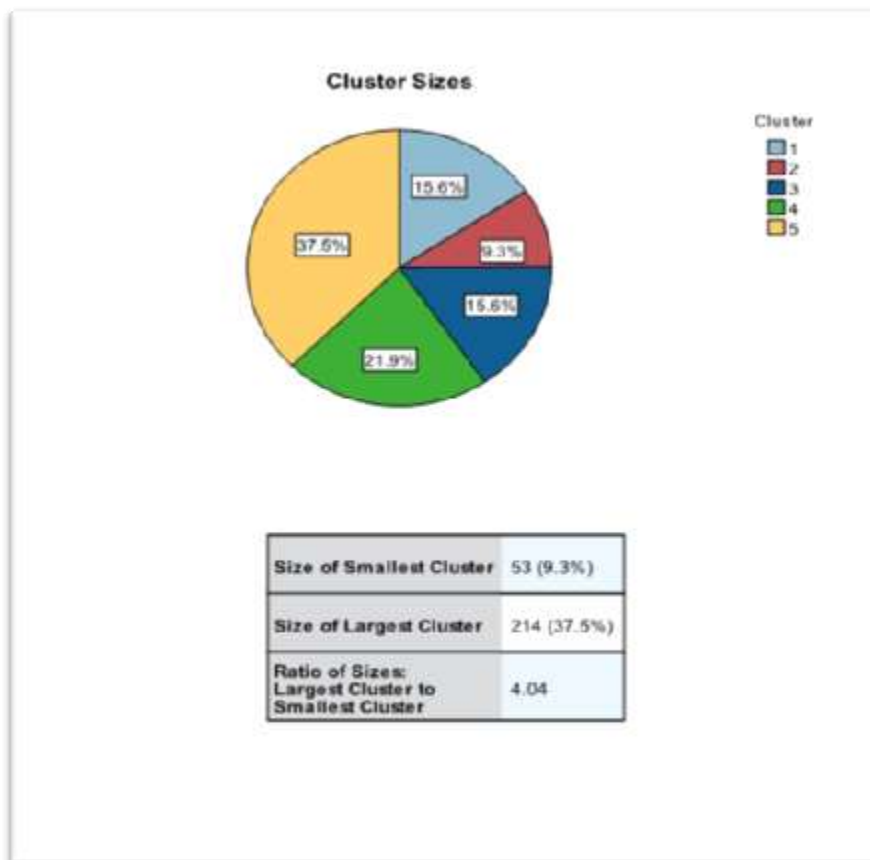
Cluster sizes of five different clusters are presented by Figure 1. It is found that largest cluster is approximately four times of smallest factor. Two clusters (37.5% and 21.9% of total cases) are large compare to rest three clusters (15.6%, 15.6% and 9.3% of total cases).

Figure 2: Cluster-wise measures of different variables

The research endeavor constitutes of five clusters which is perceptibly represented by Figure 2. Interpreting Cluster 5, the multitude gets along with 214 arts students (100%). Further devising up, the rumination is accentuated with colleges positioned in Panchayat region (100%), outshined by rural students (100%). This amalgamation subsist of female candidates (100%), concluding an average score of 146.46. Consequently, this accumulation becomes an embodiment of the female rural-college going students of arts, stationed in the Panchayat area.

Confabulating about the 4th cluster, it is the dwelling of 125 arts students (100%). This cluster becomes the congregate of colleges located in Panchayat region (100%), constituting of rural students (100%). This amalgamation is quintessentially male (100%), recording an average score of 148.00. On account of the same, this categorization consists of male rural-college going students of arts, settled in the Panchayat area.

1st cluster ushers in commanding by the students of arts (49.4%), with their location recorded in the Municipality area (97.8%). The said amalgamation is dominated by urban students (89.9%), who are again cleft into female (65.2%) and male (34.8%) aspirants, scoring an average of 151.89. Therefore conclusively,

this group is an assembling composed of the rural students (male and female) of all streams (arts, commerce and science) of colleges, stationed in Municipality area.

3rd cluster displays amass of 89 arts students (100%). This typifies the colleges based in Municipality area (100%). This body is overshadowed by rural students (100%), abiding by the female candidates (100%) begetting an average score of 148.28. Henceforth, this group is patterned by the

female rural students of arts stream of colleges situated in Municipality region.

2nd cluster also consists of 53 science students (100%), whose college is located in both the Panchayat and Municipality region, is dominated by rural students (100%). The cluster is led by the male (67.9%) candidates with an average score 145.96. This group accounts for, rural, male students associated with science stream from the colleges positioned in Municipality and Panchayat area.

Figure 3: Pictorial representation of cluster-wise measures of different variables
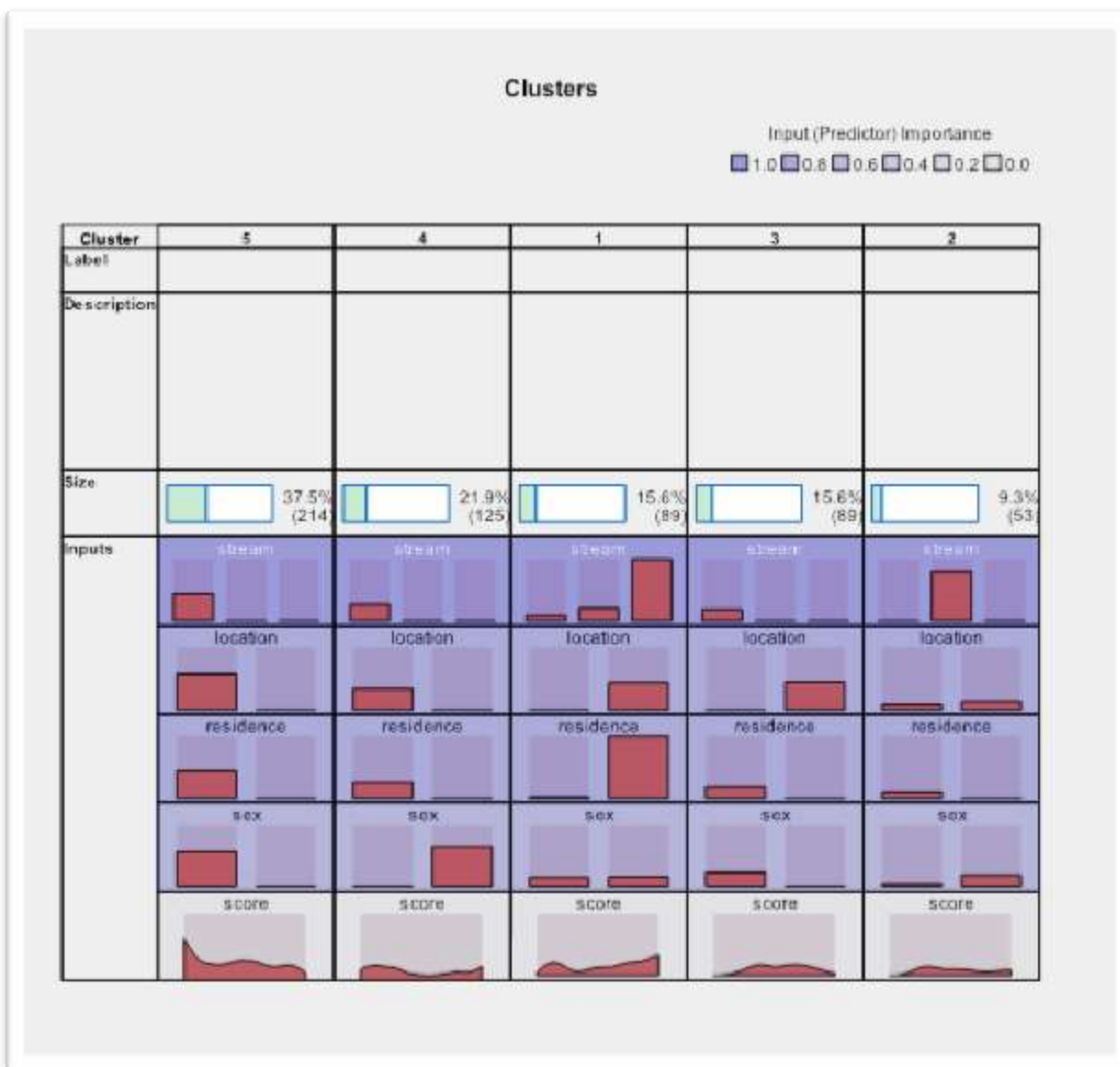
In respect to the total sample, Figure 3 represents the pictorial representation of the clusters. First two clusters are formed by the majority of the

samples and overall distributions are also visible in this figure.

CONCLUSION

Clustering is a grouping system by which one can classify the total sample in different groups using the assigned values of the variables. Here, female students of arts formed two clusters (cluster 3 and 5), male students of arts formed one cluster (cluster 4), one cluster (cluster 2) is formed by science students and one cluster (cluster 1) is formed by arts, commerce and science students. Majority of the rural male and rural female students are quite closer according to their opinion about yoga practices. Location of college is another important aspect for formation of clusters.

REFERENCES

1. Battaglia, O. R., Benedetto Di Paola, B. D. & Fazio, C. (2016). A New Approach to Investigate Students' Behavior by Using Cluster Analysis as an Unsupervised Methodology in the Field of Education, Applied Mathematics, 7, 1649-1673.
2. Battaglia, O. R., Paola, B. D. and Fazio, C. (2017). A quantitative analysis of Educational Data through the Comparison between Hierarchical and Not-Hierarchical Clustering, EURASIA Journal of Mathematics Science and Technology Education, 13(8), 4491-4512.
3. Borgavakar, S. P. & Shrivastava, A. (2017), Evaluating Student's Performance using K-Means Clustering, International Journal of Engineering Research & Technology (IJERT), ISSN: 2278-0181, Vol. 6 Issue 05, May, Pp 114-116
4. Campagni, R., Merlini, D. & Verri, M. C. (2014). Finding Regularities in Courses Evaluation with K-means Clustering., CSEDU - 6th International Conference on Computer Supported Education, 2014, Vol. 2, pp. 26-33.
5. Dutt, A., Aghabozrgi, S., Ismail, M.A.B. & Mahroeian, H. (2015). Clustering algorithms applied in educational data mining. International Journal of Information and Electronics Engineering, 5, 112-116.
6. Fazio, C., Battaglia, O. R., & Di Paola, B. (2013). Investigating the quality of mental models deployed by undergraduate engineering students in creating explanations: the case of thermally activated phenomena. Phys. Rev. ST Phys. Educ. Res., 9, 020101.
7. Govindasamy, K. & Velmurugan, T. (2018). Analysis of Student Academic Performance using Clustering Techniques. International Journal of Pure and Applied Mathematics, 119(15), 309-323.
8. Ikegami, M and Neuts, B. (2020). Strategic Options for Campus Sustainability: Cluster Analysis on Higher Education Institutions in Japan. Sustainability, 12, 2527, 1-13.
9. Natek, S. & Zwilling, M. (2014). Student data mining solution–knowledge management system related to higher education institutions. Expert systems with applications, 41(14) 6400-6407.
10. Ocampo, D. M. & Neto, L. C. B. T. (2019). Cluster Analysis for Data Processing in Educational Research. Acta Scientiae, 21(4), .34-48.
11. Saa, A.A. (2016). Educational Data Mining & Students' Performance Prediction. International Journal of Advanced Computer Science and Applications, 7(5), 212-220.
12. Saha, B. (2021); Attitude towards Yoga Practice among College Students with Regard to Gender, Residence and Stream of Study. IAR Journal of Humanities and Social Science; 2021; 2(5): 25-29.
13. Schreiner, C. (2006). Exploring a ROSE-Garden: Norwegian youth's orientations towards science – seen as signs of late modern identities. Ph.D. Thesis – Faculty of Education, University of Oslo
14. Shovon, H.I. & Haque, M. (2012), An Approach of Improving Student's Academic Performance by using K-means clustering algorithm and Decision tree, International Journal of Advanced Computer Science and Applications, Vol.3, No. 8
15. Xinpeng Ji, W.C., Liu, Y., Xiao, Y., Chen, B., Liu, H. & Zhou, S. (2020). Analysis of University Students' Behavior Based on a Fusion K-Means Clustering Algorithm. Applied Science, 10, 6566, 1-28