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CONTENTS

EDITORIAL 1

RESEARCH ARTICLES

1. **Academic Procrastination in Relation to Academic Performance of Higher Secondary Students** 2

   Dr. N. Kalaiarasi,

   Associate Professor,

   N.K.T National College of Education, Chennai

   P. Revathy,

   M.Ed Scholar;

   N.K.T National College of Education, Chennai

2. **Conducting, Interpreting and Applications of Factor Analysis in Educational Research** 11

   Dr.S.Prabu Shankar,

   Assistant Professor,

   Dept. of Education,

   IASE, Saidapet,

   Chennai - 600 015.

3. **The Influence of Home Environment on Mathematical Problem Solving Ability of Higher Secondary Students** 21

   Dr. Johnsi Priya J,

   Assistant Professor in Education,

   Meston College of Education,

   Royapettah,

   Chennai - 600 014.

4. **Environmental Ethics and Environmental Risk Perception of Prospective Teachers** **33**

S. Brudnell Sam,

PG Assistant in Physics,

Wesley Hr. Sec. School, Royapettah, Chennai - 600 014.

5. **Academic Achievement Among Higher Secondary Students in Relation to Their Study Skills** **43**

A. S. Arul Lawrence,

Research Supervisor,

School of Education, T.N.O.U, Chennai

T. Hanitha,

M.Phill Scholar,

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EDITORIAL

"The only true wisdom is in knowing you know nothing."

-Socrates

"How do we know what we know" is the basic question of all human kind?

Ancient Indian philosophers are of view that knowledge is daily living of every individual. They meant that knowledge could be acquired only through humbleness and knowledge acquisition is more of religious outlook. Western thinkers believed that knowledge is gro19th and development of an individual.

Robert Audi in his book on Epistemology claims that sources of knowledge are perception, reasoning, intuition and sense experience, "Impressions are the sources of all ideas and knowledge" says Hume. "Knowledge has two different views based on the judgements inner and outer" claims John Locke. To know that we know what we know, and to know that we do not know what we do not know, that is true knowledge reiterates Nicolaus Copernicus".

Education is not just about going to school and getting a degree. It's about widening our knowledge. All our knowledge begins with the senses, proceeds then to the understanding, and ends with reason. As teacher Educators let us find ways to improve students reasoning. Let us create more opportunities for students to analyse and reasoning the relevance of the data, evaluating data sources and teach students strategies for systematically gathering data, encourage students to acknowledge the goodwill and services of the contributors in their attempt to boost quality at all levels of education. Wishing all the readers a prolific reading.

Dr. Alma Juliet Pamela

Editor

Research Article

Academic Procrastination in Relation to Academic Performance of Higher Secondary Students

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ABSTRACT

The present study is aimed to investigate the academic procrastination among higher secondary students and its relationship with academic performance. Effect of some demographic variables like gender, locale, type of management of schools were also explored. Sample consisted of234 higher secondary students (121 boys & 113 girls) selected using stratified random sampling technique from different schools of Coimbatore district. The Tuckman Procrastination Scale (1991) was used to collect academic procrastination behaviour of higher secondary students. Though boys and girls were found to be similar in procrastination behaviour, girls were found to outperfom1 boys academically. No significant relationship was found between academic procrastination and academic performance of higher secondary students.

Keywords: Academic procrastination, academic performance, higher secondary students, study habits, student behaviour

INTRODUCTION

Procrastination is a common event and is often unavoidable because there are thousands of potential tasks that one could be doing at any time. Every single human being either working or non- working has to complete numerous tasks during a day for an effective performance, but for certain reasons completion of these required tasks is often delayed. This general tendency of delaying or postponing different tasks is referred as procrastination. Procrastination comes from the Jatin "Pro", which means of "tomorrow" (1994). There seems to be an agreement on procrastination as consistently delaying behaviours regardless of consequences.

Academic procrastination is the most researched procrastination domain (Jorke, Thau, Fries, 2011). This form of situational procrastination occurs when a person is passive in completing academically related tasks such as studying for an exam or talking to an instructor. People who procrastinate academically may be consciously or unconsciously aware they are engaging in the behaviour.

In relation to educational research, academic performance of a student can be regarded as the observable and measurable behaviour of a student in a particular situation. Academic performance of students consists of scores obtained from teacher-made test, first te1m examination, mid-semester test and so on.

REVIEW OF RELATED LITERATURE

Solomon and Rothblum (1984) defined academic procrastination as doing homework, preparing for exams at the end of the term at the last minute. Task avoidance and fear of failure are the primary excuses given by students to avoid starting their work (Solomom & Rothblum, 1984). Task avoidance is particularly likely if the task involves a heavy cognitive demand and is subject to evaluation. Fear of failure on the other hand, causes delaying for fear that performance will be substandard and not reach the expectations set by others. (Brownlow & Reasinger, 2000). The most accepted definition used for academic procrastination is "intentionally delaying or deferring work that must be completed" (Schraw.et.al, 2007).

Research indicates academic procrastination does not occur in the initiation or design phase; procrastinators and non-procrastinators will both design a plan of action to complete a task (Henderson, Gollwitzer, &Oettingen, 2007; Wieber & Gollwwitzwer, 2010).However, people who procrastinate with academic tasks execute their task significantly later when compared to non- procrastinators (Pychyl, Morin & Solomon, 2000; Steel, 2007).

Academic perfom1ance refers to the knowledge attained and designated by marks, assigned by teacher. Negative cmrelations were reported between procrastination and academic performance. (Akinsola,Tella &Tella 2007; Beck,Koons & Milgrim,2000; Moon & Illingworth, 2005; Orpen,1998; Tice &Baumeister, 1997; Wang& Englander,2010).

These studies results were supported by other studies, showing that high procrastinators perform below average on academic tasks (Van Eerde,2003; Lakshminarayan, Potdar & Reddy,2013). But procrastination has also positive aspects, as reported in studies investigating differences between active and passive procrastinators, the fonner showing more

similar results with non-procrastinators, in what academic performance is concerned. (Hsinchunchu& choi, 2005).

NEED FOR THE STUDY

The vast advancement of Science and Technology had brought about greater impact on academic performance of school students. With the advent of internet, students utilise this feature both constructively and also for recreation activities. In the present scenario the extensive use of social media by students cannot be denied. These young higher secondary students who arc at the onset of adolescent stage are fascinated and attracted by this social media and waste their precious time. As a result they tend to procrastinate their academic tasks. It leads to twelfth hour preparation for the examinations, completing the assignments at last minute in a hurry and so on. Even the high achievers also sometimes cannot able to perform better in the examination for which they are capable. Hence, this study attempts to find the relationship between academic procrastination and academic performance of higher secondary students.

HYPOTHESES

I) Academic procrastination and Academic performance of higher secondary students will be moderate.

II) There will be no significant difference in the academic procrastination and academic performance of higher secondary students with respect to
   a) Gender
   b) Locality of the school
   c) Type of management of schools

III) There will be a significant relationship between academic procrastination and academic perfom1ance of higher secondary students.

METHODOLOGY

The research design is of nonnative survey method, and the sampling technique used for this study is stratified random sampling technique.

SAMPLE

The sample consists of234 higher secondary students (121 boys and 113 girls) drawn from various government, government-aided and self-financing schools in rural and urban areas of Coimbatore district.

INSTRUMENTS USED

The Tuckman Procrastination Scale (1991) was used to collect academic procrastination behaviour of higher secondary students. The total mark secured by the students in first term examination, obtained from school mark register was considered as the measure of academic performance of higher secondary students.

ANALYSIS AND INTERPRETATION OF DATA

The data collected in the present study were analyzed by using Analysis of Va1iance (ANOVA), t-test and Correlation Analysis.

TABLE 1

Showing the Mean and Standard deviation between Academic Procrastination and Academic Performance of Higher Secondary Students

Variable	N	Maximum possible score	Mean	S.D
Academic procrastination	234	64	35.41	5.491
Academic performance	234	1200	694.76	191.486

From the table 1, the mean value 55% is showing that academic procrastination behaviour of higher secondary students is moderate.

The mean value 57% is showing that the academic performance of higher secondary students is moderate.

TABLE2

Showing the difference between Academic Procrastination and Academic Performance of Higher Secondary Students with respect to Gender.

Variable	Boys (N=121)		Girls (N=113)		't'value	Pvalue
	Mean	SD	Mean	SD		

Academic procrastination	35.90	5.344	34.88	5.619	1.430	0.154
Academic performance	658.92	162.666	733.13	212.266	3.014	0.003

From the table 2, since the calculated p value 0.154 for academic procrastination is greater than 0.05, the nu11 hypothesis is accepted at 0.05 level of significance. It is inferred that academic procrastination is not differing significantly with respect to gender.

Hence, it is concluded that there is no significant difference in academic procrastination behaviour of higher secondary students with respect to gender.

From the table 2, it is evident that the calculated p value 0.003 for academic performance is lesser than 0.01, the null hypothesis is not accepted. It is inferred that academic performance is differing significantly with respect to gender.

It is clear that there is significant difference in academic performance of higher seconda1y students with respect to gender.

Further, it is evident from the mean values that girls perform academically higher than boys.

Hence, in the formulated hypothesis there will be no significant difference between boys and girls in academic procrastination behaviour is accepted.

Further, in the formulated hypothesis there will be no significant difference between boys and girls in academic performance is not accepted.

TABLE3

Showing the difference between Academic Procrastination and Academic Performance of Higher Secondary Students with respect to the Locality of the School

Variable	Rural (N=llS)		Urban (N=ll9)		't'value	P value
	Mean	SD	Mean	SD		
Academic procrastination	36.06	5.665	34.77	5.263	1.802	0.073
Academic perfom1ance	682.23	186.956	706.87	195.789	0.984	0.326

From the table 3, since the calculated p value 0.073for academic procrastination is greater than 0.05, the null hypothesis is accepted at 0.05 level of significance. It is inferred that academic procrastination is not differing significantly with respect to locality of the schoo1.

From the table 3, it is evident that the calculated p value 0.326 for academic performance is greater than 0.05, the null hypothesis is accepted at 0.05 level of significance. It is inferred that academic performance is not differing significantly with respect t? locality of the school.

It is concluded that there is no significant difference in academic procrastination and academic performance of rural and urban higher secondary students.

Hence, the formu1ated hypothesis there will be no significant difference in academic procrastination and academic performance of higher secondary students with respect to locality of the school is accepted.

TABLE4

Showing the difference in Academic Procrastination behaviour of Higher Secondary Students with respect to the type of Management of Schools

Variable	Source of variation	Sum of Squares	Df	Mean squares	F- ratio
Academic procrastination	Between groups	133.906	2	66.95	2.245NS
	Within groups	6890.526	231	29.82	
	Total	7024.432	233		

NS- Not significant

From the table 4, it is clear that obtained F-va]ue is Jesser than the table value for df2 and 231 at 0.05 level. Therefore, the null hypothesis that there will be no significant difference in academic procrastination behaviour of higher secondary students based on the type of management of schools is accepted.

TABLES 5

Showing the difference in Academic Performance of Higher Secondary Students with respect to the type of Management of Schools

Variable	Government {N=86) (l)		Govt.Aided (N=81) (2)		Self-Financing (N=67) (3)		F-ratio	Level of Significance	Group of Significantly
	Mean	SD	l\fean	SD	Mean	SD			
Academic Performance	690.83	181.67	623.79	I 78.74	785.6	183.39	14.658	P<0.01	(1,2), (1,3), (2,3)

From the table 5, F ratio calculated for the academic performance score with respect to type of management of schools reveal that higher secondary students belong to government,

government- aided and self-financing schools differed significantly in their academic performance.

Further, analysis of difference between the students of different type of management of schools tested through Tukey-HSD reveal that in academic performance the students belong to self-financing schools differed significantly from those who belong to government and government aided schools. It is furtl1er inferred higher secondary students of self-financing schools had exhibited higher academic performance than students of government schools and then followed by government aided schools.

TABLE 6

Showing the Correlation between Academic Procrastination and Academic Performance of Higher Secondary Students

	Academic performance
Academic procrastination	-0.092^{NS}

NS- Not significant

From the table 6, since the calculated r value 0.092 is not significant, the null hypothesis is that there is no significant correlation between academic procrastination and academic perfom1ance of higher secondary students is accepted.

FINDINGS

- Academic procrastination and Academic performance of higher secondary students was moderate.
- Boys and Girls were found to be similar in their academic procrastination behaviour.
- Girls were found to be higher in their academic performance than boys.
- No significant difference was found in academic procrastination and academic performance of higher secondary students with respect to the locality of the school.
- No significant difference was found in academic procrastination behaviour of higher secondary students based on the type of management of schools.
- The academic performance of higher secondary students of self-financing schools was found to be higher than students of government schools and then followed by government aided schools.

DISCUSSION AND CONCLUSION

As in the past, academic procrastination is delay, deliberate and repeated behavioural that have emerged in the field of education and it's to become common among the students. Results of this study with aim to examine the prevalence of academic procrastination in relation to their academic performance among students, implying that more than half of the students in relation to academic tasks in frequently, often, or always, are procrastinate. This result is largely consistent with the findings of many researchers (Solomon & Ruthbloom, 1984; Kagan, 2009; Ferrari, Johnson, & McDonald, 2005; K1asn et al., 2008; Hariot & Ferrari, 1996) based on procrastination is the high rate of school. On gender, the academic procrastination researches, has largely equivocal, different, ambiguous and complex. Some of these studies (Ferrari et al., 1995; Kagan, 2009; Ozer & Dmyrvfrary, 2009) suggest that males procrastinate more. However, other studies indicate that there is no significant relationship between gender and procrastination (Clark & Hill, 1994; Haykvk, 1993; Solomon & Ruthblum, 1984). This study results also indicate that there wasn't a significant impact of gender on academic procrastination.

Now-a-days students are spending too much time on social sites, and much lesser time on socializing in person. In addition, students are attempting to multi-task. They are trying to check various social media sites while they study. Besides, their ability to concentrate on their task at hand gets significantly reduced due to the distraction that is brought by all these social media.

Hence, it is suggested that stringent measures shall be taken by the service providers in the register process in the social media. And the duration of constructive use of social media and internet sites sha11 be monitored by them. These might facilitate the students to focus on their academic tasks and control their academic procrastination behaviour.

Knowing and using appropriate planning skills is one key to avoid academic procrastination. When people plan precisely people will better focus their ideas which help them decide on the steps they need to take in order to achieve a particular goal.

REFERENCES

- Jill Omer Janssen. (2015). Academic Procrastination: Prevalence among high school and undergraduate students and relationship to Academic achievement (Doctoral

dissertation,Georgia State University, Atlanta, GA) Retrieved from: http:// scholarworks.gsu.edu/epse diss

- Sunitha,T.P., & Dr.MuhammedunniAlias Musthafa,M.N. (2013). Relationship between Academic Procrastination and Mathematics anxiety among secondary school students. International Journal of Education and Psychological Research,Vol.2,Issue 2,101-105.
- Mussa.rat Jabeen Khan,Hafsa Asif,Syeda Sumbul Noor & Sidra Mm1eer. (2014). Academic Procrastination among male and female University and College students. FWU Journal of Social sciences, Vol.8, No.2,65- 70. Retrieved from: http://sbbwu.edu.pk/journal
- Justin D.Mccloskey. (2011). Finally, My Thesis on Academic Procrastination (Degree of Master of Science in Psychology, Arlington). Retrieved from: htpps://uta-ir.tdl.orghttps://www.musero.org.ng>publications

Research Article

Conducting, Interpreting and Applications of Factor Analysis in Educational Research

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ABSTRACT

This paper focuses on the conceptual and interpretational aspects of Factor analysis from the applicational perspectives of educational research. Factor analysis is a multivariate statistical method and is basically used in the analysis of data/ matrices of correlation coefficients (Ferguson, 1981). Further factor analysis may be defined as the 'statistical technique which uses the correlation between the observed variables to estimate the common factors and the structural relationships linking the factors to variables'. Spearman (1904), observed that factor analysis may be widely applied for examining patterns of interrelationships, data reduction, instrument development, classification and description of data, data transformation, hypothesis testing, exploring relationships in new domains of interest, and mapping construct space.

In the context of functional application of factor analysis it may be view as a data reduction or structure reduction technique simply used to describe the variability among the observed random variables in terms of fewer unobserved random variables defined as 'factors'. Here in this case the major objective of factor analysis is to reduce the number of variables and to detect the structure in the relationships between the variables. Dalen, (1979), opines that factor analysis is concerned with the identification and description of structure within the set of relations. This paper is an attempt to explain factor analysis in the context of its examining patterns of interrelationships, data reduction, instrument development, classification and description of data, data transfo1mation and data reduction with tabular illustrations and precedents that describes the wide range of applications of factor analysis in educational research.

Keywords: Factor analysis, educational research, statistical methods, data interpretation, research methodology

INTRODUCTION

Factor Analysis has its origin dating back to nearly a 100 years where Pearson (1901) and Spearman (1904) have used it to explain the influence of psychological variables thus by providing the conceptual and theoretical rationale for both exploratory and confirmatory factor analysis. Studies as quoted from Ferguson (1981), cites that 'factor analysis as a method originated with Spearman. In a paper on the theory of intelligence published in 1904, Spearman analysed tables of inter-correlations between psychological tests and were able to show that the inter-correlations could be accounted for in terms of one general factor common to all tests and factors which were specific or unique to each test". Following Spearman major contributions on 'factor analysis' were cited from the works of Godfrey H.Thomson, L.L.Tlmrstone, J.P.Guilford, L.Guttman, H.F.Kaiser and other contemporaries.

Nunnally (1978), observed the various basic applications of Factor analysis is cornn1only used in the fields of psychology and education and is considered the method of choice for interpreting self-reporting questionnaires. Factor analysis is a multi variate statistical procedure that has diverse applications; further factor analysis reduces a large number of variables into a smaller set of variables (also referred to as factors). Secondly, it establishes underlying dimensions between measured variables and latent constructs, there by allowing the fom1ation and refinement of theory. Thirdly, it provides construct validity evidence of self-reporting scales.

Factor analysis does two major functions, firstly, "it reduces the original set of variables to a smaller number of variables called factors" and secondly, "factors acquire meaning because of structural properties that may exist within the set of relationships". Thus, a) the process of reducing the number of variables and b) the concept of structure are the two major applications of factor analysis.

BASES OFFACTORANALYSIS

In educational research factor analysis is commonly used in data reduction, tool/scale development and analysis, the evaluation of a psychometric quality of a measure and the assessment of the dimensionality of a set of variables. The purpose of applying factor analysis is to determine the small number of factors based on a particular number of inter-related quantitative variables. In fact, the major understanding of factor analysis lies in not looking at a factor on the whole but to understand the constructs. For example, if Adjustment is a variable, the constructs / factors that contribute to this variable may be classified into (i) Home

adjustment (ii) Health adjustment (iii) Social adjustment (iv) Emotional adjustment (v) Personal adjustment and so on. Factor analysis does not measure directly the observable variable but the constructs by measuring several of its underlying dimensions called as the sub-factors or sub-variables or the attributes of a factor or a variable. The identification of such underlying dimensions (or factors I sub-variables/ attributes) simplifies the understanding and description of a major variable (for example variables like personality, learning styles, study habits, stress etc.)

Further, factor analysis is observed as a data reduction technique as it reduces a large number of overlapping variables to a smaller set/ group of factors that reflect the dimensions or constructs of a particular variable. The underlying factors can be used to explain the complex identity that it shares with the other items in a tool. In this context factor analysis represent the relationships among the sets of variables in line and yet keeps the factor more meaningful.

TYPES OF FACTOR ANALYSIS

The three major types of factor analysis widely been used in data analysis concerned with educational research are,

- Exploratory factor analysis
- Confim1atory factor analysis
- Structural equation modelling

(I) Exploratory factor analysis

Exploratory factor analysis is used to measure the underlying factors that affect the variables in a data structure without setting any predefined structure to the outcome. It is widely used to find the underlying structure of a relatively large set of variables. Exploratory Factor Analysis is a technique within factor analysis whose overarching goal is to identify the underlying relationships between measured variables. It is used to identify the structure of the relationship between the variable and the respondent.

Exploratory factor analysis can be performed by using the following two methods

- R-type factor analysis: When factors are calculated from the correlation matrix, then it is called R-type factor analysis.
- Q-type factor analysis: When factors are calculated from the individual respondent, then it said to be Q-type factor analysis.

(ii) Confirmatory factor analysis

Confirmatory factor analysis on the other hand is used as tool in educational research and analysis to reconfirm the effects and correlation of an existing set of predetermined factors and variables that affect these factors is a multi variate statistical procedure that is used to test how well the measured variables represent the number of constructs. Confirmatory factor analysis and exploratory factor analysis are similar techniques, but in exploratory factor analysis, data is simply explored and provides information about the numbers of factors required to represent the data. In exploratory factor analysis, all measured variables are related to every latent variable. But in confim1atory factor analysis, researchers can specify the number of factors required in the data and which measured variable is related to which latent variable. Confirmatory factor analysis is a tool that is used to confirm or reject the measurement theory. The major instances where confirmatory factor analysis applied are:

- Defining individual construct
- Developing the overall measurement model theory
- Designing a study to produce the empirical results
- Assessing the measurement model validity

(iii) Structural Equation Modeling (SEM)

Structural equation modeling hypothesizes a relationship between a set of variables and factors and tests these casual relationships on the linear equation model. Structural equation modeling can be used for exploratory and confirmatory modeling alike, and hence it can be used for confinning results as well as testing hypotheses.

It is a statistical technique for testing and estimating causal relationships using a combination of statistical data and qualitative causal assumptions. Structural equation modeling encourages confirmatory rather than exploratory modeling; thus, it is suited to theory testing rather than theory development. It usually starts with a hypothesis, represents it as a model, develops the constructs of interest with a measurement instrument, and tests the model (Wang, 2009). It is a class of methodologies that seeks to represent hypothesis about summary statistics derived from empirical measurements in terms of smaller numbers of "structural" parameters defined by a hypothesized underlying model. It is used for testing and estimating causal relationships using a combination of statistical data and qualitative causal assumptions. SEM encourages confirmatory rather than exploratory modeling; thus, it is suited to theory testing rather than theory development. It usually starts with a hypothesis, represents it as a

model, develops the constructs of interest with a measurement instrument, and tests the model (Prabu, 2016).

STEPS IN CONDUCTING STRUCTURAL EQUATION MODELING:

- Defining individual constructs
- Developing the overall measurement model
- Design the study to produce the empirical results
- Assessing the measurement model validity
- Examine the structural model validity

FACTOR ANALYSIS PROCESSES

- Principal Component Analysis (used to emphasize variation and bring out strong patterns in a data set and aims at reducing a large set of variables to a small set that still contains most of the information in the large set.).
- The Correlation matrix for all variables is computed (computes the correlation coefficients of the columns of a matrix)

  The common tests used to do correlation matrix are
  - Bartlett test of sphericity
  - Kaiser-Meyer Olkin (KMO) measure of sampling adequacy
- Factor extraction (the major objective of this step is to determine factors and is used to form uncorrelated linear combinations of the observed va1iables).

Some of the other widely used factor extraction methods are,

- Maximum likelihood method
- Principal axis factoring
- Alpha method
- Un-weighted least squares method
- Generalized least squares method
- Image factoring,

Factor Extraction Criteria: "Theory is the first criteria to determine the number of factors to be extracted. From theory, we know that the number of factors extracted does make sense. Most researchers use the Eigenvalue criteria for the number of factors to be extracted. Value of the percentage and variance explained method is also used for exploratory factor

analysis. We can use the screen test criteria for the selection of factors. In this method, Eigenvalue is plotted on a graph and factors are se1ected".(Quoted from Statistics Solutions Website).

- Factor rotation (is that they can create factors that are correlated or uncorrelated with each other)

  Orthogonal rotation: In this method, axis are maintained at 90 degrees, thus the factors are uncorrelated to each other. In orthogonal rotation, the following three methods are available based on the rotation:

♦ QUARTIMAX: Rows are simplified so that the variable should be loaded on a single factor.

♦ VARIMAX: Used to simplify the column of the factor matrix so that the factor extracts are clearly associated and there should be some separation among the variables.

♦ EQUIMAX: The combination of the above two methods. This method simplifies row and column at a single time.

- Factor loading (the relationship of each variable to the underlying factor is expressed by the so-called factor loading)
- Making final decisions about the number of underlying factors (the grouping or the extraction of the factors based on the loading of factors)
- Factor naming (naming of the factors reduced according to the dimensionality of the data set)

Applications of Factor analysis in data analysis of Educational Research

- It is used to analyze the relationship between two observable variables and how it is affected by another smaller set of unobservable variables.
- It helps in identifying the items in a tool based on the commonality factor of the items and extracts factors
- Estimate factors or latent variables
- It reduces the dimensionality of a large number of variables to a fewer number of factors
- In data reduction factor analysis is used to determine what items should be included excluded from a measure.
- It is concerned with the identification and description of structure within the set of relations present in the items of a tool
- It may point out relationships that may not have been obviously found or identified

- It can point out to the underlying relationships with respect to sub-variables
- It is easier to abridge and c01Telate data through factor analysis and also to draw conclusions from the data collected through a tool
- It can be used to form realistic groups of variables and causal factors that affect them
- Instead of grouping responses and response types, factor analysis segregates the variable and groups these according to their co relevance.

Step by Step guide to carry out factor analysis in SPSS

-Analyze

-Data Reduction

-Factor

-Select the variables you want the factor analysis to be based on and move them into the **Variable(s)** box.

- In the **Descriptives** window, you should select **KMO and Bartlett's test of sphericity.**

KMO is a statistic which tells whether you have sufficient items for each factor. It should be over 0.7. Bartlett's test is used to check that the original variables are sufficiently correlated. This test should come out significant ($p < 0.05$) - if not, factor analysis will not be appropriate.

Click on Continue.

- In the **Extraction** window, you can select the extraction method you want to use

(e.g. Principal components, etc.). Under Analyze ensure that Correlation Matrix is selected (this is the default). The default is also to extract eigenvalues over 1 but if you want to extract as specific number of factors you can specify this.

Click on Continue.

In the Rotation window you can select your rotation method (as mentioned above, **Varimax** is the most common). You can also ask SPSS to display the rotated solution. Once you have selected this.

Click on Continue.

- In the Scores window you can specify whether you want SPSS to save factor scores

for each observation (this will save them as new variables in the data set). Under **Method** choose **Regression**. You can also ask SPSS to display the factor score coefficients.

Click on Continue.

DEFINITION OF TERMS

Bartlett's sphericity test *(Bartlett's test (Snedecor and Cochran, 1989) is used to test if k samples are from populations with equal variances. Equal variances across populations are called homoscedasticity or homogeneity of variances) and the KMO index (Kaiser-Mayer-Olkin) Principal Component Analysis (PCA)1 is a dimension reduction technique. vfle obtain a set of factors which summarize, as 1-vell as possible, the information available in the data. The factors are linear combinations of the original variables.*

Common Factor *Analysis is a collection of statistical technique which uses the correlations bet.-.1een the observed variables to estimate common factors and the structural relationships linking factor to observed variables.*

Critical value *is a point on the test distribution that is compared to the test statistic to determine whether to reject the null hypothesis. If the absolute value of your test statistic is greater than the critical value, you can declare statistical significance and reject the null hypothesis.*

Data reduction *is reducing the number of cases or variables in a data matrix.*

Exploratory factor analysis *is used to explore the underlying structure o.f a collection of observed variables, 1,vhen there are no a priori hypotheses about the factor structure.*

Eigen value *is the variance in a set o. variables explained by a factor or component and denoted by 'lambda'( )An Eigen)value is the sum of the squared values in the column of a factor matrix (structure of coefficients in which the factors are presented as columns and the variables are presented as rows).*

Equimax rotation *is a compromise bet.1-1een Varimax and Quartimax criteria. Direct oblimin rotation is the standard method when one wishes a non-orthogonal (oblique) solution - that is, one in which the factors are allowed to be correlated.*

Factor analysis *is basically a statistical data reduction technique used to explain the variability among observed random variables in terms of fewer unobserved random variables called factors. It is used to a) estimate factors or latent variables of b) to reduce the dimensionality of a large number of variables toa fewer number of factors.*

Factor loading *a term used to refer to factor pattern coefficients or structure coefficients*

Factor pattern coefficient *is univariate essence it should be interpreted as the (relatively simple) meaning lying on (or "behind") the intersection of the meanings/contents of the variables loaded by the factor. With*

Kaiser-Meyer-Olkin (KMO) Test for Sampling Adequac

The test measures sampling adequacy for each variable in the model and for the complete model. The statistic is a measure of the proportion of variance among variables that might be common variance. The lower the proportion, the more suited your data is to Factor Analysis. KMO returns values between 0 and 1.

OBLIQUE ROTATION

In oblique rotations the assumptions of independent factors is relaxed and the new axes are free to take any position in the/actor space, but the degree of correlation allowed among factors is in general, small because two highly correlated factors are better interpreted as only one factor.

In oblique rotation, factors are not orthogonal; still, we usually prefer to interpret a factor as clean entity from the other factors. That is, ideally, factor X label would dissociate from a correlated factor Y label, to stress individuality of both factors, while assuming that "in outer reality" they correlate. Correlatedness thus gets to be an isolated characteristic of entities from the labels of the entities.

Orthogonal rotation An important difference between them is that they can create factors that are correlated or uncorrelated with each other. Rotations that allow for correlation are called oblique rotations; rotations that assume the factors are not correlated are called orthogonal rotations. Our graph shows an orthogonal rotation.

Principal component analysis (PCA) is a statistical procedure that uses an orthogonal transformation to convert a set of observations of possibly correlated variables into a set of values of linearly uncorrelated variables called principal components (or sometimes, principal modes of variation).

P-value- the test rejects the hypothesis of normality when the p-value is less than or equal to 0.05. Failing the normality test allows you to state with 95% confidence the data does not.fit the normal distribution. Passing the normality test only allows you ·to state no significant departure from normality was found.

Varimax rotation is used to simplify the expression of a particular sub-space in terms of just a few major items each. The actual coordinate system is unchanged, it is the orthogonal basis that is being rotated to align with those coordinates.

References:

- Bryman, A. &Cramer, D. (2012). Quantitative Data Analysis with IBM SPSS 17, 18 & 19: A Guide for Social Scientists. London: Routledge
- George, A.Ferguson. (1981). Statistical Analysis in Psychology and Education. 5th ed. Japan: McGraw Hill.
- Gorsuch, R.L. (1990). Common factor analysis versus component analysis: Some well and little known facts. Multivariate Behavioral Research, 25, 33-39.
- Kim, J.O., &Mueller, C.W.(1978). Factor Anal.vsis: Statistical Methods and Practical L<1sues. California: Sage.
- MacCallum, R.C. (1983). A comparison of factor analysis programs in SPSS, BMDP, and SAS.Psvchometrika, 48(2): 223-231.
- Nunnally, J.C. (1967). Psychometric theory. New York: McGraw Hill.
- Nunnally, J.C. (1978). Psychometric theory. 2nded. New York: McGraw-Hill.
- Prabu Shankar, S.(2016). Perspectives of Structural Equation Modeling. The Indian Educational Researcher.15 (I): 22-32.
- Robert, Ho. (2013). Handbook of Uni variate and Multi variate Data Analysis with IBM SPSS. 2nded. Florida: CRC Press.
- Rummel, R.J. (1970). Applied factor analysis. Evanston: Northwestern University Press.
- Spearman, C. (1904). General intelligence, objectively determined and measured. American Journal of Psychology, 15: 201-293.
- Thurstone, L.L. (1947). Multiple-factor analysis. Chicago: University of Chicago Press.
- Wang, Victor. C.X. (2009). Handbook of Research on E-Learning Applications for Career and Technical Education: Technologies for Vocational Training. Vol. I. USA: IGI Global.
- Weiss, D. (1976). Multi variate procedures. Chicago: Rand McNally.
- Website: www.statisticssolutions.com

Research Article

The Influence of Home Environment on Mathematical Problem Solving Ability of Higher Secondary Students

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ABSTRACT

The present study aims to examine the mathematical problem solving ability and home environment of higher secondary school students. A sample of 810 higher secondary students (406 boys and 404 girls) was selected from different schools of Chennai district, using the stratified random sampling technique. Survey method of research has been adapted. The Mathematical Problem Solving Ability test constructed by the investigator and Home Environment towards Mathematics constructed and standardized by Ancel Maria and Santhamma Raju (1998) were used to collect data from the higher secondary students. Mean, standard deviation,'t' test and one-way ANOVA were used to analyze the data with the help of SPSS (Version 20.0). The analysed data were tabulated and tested with hypothesis. Finding shows that the home environment and mathematical problem solving ability of girl students is significantly higher than boys. There is no significant difference among government, government aided and self-financing higher secondary school students in their home environment and mathematical problem solving ability. It is observed that the students from high socio-economic status found to be higher than their counter parts in their home environment and mathematical problem solving ability. The home environment and mathematical problem solving ability of higher secondary students are found to highly correlated.

Keywords: Home environment, mathematical problem-solving, higher secondary students, academic support, parental involvement

INTRODUCTION

Indeed from the very beginning of education, children start with both language an.d numerical skills. The rationale for teaching and learning mathematics is manifold because study

of mathematics subject develops discipline of thought, logical reasoning and intellectual and aesthetic satisfaction. In India, the practice of mathematics education was a well established phenomenon. It is a highly revered subject in Indian culture and is viewed as a measure of one1s intellectual ability. In contemporary education, mathematics education is a practice of teaching and learning mathematics along with associated scholarly research.

Starting from the elementary concepts of addition, multiplication, subtraction and division, school level mathematics prepares the preliminary ground for higher level studies in the same subject. The National Curriculum Framework for School Education (NCFSE-2000) has reiterated that the study of mathematics contributes in the development of precision, rational and analytical thinking, reasoning and aesthetic sense among children. The new National Curriculum Framework (NCF 2005) also places due emphasis on mathematics. Succeeding in mathematics should be the right of every child. It has recommended that mathematics should enhance the child's ability to think and reason, visualize and handle abstractions and formulate and solve problems. More than school and its curriculum in augmenting mathematics performance, parents' involvement and attitude and creating conducing environment at home for learning mathematics also play a remarkable responsibility in enhancing the mathematical problem solving ability.

REVIEW OF RELATED STUDIES

It has long been recognized that the characters of children's home circumstances influence their intellectual development and school learning. Many studies conducted in this regard has indicated that children who do well in school come from families that provide a supportive and enriched environment for learning in the home. A great deal of research on the relationship between home environment and mathematics performance have been carried out in India and abroad since beginning of this century. The findings of these researches (Reynolds and Warlberg 1992, 1993; Kivilu, 1994; Crane, 1996; Hattie, 1998; Layne, 1998; Raju and Maria, 2001; Kumar, 2005; Niklas and Schneider, 2014; Sonnenschein and Galindo, 2015; and Mariette et al., 2015) have always revealed that the home environment always play a vital role in the development of children's mathematical ability.

In attempts to seek the home environment of children in learning mathematics, it is mostly noticed that the parental involvement is positively related to children's overall mathematics achievement (Balli et al., 1998; Kubilius et al., 1991; Civil, 2006; Menzo, 2008; Abdallah and Allen, 2009; McDonnell et al., 2010; Roberts, 2011; and Dumont et al., 2012).

Available literature on parental involvement in children's mathematics learning appears to focus on home practices (Raju and Maria, 2001), parent-child interaction in home settings (Portes et al., 2000 and Lukie et al., 2014), parents encouragement (Filer and Chang, 2008), parents educational qualification and occupation (Kumar, 2005; Ezhilrajan, 2012; and Akinsanya et al., 2014), family income (Tusi, 2005), socio-economic status of the parents (Anders et al., 2012), numeracy activities at home (Manolitsis et al., 2013 and Skwarchuk and Lefevre, 2015), parent's belief about mathematics (Missall et al., 2015), family norms (Yan and Lin, 2005) and parents information/ social network (Epstein et al., 2007). In his study, O'Sullivan et al. (2014) has also indicated that parental involvement in mathematics homework in the forms of provision of structure, direct assistance and autonomy support predicts children's mathematics achievement but parents who lack skill, knowledge and confidence in mathematics were unable to help their children at home for mathematics homework (McNamara ct al., 2000).

SIGNIFICANCE OF THE STUDY

Today, mathematics is more critical to school success than ever before. Children are taught mathematics in school, but research shows that families are an essential part of this learning process. In other words, by doing mathematics with children and supporting mathematics learning at home, one can make a great difference. Parental encouragement and support to children's mathematics learning, from preschool to higher secondary level, can be pivotal to their attitude toward mathematics and their achievement in this subject area.

Parents should construct knowledge in the mind of the children that learning mathematics is dreadfully imperative. Communicating a positive and can-do attitude about mathematics is the single most important way for the parents to ensure that their children will be successful in mathematics. Home with educated members can help the children in their mathematics homework and projects when they experiences difficulties in completing them successfully. Researches show that, the parents who are confident that their children can learn mathematics and the parents who actively support them as they do so, have evidenced a greater mathematics achievement of their children. Parents must provide the children with calculators, computers, and the internet to do mathematics at home. Doing tasks that involve mathematics and technology, helps to prepare children for the future accomplishment. The members of effective home environment should spend time with the children on simple board games, puzzles, and activities that involve mathematics, involve children in activities like shopping,

cooking, and home fix-it projects to show them that mathematics is practical and useful, encourage children to solve problems that involve mathematics and engage them in conversations about what they are thinking when they solve mathematics problems. Therefore, the components such as physical facilities of home, cohesion in doing home work, parental behaviour, achievement orientation towards mathematics are significant for the learning of mathematics at home and in turn influence the mathematical problem solving ability of the students.

OPERATIONAL DEFINITIONS OFTHE KEY TERM

Mathematical problem solving ability: Mathematical problem solving ability refers to the process wherein students encounter a problem - a question for which they have no immediately apparent resolution, nor an algorithm that they can directly apply to get an answer. They must then read the problem carefully, analyze it for whatever information it has, and examine their own mathematical knowledge to see if they can come up with a strategy that will help them find a solution. The process forces the reorganization of existing ideas and the emergence of new ones as students work on problems with the help of a teacher who acts as a facilitator by asking questions that help students to review their knowledge and construct new ideas.

Home Environment for Mathematics Learning: All the objects, conditions and factors in the home of an individual which has the power to influence him, constitute the home environment of the person. The home environment for mathematics refers to meaningful learning experiences related to school instruction which are planned, carried out in the home and evaluated under the guidance of the parents or other adult etc. The environment at home, in terms of physical facilities, cohesion, parental behaviour, achievement motivation and intellectual and cultural orientation constituted the home environment for mathematics in the present study.

OBJECTIVES OFTHE STUDY

On the basis of the comprehensive conceptual frame work and early research works, the following objectives are framed for the present study by the investigator:

- To assess the mathematical problem solving ability and home environment of higher secondary students.

- To find out the significant differences if any on mathematical problem solving ability and home environment of higher secondary students with respect to certain demographic variables such as gender, type of management and socio economic status.
- To find out the significant association if any on the levels of mathematical problem solving ability with respect to the levels of home environment of higher secondary students.
- To find out the correlations if any between the mathematical problem solving ability and home environment of higher secondary students.

HYPOTHESIS

- There is no significant difference between boys and girls in their mathematical problem solving ability and home environment.
- There is no significant difference among government, government aided and self-financing higher secondary school students in their mathematical problem solving ability and home environment.
- There is no significant difference among students from low, moderate and high socio-economic status in their mathematical problem solving ability and home environment.
- There will be no significant association among students with different levels of mathematical problem solving ability with regard to levels of home environment.
- There will be no significant correlation between mathematical problem solving ability and home environment of higher secondary students.

METHODS AND PROCEDURES

Survey method of research has been used in the present study. Using the simple random sampling technique, 810 higher secondary school students (406 boys and 404 girls) were selected from different schools of Chennai district. The data were collected from the higher secondary students by using Mathematical Problem Solving Ability test constructed by the investigator and Home Environment Inventory for Mathematics constrncted and standardized by Ancel Maria and Santhamma Raju (1998). The collected data were scored according to the scoring scheme and the score were tabulated for the data analysis. Mean, standard deviation, 't' test and one-way ANOVA were used to analyze the data with the help of SPSS (Version 20.0). The analysed data were tabulated and tested with hypothesis as below;

HYPOTHESIS TESTING

$H_0$1: There is no significant difference between boys and girls in their mathematical problem solving ability and home environment.

Table -1 Showing the Significance of Mean difference between Boys and Girls in their Mathematical Problem Solving Ability

Variables	Groups	N	Mean	SD	't'- Value	P-Value
Mathematical Problem Solving Ability	Boys	406	63.33	15.495	2.430	0.015*
	Girls	404	65.73	12.468		
Home Environment	Boys	406	72.43	12.110	2.447	0.015*
	Girls	404	74.51	12.117		

* - significant at 0.05 level

It could be inferred from the above table that the mathematical problem solving ability of boys and girls are differing significantly. It is also observed that the mathematical problem solving ability of girl students is significantly higher than boys. Hence, in the formulated hypothesis, "There is no significant difference between boys and girls in their mathematical problem solving ability" is rejected.

$H_0$2,: There is no significant difference among government, government aided and self- financing higher secondary school students in their mathematical problem solving ability and home environment.

Table -2 Showing the Significance of Mean difference Among Government, Government Aided and Self-Financing Higher Secondary School Students in their Mathematical Problem Solving Ability

Variables	Groups	N	Mean	SD	't'- Value	P-Value
Mathematical Problem Solving Ability	Government	278	63.30	17.49	2.114	0.121
	Government Aided	274	65.77	12.35		
	Self-financing	258	64.51	11.48		
Home Environment	Government	278	73.42	10.94	0.993	0.371
	Government Aided	274	74.21	12.35		
	Self-financing	258	72.73	13.14		

It could be inferred from the above table that the mathematical problem solving ability and home environment of government, government aided and self-financing higher

secondary school students are not differing significantly. Hence, in the formulated hypothesis, "There is no significant difference among government, government aided and self-financing higher secondary school students in their mathematical problem solving ability and home environment" is accepted.

$H_0$3: There is no significant difference among students from low, moderate and high socio-economic status in their mathematical problem solving ability and home environment.

Table -3 Showing the Significance of Mean difference Among the Students from Low, Moderate and High Socio-Economic Status in their Mathematical Problem Solving Ability

Variables	Groups	N	Mean	SD	't'- Value	P- Value
Mathematical Problem Solving Ability	Low Socio-Economic Status	236	60.33	14.35	29.582	0.000**
	Average Socio-Economic Status	310	63.48	13.89		
	High Socio-Economic Status	264	69.49	12.65		
Home Environment	Low Socio-Economic Status	236	71.70	12.57	7.767	0.000**
	Average Socio-Economic Status	310	72.84	11.23		
	High Socio-Economic Status	264	75.77	12.50		

** - Significant at 0.01 level

It could be inferred from the above table that the mathematical problem solving ability and home environment of higher secondary school students from low, moderate and high socio-economic status are differing significantly. It is observed that the students from high socio-economic status found to be higher than their counter parts in their mathematical problem solving ability and home environment. Hence, in the formulated hypothesis, "There is no significant difference among students from low, moderate and high socio-economic status in their mathematical problem solving ability and home environment" is rejected.

$H_0$4: There will be no significant association among students with different levels of mathematical problem solving ability with regard to levels of home environment.

Table 4.4 - Showing the Significance of Association Among the levels of Mathematical Problem Solving Ability of Students in the Variable of Home Environment

Levels of Home Environment	Levels of Mathematical Problem Solving Ability			Row Total	Chi-Square Value	P-Value
	Low	Moderate	High			
Low	60 [27.3 %]	120 [54.5 %]	40 [18.2 %]	220	12.301	0.015*
Moderate	89 [24.5 %]	166 [45.7 %]	108 [29.8 %]	363		
High	54 [23.8 %]	102 [44.9 %]	71 [31.3 %]	227		
Column Total	203	388	219	810		

* - significant at 0.05 level

The findings presented in the above table revealed that there is significant association between mathematical problem solving ability and home environment among the higher secondary students. Comparing the levels of mathematical problem solving ability of students with low home environment, 27.3% are low, 54.5% are moderate, and 18.2% are high mathematical problem solvers. While comparing with the students having moderate home environment, 24.5% are low, 45.7% are moderate, and 29.8% are high mathematical problem solvers. Among the students of high classroom environment, 23.8% are low, 44.9% are moderate, and 31.3% are high mathematical problem solvers. It is observed from the table that students who have better home environment are good at mathematical problem solving than low and moderate home environment. It is obvious that conducive learning environment, good material resources and parents and siblings support for learning mathematics constitutes better home environment for learning and this in tum helps to enhance mathematical problem solving ability.

$H_0$5: There is no significant correlation between mathematical problem solving ability and home environment of higher secondary students.

Table 4.5 - Showing the Significance of Relationship between Mathematical Problem Solving Ability and Home Environment of Higher Secondary Students

Variables	'r'	Level of Significance
Mathematical Problem Solving Ability and Home Environment	0.126**	0.01

** - significant at 0.01 level

It is clearly revealed from the above table that there is a significant relationship between mathematical problem solving ability and home environment of the higher secondary school students.

FINDINGS AND DISCUSSION

The result of differential analysis based on gender revealed that the girls have scored high in mathematical problem solving ability and home environment than boys. This may be because the parents are now highly aware that the education for girl children is very essential and so, they actually provide all the amenities for both the gender for learning but the girls are found to be properly utilizing all the facilities available at home for learning mathematics than boys. The results have also revealed that the students belong to all the three types of management are similar in mathematical problem solving ability and home environment. The fact following this may be that the government has implemented continuous and comprehensive evaluation system at schools for the enrichment of students' problem solving and thinking skill without any specific consideration to a particular school management type. Now a days, parents are also much open-handed to support their children in education and provide all the conveniences required for learning at home irrespective of their income limit.

The finding of the present study has also revealed that home environment as an important predictor of the mathematical problem solving ability for the sample of government school students and low socio-economic status group students. Once parents believe their support is of importance to their children's mathematical development, they provide as many opportunities as they can (Bicer, et al., 2012), and students who have had opportunities at home to learn mathematics demonstrated more mathematical achievement than their peers who lacked such opportunities. Zadeh, Famia and Ungerleider (2010) showed that providing an enriched home environment was essential for the mathematics achievement of both boys and

girls, and they indicated that providing an enriched home environment was one of the options available to influence children's mathematics achievement.

The significance of mean difference among the level of socio-economic status of the students with respect to the selected variables of the study revealed that the students belonging to high socio- economic status found to be higher in mathematical problem solving ability and home environment than the students belonging to moderate socio-economic status followed by low socio-economic status. There are plenty of evidences shown that children's educational outcomes vary sharply with their parents' socio-economic background. Families with high socioeconomic status often have more success in preparing their young children for school because they typically have access to a wide range of resources to promote and support children's development. They are able to provide their children with high-quality child care and books to encourage children in various learning activities at home. Also, they have easy access to information regarding their children's emotional as well as cognitive development. In addition, families with high socioeconomic status often seek out information to help them better prepare their children for school. Hence, the above mentioned variables were found to be high for students belonging to high socio-economic status.

Educational Implications

Home experiences are vital in shaping children's future mathematical interest, belief, motivation and ability. The role of parents at home in shaping their children's mathematics ability during early childhood is very essential. Each parent provides different experiences for learning at home, the observations of each child results in differences related to their parents' attitude, value, and belief about mathematics. All of these parental behaviours lead to different educational emphases in the home. To provide more positive educational experiences at home, parents need to be informed about how their involvement affects their children's mathematical skills and knowledge.

Parental involvement in its many and varied ways is a vital parameter for increasing children's mathematical problem solving ability. Parental aspirations, parent-child communication, home structure, and parents' involvement in school's activities, socioeconomic status, success expectations from their children's mathematics courses, parental beliefs about mathematics are also he significant indicators affecting children's mathematical achievement either adversely or positively. Hence, it is suggested that the parents must have the aspiration in developing their children's mathematical ability but they should not vigour the children to

focus more on mathematical learning since it may produce adverse effect in children's learning. Parents do not need extensive mathematical knowledge to support their children's learning. Discussion of interesting questions, and talk about ways that mathematics can help us with everyday activity, can be more useful than knowing a correct procedure or answer. It is also proposed that the parents and the wider family should encourage the child to explore and share the mathematical concepts that are involved in their family life and activity. Parents must provide regular support in terms of learning materials, tools, models and books in order to recognise the mathematics in the world around them.

Researches have revealed that students who have had opportunities at home to learn mathematics demonstrated more mathematical achievement than their peers who lacked such opportunities. Economic status of parents has had significant effects on mathematical problem solving ability during early childhood, but its effects have not been shown to be as noteworthy as during later childhood. The reason is because the worst effects of poverty on children can be explained by a lack of early cognitive development within the home. It is suggested that low socio- economic parents can support their children's informal mathematical knowledge and skills by enhancing their readiness before they start school; thus reducing the gap between low and high socio-economic status students and parents must also believe that their support is important to their children's mathematical development. Socio-economic background was not only explained by parents' financial resources, but it was mostly based on parents' educational background and exposure to mathematics. It is suggested that the parents must also empower themselves with mathematical concepts that are used in-and-out-of-school in order to improve children's attitudes towards mathematics and to understand the value and relevance of mathematics in a variety of contexts.

CONCLUSION

The research has presented a clear picture on the Mathematical problem solving ability and home environment of higher secondary students. The mastery of problem solving skills, among the students is still at moderate level. Eff01is to upgrade and thus help students to mastery the problem solving ability should be planned and implemented not only in school but also in home. The environment conducive for learning mathematics, parental support and encouragement is also found very essential for learning mathematics in this study. It is hoped that the data generated by this research can contribute towards the upgrading of teaching and learning mathematics in India.

References:

- Abdallah, A., and Allen, N. (2009). Parental involvement in students' mathematics achievement. Elementary School Journal, l 03(5), 503-518.
- Akinsanyo, 0., Kassim, A.O., & Modupe, S.O. (2014). Relative effects of parents• occupation, qualification and academic motivation of wards on students' achievement in senior secondary school mathematics in Ogun state. Journal of Education and practice, 5(22), 99-105.
- Anders, Y., Rossbach, H., Weinert, S., Ebert, S., Kuger, S., Lehrl, S., & Maurice, J. (2012). Home and preschool learning environments and their relations to the development of early numeracy skills. Early Childhood Research Quarterly, 27(2), 231-244.
- Bicer,A., Capraro, R. M., & Cetin, S. C.(2012). Parental involvement effects on students' mathematics achievement. Paper presented at the annual conference of Southwest Educational Research Association, New Orleans, Louisiana.
- Balli, S. J., Demo, D. H., & Wedman, J. F. (1998). Family involvement with children's homework: An intervention in the middle grades; Family Relations, 47(2), 142-146.
- Civil, M. (2006). Working towards equity in mathematics education: Afocus on learners, teachers, and parents. In S. Alatorre, J.L. Cortina, M. Saiz, & A. Mendez (Eds.), Proceedings of the Twenty Eighth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (Vol. 1, 30-50). Merida, Mexico: Universidad Pedag6gicaNational.
- Crane, J. (1996). Effects of home environment, socio-economic status, and maternal test scores on mathematics achievement. Journal of Educational Research, 89(5), 305-314.

Research Article

Environmental Ethics and Environmental Risk Perception of Prospective Teachers

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ABSTRACT

The present study. aims to examine the environmental ethics and environmental risk perception of prospective teachers. Survey method of research has been used in the present study. Using the simple random sampling technique, 1083 prospective teachers (466 Male and 617 Female) were selected from different colleges of education of Chem1ai district. The data were collected from the prospective teachers by using a tool Environmental Awareness Ability Measure (EAAM) constructed and validated by Dr. Praveen Kumar Jha (2005) and Environmental Risk Perception Scale (2017) constructed and validated by the investigator. The collected data were scored according to the scoring scheme and the score were tabulated for the data analysis. Mean, standard deviation, 't' test, one-way ANOVA and correlation analysis were used to analyze the data with the help of SPSS (Version 20.0). The analysed data were tabulated and tested with hypothesis. Finding shows that the there is a significant positive correlation between environmental ethics and environmental risk perception of prospective teachers.

Keywords: Environmental ethics, environmental risk perception, prospective teachers, sustainable education, and environmental awareness

INTRODUCTION

Education is a process which makes an individual to adopt himself whole heartedly for the changing environment. Education also provides an individual opportunity to acquire skills for a better living. Education further enables a person to perceive a stimulus from the environment and respond to it in a positive manner. Environment has influenced and shaped our lives since the time immemorial. It is from the environment that we get our food to eat, water to drink, air to breath and all the necessities of day today life, thus constituting it as a life support system. Through the process of natural selection and elimination it i.s environment

only which has caused the evolution of biological spectrum, the biosphere as it exists today. Today environment has become the concern of all; the academicians, intellectuals, scientists, policymakers and government across the continents. (Kant and Shanna, 2013).

Decades ago, when environment was not a buzz word, Mahatma Gandhi has said, "The earth provides enough to satisfy everyman's needs, but not everyma111s greed". The relationship between environment and humankind is indeed deep and has recognized from the Vedic period. Furthermore, non-violence towards both animate and inanimate components of biosphere has been ingrained as guiding principle in the Indian psyche. Therefore, awareness on environment is the paramount concern of all the citizens of society. Environment protection stares by creating awareness among the people so that it becomes part of their lifestyle. The key to achieving this goal lies in environmental education and its objectives of environmental education such as awareness, knowledge, attitudes, skills and participation of people in protecting the environment.

SIGNIFICANCE OF THE STUDY

Man has to tackle his environment everyday to his survival and prosperity. It is very necessary to know about several features of natural environment. Environment is a source of happiness to man, and his happiness will be heightened, if he learns to love and appreciate nature. There is an immediate need to make man aware about environmental degradation, pollution, ecological imbalance and it's after effects. Since he is a social animal, there is a need to understand the social environment also.

In the present day technological society, we observe both knowledge and population explosion. Advancement in science and technology in an arbitrary way and the rapid growth of urbanization has posed danger to man. We experience a lot of problems due to environmental pollution. It is predicted by the environmental specialists that India is one of the important developing countries, which will be suffering a lot due to the environmental pollution within the next 20 years. Therefore, it is important to create environmental awareness among the people; otherwise, we will be paying a heavy price (Tung, 2002).

The physical environment with its different aspects stimulates and directs human behaviour in many ways. The emergence of environmental psychology has provided many eye-opening issues about the environment. The impact of environment on behaviour and creating the environmental awareness are two major focuses of environmental psychology. The principles of environmental education aim at providing proper understanding of the

environment and various hazards of polluting the environment. In this light, environmental awareness helps the social groups and individuals to acquire an understanding and make them sensitive to the total environment and its related problems (Jha, 1998). So it is the need of the hour to promote environmental awareness about the risk pertaining to environmental degradation and environmental ethics among the prospective teachers especially as they will be given responsibility to impart knowledge on these issues to the future generation students to protect our own environment.

OPERATIONAL DEFINITION OF THE KEY TERMS

ENVIRONMENTAL ETHICS

Environmental Ethics is referred as an ecological conscience or moral that reflects a commitment and responsibility toward the environment, including plants and animals as well as present and future generations of people. It is concerned with the dos and don'ts of the human beings to the environment.

In the present investigation, it is assessed by Environmental Ethics Scale (2001), developed and validated by Dr. Haseen Taj.

ENVIRONMENTAL RISK PERCEPTION

Risk perception is the subjective judgment that people make about the characteristics and severity of a risk. The phrase is most commonly used in reference to natural hazards and threats to the environment or health, such as nuclear power. Perceived environmental risk is one's opinion of the likelihood of risk (the probability of facing harm) associated with performing ace1iain activity or choosing a certain lifestyle. Risk perception involves judging the riskiness of each environmental risk factor selected in the research.

In the present investigation, it is assessed by Environmental Risk Perception (2016), developed and validated by the investigator and supervisor.

OBJECTIVES OF THE STUDY

The following objectives have been set in the present study,

- To find out the levels of environmental ethics and environmental risk perception among prospective teachers.
- To find out whether there is any significant difference in environmental ethics and environmental risk perception with respect to

a) Gender (Male/Female)

b) Age(20-25/26-30)

c) Type of Management of Colleges (Government / Government Aided / Self Finance)

d) Stream of Study (A1is /Science)

- To find whether there is any significance relationship among environmental ethics and environmental risk perception among prospective teachers.

HYPOTHESIS

- There is a significant difference in environmental ethics and environmental risk perception with respect to

a) Gender (Male/Female)

b) Age (20-25 /26-30)

c) Type of Management of Colleges (Government / Government Aided / Self Finance)

d) Stream of Study (Arts/ Science)

- There is a significance relationship between environmental ethics and environmental risk perception among prospective teachers.

METHODS AND PROCEDURES

Survey method of research has been used in the present study. Using the simple random sampling technique, 1083 prospective teachers (466 Male and 617 Female) were selected from different colleges of education of Chennai district. The data were collected from the prospective teachers by using a tool Environmental Awareness Ability Measure (EAAM) constructed and validated by Dr. Praveen Kumar Jha (2005) and Environmental Risk Perception Scale (2017) constructed and validated by the investigator. The collected data were scored according to the scoring scheme and the score were tabulated for the data analysis. Mean, standard deviation, 't' test, one-way ANOVA and correlational analysis were used to analyze the data with the help of SPSS (Version 20.0). The analysed data were tabulated and tested with hypothesis as below;

HYPOTHESIS TESTING

$H_0$1: There is no significance difference between Male and Female Prospective Teachers in their Environmental Ethics and Environmental Risk Perception

Table 1 - Showing the Significance of the Difference Between the Mean Scores of Male and Female Prospective Teachers in their Environmental Ethics and Environmental Risk Perception

Variables	Gender	N	Mean	SD	't' Value	Level of Significance
Environmental Ethics	Male	466	64.53	18.188	2.560	0.05 S
	Female	617	61.51	20.009		
Environmental Risk Perception	Male	466	32.24	8.063	I.23I	NS
	Female	617	31.61	8.563		

It is evident from the above table that there is a significant difference between Male and Female Prospective Teachers in their Environmental Ethics. It is observed that the Male Prospective Teachers are found to be higher than the Female Prospective Teachers in their Environmental Ethics. But the Environmental Risk Perception of Male and Female Prospective Teachers are found to be similar.

$H_0$2: There is a significant difference between the Prospective Teachers who age is less than or equal to 25 and above 25 years in their Environmental Ethics and Environmental Risk Perception

Table 2 - Showing the Significance of the Difference Between the Mean scores of Prospective Teachers who age is less than or equal to 25 and above 25 years in their Environmental Risk Perception

Variables	Gender	N	Mean	SD	't' Value	Level of Significance
Environmental Ethics	Less than or Equal to 25 yrs	669	64.17	18.615	2.966	0.01 S
	Above 25 yrs	4147	60.61	20.178		
Environmental Risk Perception	Less than or Equal to 25 yrs	669	31.80	8.337	0.444	NS
	Above 25 yrs	414	32.03	8.388		

It is evident from the above table that there is a significant difference between the Prospective Teachers whose age is less than or equal to 25 and above 25 years in their Environmental Ethics. It is observed that the Prospective Teachers whose age is less than or equal to 25 are found to be higher than the above 25 years in their Environmental Ethics. But

the Environmental Risk Perception of Prospective Teachers whose age is less than or equal to 25 are found to be similar.

$H_0$3: There is no significant difference among the Prospective Teachers studying in Government, Government Aided and Self-Finance Colleges in their Environmental Ethics and Environmental Risk Perception

Table 3 - Showing the Significance of the Difference Among the Prospective Teachers studying in Government, Government Aided and Self-Finance colleges in their Environmental Ethics and Environmental Risk Perception

Variables	Type of College Management	Mean	Ssb	Ssw	'F'Value	Level of Significance
Environmental Ethics	Government	58.76	9246.493	393633.1	2.685	0.05 S
	Gov1. Aided	63.29				
	Self - Finance	65.61				
Environmental Risk Perception	Government	30.88	564.297	74863.92	.067	NS
	Govt. Aided	32.04				
	Self - Finance	32.56				

It is evident from the above table that there is a significant difference among the Prospective Teachers studying in Government, Government Aided and Self-Finance colleges in their Environmental Ethics and Environmental Risk Perception. It is also observed that the students studying in Self-Finance colleges are found to be higher than the Government and Government Aided colleges in their Environmental Ethics and Environmental Risk Perception.

$H_0$4: There is no significant difference among the Prospective Teachers studying in Arts and Science stream in their Environmental Ethics and Environmental Risk Perception

Table 4 -Showing the Significance Difference Between the Prospective Teachers Studying in Arts and Science Stream in their Environmental Ethics and Environmental Risk Perception

Variables	Stream of Study	N	Mean	SD	't' Value	Level of Significance
Environmental Ethics	Arts	494	59.90	20.431	4.647	0.01 S
	Science	588	65.32	17.889		
	Arts	494	30.26	8.504		

Environmental Risk Perception	Science	588	33.27	7.974	6.005	NS

It is evident from the above table that there is a significant difference between the Prospective Teachers studying through Arts and Science stream in their Environmental Ethics and Environmental Risk Perception. It is also observed that the students studying in science stream are found to be higher than the students studying in arts stream in their Environmental Ethics and Environmental Risk Perception.

Table 5 - Showing the Significance of Relationship Between Environmental Ethics and Environmental Risk Perception of Higher Secondary Students

Variables	'r' Value	Level of Significance
Environmental Ethics and Environmental Risk Perception	0.616	0.01 S

The above table reveals that there is a significant relationship between environmental ethics and environmental risk perception of higher secondary school students.

FINDINGS AND DISCUSSION

From the above analyses it is evident that there is a significant difference between Male and Female Prospective Teachers in their Environmental Ethics. It is observed that the Male Prospective Teachers are found to be higher than the Female Prospective Teachers in their Environmental Ethics. And it is also contradictory with the findings of GulHanimErol and Kutret Gezer (2006) and SacitKose, et.al. (2011), which says it is greater for females than the male. The reason for male Prospective Teachers having high environmental ethics is their area of interest is entirely different compared to females. Also our social environment set up makes the females to think about family more rather than society related. As per the findings of Kuhlemeier et al. (1999) environmentally responsible behaviour was more strongly connected with the willingness to make sacrifices than with attitude toward the environment. The willingness to make sacrifices may be less in female Prospective Teachers due to their faith in traditional values (Family oriented). The Environmental Risk Perception of Male and Female Prospective Teachers are found to be similar. This may be due to the fact that both sexes have faced Environmental disasters like flood, cyclone, drought and change in climate conditions for the past few years and the impact is more on their life. This leads to the increase of knowledge of Risk Perception.

It is evident that there is a significant difference between the Prospective Teachers whose age is less than or equal to 25 and above 25 years in their Environmental Ethics. It is observed that the Prospective Teachers whose age is less than or equal to 25 are found to be higher than the above 25 years in their Environmental Ethics. This may be to the fact the job pressure and peer pressure makes the prospective teachers to focus themselves to build a career. In that process the Ethical values get diminished. The Environmental Risk Perception of Prospective Teachers whose age is less than or equal to 25 are found to be similar. And it doesn't agree with the findings of Shepherd, (2012) who have stated that age also influenced risk Perception.

In comparing the Prospective Teachers studying in Government, Government Aided and Self-Finances in their Environmental Ethics and Environmental Risk Perception. It is found that the students studying in Self-Finance schools are found to be higher than the Government and Government Aided schools in their Environmental Ethics and Environmental Risk Perception. The students of Self-Financing colleges may be high in their economic status and this makes them to look beyond the curriculum. Their facility of having access to technology like internet, smart phones will give more information related to Environmental Ethics and Environmental Risk Perception.

It is observed that the students studying in science stream are found to be higher than the students studying in arts stream in their Environmental Ethics and Environmental Risk Perception. The words of Ibarra et al. (2009) all teachers.. regardless of their subject area, should know environmental concepts so that they are able to be good role models to their students must be used more effectively in educating the student Teacher so that all stream teachers irrespective of their subject develops a passion towards environment, Education which is a vital tool in shaping anyone's life plays a role in developing Environmental Ethics which in tum makes our society green and safety.

EDUCATIONAL IMPLICATIONS

Prospective teachers are the most powerful stratum of the society, who must know the importance of environment and nature substantially. Students should understand the need for protecting the environment and be prepared to fight against the_ contamination of the atmosphere as students are tomorrow's future.

- Student teachers should participate in tree planting campaign in and around their schools and residential areas.

- They should take part in various environmental management seminars organized by the college.
- They should travel by foot or bicycles to college and other places.
- Students should develop the habit of reading and writing in the day light and hence save energy.
- Students should help the government and the non-government organizations in preventing pollution from the society by actively participating in programmes and by giving the information of those who pollute the environment.
- Student teachers should pa1iicipate in all the environmental activities organized by the college such as cleanliness day, debate, elocution, quiz, poster making etc. Thei can make campaigns in favour of environment.
- They can form informal groups to protect the environment.
- Students can protest the deeds of the offenders.
- They can send petition to the authorities or editors of newspapers.
- Children should contribute significantly in conserving the environment

CONCLUSION

All creation of God, has got its own significance and function. Environment is a house for all living beings such as human, animal, birds as well as plant. Hence it is necessary to know and appreciate the importance of nature, its existence and its relation to human life. With India poised to become one of the youngest nations in the world in the couple of years, it is the prospective teachers who shall have to largely shoulder the responsibility of saving the environment. This can be possible only if they start making smaller changes to their lifestyles that could lead to ripple effect. Thus the study reveals that the prospective teachers alone can spread the ethics to be followed in environmental issues and can help the future students to perceive the risk of exploiting the environment.

References

- Environmental Ethics: An Empirical Study of West German Adolescents. Szagun, Gisela; Mesenholl, Elke Journal of Environmental Education, v25 nl p37-44 Fall 1993.
- Chan, Kara. "Environmental attitudes and behaviour of secondary school students in Hong Kong."Environmentalist4.16 (1996):297-306.

- Manjengwa, J.M. (1998). EE for sustainable development in secondary schools in Zimbabwe, A focus on gender difference. The International Journal of EE and Information. 17(1), 17-25
- Green, J.S. et al. (2000). Environmental attitudes, knowledge and behaviours of Missouri 6th and 1st grade students. Journal of interpretation Research, Vol. 5, No. 1,pp. 56-58.
- Khalid, Tahsin; (2001). Pre-service Teachers' Misconceptions Regarding Three Environmental Issues. Can J Environ Educ. 6.
- David Hough, 2003 RMLE Research in :Middle Level Education Online, Volume 26, No. 1
- Ajiboye, Josiah and O Ajitoni, S (2008) Effects of Full and Quasi-Participatory Leaming Strategies on Nigerian Senior Secondary Students' Environmental Knowledge: Implications for Classroom ... International Journal of Environmental & Science Education volume 3, month 01, pages 58-66,
- Dunlap, R. E., & McCright, A. M. (2008). A widening gap: Republican and Democratic views on climate change. Environment, 50, 26-35
- Ibarra, J., Quilez, M. J., & Carrasquer,J. (2009). Environmental issues and ecological understanding in teachers training. Acta Didactica Napocensia, 2(2), 65-72.

Research Article

Academic Achievement among Higher Secondary Students in Relation to Their Study Skills

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ABSTRACT

The investigators made an attempt to find out the academic achievement among higher secondary students in relation to their study skills at Kancheepuram educational district. The sample for the present study consisted of 600 higher secondary school students studying in Kancheepuram educational district. The investigators used simple random sampling technique to collect the data. For collecting data the investigators used the marks obtained by the students in the quarterly examinations as Academic Achievement and self-made Study Skills Questionnaire. For analyzing and interpreting data, the investigator has used percentage analysis, standard deviation, mean, t-test and correlation analysis as statistical techniques. The finding shows that there is a positive significant relationship found between study skills and academic achievement of higher secondary students.

Keywords: Academic achievement, study skills, higher secondary students, learning strategies, academic success

INTRODUCTION

Study skill might have a major effect on a student's academic performance. It is believed that each person or every individual has a different study skill and it is important to find out the best personal way to study. Studying with friends or peer group has a long way to go in a student's study habits or study skills; it has a positive influence to the students' achievement mostly. A very good and conducive environment encourages students' study skills and might have positive impact of their academic achievements. In this paper, it is explored that how the study skill influences one's academic performance at various levels.

SIGNIFICANCE OF THE STUDY

Learning how to study is really a long-term process. As one goes on studying, one finds more techniques and methods that offer new information leading one on an interesting and successful direction. So, learning how to study or to develop good study habits is a lifelong process, and one should be ready to modify one's method of study according to the need of the time. A study habit or skill is connected with learners' performances. Study skills reflect students' usual act of studying and also call forth and serve to direct the learner's cognitive processes during learning. It includes a variety of activities: time management, setting appropriate goals, choosing an appropriate study environment, using appropriate note-taking strategies, choosing main ideas, and organization (Proctor et al, 2006). The use of technologies provides an opportunity for educators to search for the most suitable learning environments for students' study skills.

Study skills are not innate and inherited. It brings accuracy in the action and they are performed every time in the same way. It is therefore, essential that proper care should be taken to develop desirable habits of work, thought and feeling in children from the very beginning. In the field of education too, habits exercise a strong impact. Habits of thinking regularity, proper reasoning, punctuality etc., help the pupils in their proper adjustment and learning. In all educational institutions, the whole teaching-learning process is directed towards achievement in the academic field as well as in the sphere of co-curricular activities. The academic achievement is required to be of greater value and for the attainment of which the students, teachers and parents strive towards it (Verma, 2016). Achievement is the act of accomplishing attaining or finishing something that has been accomplished successfully, especially by means of skill, practice or preference. The term achievement is used more generally to describe performance in the subjects of the curriculum. Achievement is that state of mind in which one realizes its goal or targets. Hence the investigators want to find out the relationship between study skills and academic performance among higher secondary students.

OPERATIONAL DEFINITIONS OF THE KEY TERMS

- Academic achievement refers to how the student performs in the examination and how much marks are secured from the examination. The total marks earned by the students are considered as academic achievement of student.
- Study skills mean the strategies and techniques that enable the pupils to make the most efficient use of their time, resources, and academic potential.

- Higher secondary students: Students who are studying XI and XII standard in higher secondary schools from Kancheepuram Educational District.

OBJECTIVES

- To find out the level of study skills of higher secondary students.
- To find out the significant difference between arts and science group higher secondary students in their study skills.
- To find out the significant difference between rural and urban school higher secondary students in their study skills.
- To find out the level of academic achievement of higher secondary students.
- To find out the significant difference between arts and science group higher seconda1y students in their academic achievement.
- To find out the significant difference between rural and urban school higher secondary students in their academic achievement.
- To find out the relationship between study skills and academic achievement of higher secondary students.

NULL HYPOTHESES

- There is no significant difference between arts and science group higher secondary students in their study skills.
- There is no significant difference between rural and urban school higher secondary students in their study skills.
- There is no significant difference between arts and science group higher secondary students in their academic achievement.
- There is no significant difference between rural and urban school higher secondary students in their academic achievement.
- There is no relationship between study skills and academic achievement of higher secondary students.

METHODS AND PROCEDURES

The investigators used survey method to find out the academic achievement of higher secondary students in relation to their study skills. The sample for the present study consisted of 600 higher secondary school students studying in Kancheepuram educational district. The

investigators used simple random sampling technique to collect the data. For collecting data the investigators used the marks obtained by the students in the quarterly examinations as Academic Achievement and self- made Study Skills Questionnaire. For analyzing and interpreting data, the investigator has used percentage analysis, standard deviation, mean, t-test and correlation analysis as statistical techniques.

ANALYSIS OF DATA

Table-1: Level of Study Skills of Higher Secondary Student

Variable	Low		:Moderate		High	
	N	%	N	%	N	%
Study method	153	25.5	342	57.0	105	17.5
In the classroom	223	37.2	344	57.3	33	5.5
Homework	251	41.8	240	40.0	109	18.2
Regarding examination	21	3.5	363	60.7	215	35.8
Obstacles to effective study	178	29.7	273	45.5	149	24.8
Study skills	159	26.5	296	49.3	145	24.2

It is inferred from the above table that 25.5% of higher secondary students have low, 57.0% of them have moderate and 17.5% of them have high level of study method 37.2% of higher secondary students have low, 57.3% of them have moderate and 5.5% of them have high level in the classroom. 41.8% of higher secondary students have low, 40.0% of them have moderate and 18.2% of them have high level of homework.

3.5% of higher secondary students have low, 60.7% of them have moderate and 35.8% of them have high level of regarding examination. 29.7% of higher secondary students have low, 45.5% of them have moderate and 24.8% of them have high level of obstacles to effective study and 26.5% of higher secondary students have low, 49.3% of them have moderate and 24.2% of them have high level of study skills.

Table-2: Level of Academic Achievement of Higher Secondary Students

Variable	Low		:Moderate		High	
	N	%	N	%	N	%
Academic achievement	163	27.2	312	52.0	125	10.8

It is inferred from the above that 27.2% of higher secondary students have low, 52.0% of them have moderate and 20.8% of them have high level of academic achievement.

H_0l: There is no significant difference between arts and science group higher secondary students in their study skills.

Table-3: Difference Between of Arts and Science Group Higher Secondary Students in their Study Skills

Study skills	Group	N	Mean	S.D	Calculated 't' value	Remarks at 5% level
Study method	Alis	265	27.84	10.04	12.58	S
	Science	335	39.2	12.06		
In the classroom	Arts	265	6.32	3.01	3.63	NS
	Science	335	8.43	10.1		
Homework	Arts	265	3.17	l.83	0.59	NS
	Science	335	3.25	l.73		
Regarding examination	Arts	265	13.16	0.78	0.91	NS
	Science	335	13.1	0.82		
Obstacles to effective study	Arts	265	6.62	2.92	1.58	NS
	Science	335	6.17	3.98		
Study skills	Arts	265	57.1	11.24	11.14	S
	Science	335	70.15	17.31		

(At 5% level of significance the table value of 't' is 1.96, S- Significant, NS-Non Significant)

It is inferred from the above table that there is no significant difference between of arts and science group higher secondary students in their homework, regarding examination

and obstacles to effective study. But there is significant difference between of arts and science group higher secondary students in their study method, classroom and study skills. While comparing the mean scores of arts and science group students in their study method, classroom and study skills, the science group students are better than arts group students

$H_0$2: There is no significant difference between rural and urban school higher secondary students in their study skills.

Table-4: Difference Between Rural and Urban School Higher Secondary Students in their Study Skills

Study skills	Location of School	N	Mean	S.D	Calculated 't' value	Remarks at 5% level
Study method	Rural	310	30.94	11.86	6.78	S
	Urban	290	37.65	12.34		
In the classroom	Rural	310	5.73	1.83	5.65	S
	Urban	290	9.39	10.86		
Homework	Rural	310	3.28	1.81	0.89	NS
	Urban	290	3.15	1.73		
Regarding examination	Rural	310	13.15	0.79	0.83	NS
	Urban	290	13.10	0.81		
Obstacles to effective study	Rural	310	6.77	3.33	2.87	S
	Urban	290	5.93	3.73		
Study skills	Rural	310	59.87	12.07	7.23	S
	Urban	290	69.22	18.65		

(At 5% level of significance the table value of 't' is 1.96, S- Significant, NS-Non Significant)

It is inferred from the above table that there is no significant difference between rural and urban school higher secondary students in their homework and examination. But there is significant difference between rural and urban school higher secondary students in their study method, classroom, obstacles to effective study and study skills. While comparing the mean scores of rural and urban school higher secondary students in their study method, classroom, and study skills, the urban school students are better than rural school students. Further it is

observed that the rural students are better than urban school students in their obstacles to effective study.

$H_0$3: There is no significant difference between arts and science group higher secondary students in their academic achievement.

Table-5: Difference between of Arts and Science Group Higher Secondary Students in their Academic achievement

Study skills	Age	N	Mean	S.D	Calculated 't' value	Remarks at 5% level
Academic achievement	Arts	265	50.83	11.993	3.93	S
	Science	335	47.44	8.217		

(At 5% level of significance the table value of 't' is 1.96, S- Significant, NS-Non Significant

It is inferred from the above table that there is significant difference between of arts and science group higher secondary students in their academic achievement.

$H_0$4: There is no significant difference between rural and urban school higher secondary students in their academic achievement.

Table-6: Difference Between Rural and Urban School Higher Secondary Students in their Academic Achievement

Study skills	Location of School	N	Mean	S.D	Calculated 't' value	Remarks at 5% level
Academic achievement	Rural	310	47.45	7.84	3.67	S
	Urban	290	50.52	12.02		

(At 5% level of significance the table value of 't' is 1.96, S- Significant, NS- Non Significant)

It is inferred from the above table that there is significant difference between rural and urban school higher secondary students in their academic achievement.

H05: There is no relationship between study skills and academic achievement of higher secondary students.

Table-7: Relationship Between Study Skills and academic Achievement of Higher Secondary Students

Study skills Vs. Academic achievement	N	df	Calculated 'y' value	Table value at 5% level	Remarks
	600	598	0.158	0.088	S

It is inferred from the above table that there is significant relationship between study skills and academic achievement of higher secondary students.

DISCUSSION AND CONCLUSION

While comparing the overall view of higher secondary students, above 50% of the students have moderate level of study skills. Regarding subject group, while comparing the mean scores of arts and science group students in their study method, classroom and study skills, the science group students are better than arts group students. Regarding location of school, while comparing the mean scores of rural and urban school higher secondary students in their study method, classroom, and study skills, the urban school students are better than rural school students. Further it is observed that the rural students are better than urban school students in their obstacles to effective study.

Regarding academic achievement, 27.2% of higher secondary students have low, 52.0% of them have moderate and 20.8% of them have high level of academic achievement. The arts students are better than science students in their academic achievement. Regarding location of school, the urban school students are better than rural school students in their academic achievement. Significant positive correlation is found between study skills and academic achievement of higher secondary students. Teachers should give regular or periodical counselling service to train the students on various study skills strategies or techniques advocated in order to boost their study habits and enrich their academic achievement.

References

- Anwar, E. (2013). A correlational study of academic achievement and study habits: issues and concerns. Excellence International Journal of Education and Research, 1 (2) 46-52
- Lawrence, A. S. A. (2014). Relationship between Study Habits and Academic Achievement of Higher Secondary School Students. Indian Journal of Applied Research, 4 (6) 143-135.

- Oluwatimilehin, J. T. B. & Owoyele, J. W. (2012). Study habits and academic achievement in core subjects among junior secondary school students in Ondo state. Niegeria Bulgarian Journal of Science and Education Policy 6 (1), 155-169
- Proctor, B. E., Prevatt, F., Adams, K., Reaser, A., & Petscher, Y. (2006). Study skills profiles of normal-achieving and academically struggling college students. The Journal of College Student Development, 47, 37-51.
- Venna, A. (2016). A Study of academic achievement among high school students in relation to their study habits. International Journal of Research in Humanities, Arts and Literature, 4 (3), 75-88.