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## READING DIFFICULTIES DIAGNOSTIC TEST IN ENGLISH

1

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### INTRODUCTION

A research study is conducted on a valid data. Major tools in social sciences research are interview, observation, questionnaires, enquiry forms, check lists, rating scales, score cards, sociometry, psychological tests etc. Depending on the nature and purpose of study, the researcher has to select appropriate tools for the research to be conducted.

There are many tests to identify students with learning difficulties in English in the Western world. A few of them are Illinois Test of Psycholinguistic Abilities (Kirk, McCarthy, and Kirth, 1968), Test of Language Diagnostic Revised (Gray and Robinson, 1967), Woodcock Reading Mastery Tests (1973), Test of Written Language (Hammill and Larsen, 1983), The Written Expression Test (Johnson, 1988), and the Brigance Diagnostic Inventory of Essential Skills (Brigance, 1979). These tests, being developed in foreign context, pose problems to Indian students, whose society, culture and needs are totally different. And, as there are no diagnostic tests in the Indian context to identify the students with reading difficulties in English,

the Investigator constructed and validated the reading difficulties diagnostic test in the present study.

### Construction of Reading Difficulties Diagnostic Test (RDDT):

As Thorndike puts *reading is reasoning*. It is a process, a dynamic, action filled way of responding to printed symbols, and not a product or a school subject. It is rightfully classed as the most important of the three Rs because as a process, it is used by all students in all phases of a school curriculum. (Russel, G. Stauffer 1975). As such, reading activity is an important aspect in the shaping of a student. Having a difficulty in this aspect naturally hinders the growth of a student. Hence, this reading difficulties diagnostic test is aimed to assess specific reading difficulties of the students. In order to develop the test, the Investigator referred the available literature and studies on reading difficulties. These studies have helped to understand the perpetual implications and procedures to diagnose reading difficulties. Snowling (1985) finds that reading activity proceeds in three stages. They are:

1. The logographic stage, in which words are identified by distinguishing visual features;
2. The alphabetic stage, at which letter sound system awareness (phonemic awareness) is mastered;
3. The orthographic stage, which is based on visual analysis that is free from the influence of sound.

Based on these, Sivagami (2000) developed Reading Diagnostic Test to identify reading difficulties in learning disabled children. Considering certain aspects of the test, Kusuma Harinath (2007) developed a reading difficulties diagnostic test to identify students with reading difficulties. The investigator has developed Reading Difficulties Diagnostic Test, suitable to identify the reading difficulties of primary school children in English. The RDDDT is framed based on the following components-

### ***Components of Reading Difficulties Diagnostic Test***

1.	Letter Identification	Visual Auditory Perception
2.	Word Attack	Auditory Visual Association
3.	Analogues	Auditory Sequence
4.	Sound Identification	Auditory Discrimination
5.	Word Recognition	Visual Motor Difficulties
6.	Oral Reading	Auditory Visual Difficulties
7.	Rhyming Words	Visual Verbal Association
8.	Comprehension	Perceptual Sensory Reception
9.	Segregate The Sounds	Auditory Segmentation
10.	Cloze Test	Perceptual Sensory Information

RDDDT is designed to gain first hand information of the learners' status in different reading aspects of English like-Phonic knowledge, visual discrimination and perceptual abilities.

The developed test has been given to the teachers who have special training English Language Teaching, with a request to review the test items and their suitability to identify the students with reading difficulties. Based on their opinion, certain test items have been revised, and certain items have incorporated or deleted. Thus,

the developed test consists of 50 objective type questions like- multiple choice, fill in the blanks, choose the correct answer, and one word answer. The test is for 50 marks and each question carries one mark. The correct answer is given 1 mark and wrong answer is given a zero.

#### **Pilot study**

Pilot study helps to assess whether the test items are suitable to the subjects it aimed. It also gives an insight into the acceptability of the test items to all the subjects it is concerned with. The Investigator made a



pilot study on a few students, with reading difficulties. The students selected for pilot study are based on teacher's observations, achievement of students, particularly in English and Bhatia's Intelligence Test scores. The purpose of the study is to find out the problems in collecting the data, the practical suitability of reading diagnostic difficulty test to the students. It also helps to find out the reliability of the tests.

### Reliability of the Reading Difficulties Diagnostic Test

In this study, the reliability of the diagnostic test is established by Split-half method. To find out the reliability of the Reading Difficulties Diagnostic Test, the diagnostic test is administered to the

students with Reading difficulties. 50 students with Reading difficulties based on teachers observations, their achievement (less than 35%) in English, (Quarterly and Half yearly Examinations) and Bhatia's Intelligence test scores, have been selected. The Reading Diagnostic test is administered on these students to find out the reliability of the test used. As already mentioned, the Split-half method is used to establish the reliability of each test. In this method, the whole test is divided into two equivalent halves by pooling the odd numbered and even numbered item scores. The correlation between these two sets of test scores have been established by using Karl Pearson's formula-

$$r = \frac{N \sum xy - \sum x \times \sum y}{\sqrt{([N \sum x^2 - (\sum x)^2][N \sum y^2 - (\sum y)^2])}}$$

From this, by using Spearman-Brown formula, the reliability of the whole test is established.

Spearman- Brown formula is

$$r_{11} = \frac{2r^{\frac{1}{2}} \times \frac{1}{11}}{1 + r^{\frac{1}{2}} \times \frac{1}{11}}$$

Thus, the obtained r-value of Reading (0.67) difficulties diagnostic test is high- indicating the reliability of the diagnostic test, used in the study.

### Validity of the Reading Difficulties Diagnostic Test

**Content Validity:** Content Validity involves essentially the systematic examination of the test content to determine whether it covers a representative sample of the behavior domain to be measured. The content validity of the Reading difficulties diagnostic test was examined by a team of experts who have a good theoretical and practical background in the field of learning difficulties. Taking their opinions into account, the content and quality of the items are improved. Thus, the Reading Difficulties Diagnostic Test used in the study possess content validity.

### **Face Validity**

Face Validity claims what the test appears to measure superficially. Thus, it refers the way the diagnostic tests appear to the examinees, the teachers and educationists. If the test content is not within the reach of examinees it loses its validity, thereby weakening the motivation. The team of experts opines that the Reading difficulties diagnostic test developed for the investigation has face validity.

### **Intrinsic Validity**

Intrinsic validity is estimated by how obtained scores measure the tests true score

components. Square root of the reliability value of the Reading Difficulties Diagnostic Tests is nothing but its intrinsic validity. Thus, the intrinsic validity of the diagnostic tests is high-Reading difficulty (0.82) indicating the suitability of the test used in the study.

### **CONCLUSION**

The diagnostic test for the assessment of Reading difficulties has thus been constructed and validated and was administered to the primary school children in the identification of learning difficulties in English of children.

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# RELATIONSHIP BETWEEN PROBLEM SOLVING ABILITY AND ACHIEVEMENT IN MATHEMATICS OF XI STANDARD STUDENTS

2

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## INTRODUCTION

*“To the Question of Life  
you are the answer,  
And  
To the problems of your life  
you are the solution”*

*-Joe Cordare*

Problems are the real facts of life. Everyone in this world has them. Unfortunately, problems are not always isolated cases. They tend to be like onions where problems peel away one after the other. In short, we will always be confronted with problems. Problems haunt people every day and night. Likewise, even children are not immune to it; children have their own problems that they face in the classroom and in home. Children can deal with any type of problem in their own way. Some of the methods they use could be very methodic, while others are very inferior. In many cases, the methods that children use to solve their problems are at best rudimentary. For children, this can mean a lot of things. If children fail to solve their problems, they may feel dejected and disappointed. On the other hand, children who can solve problems can feel very confident and bold.

## SIGNIFICANCE OF THE STUDY

The bitter truth of present education system is that a mark scored by the students in concerned subject is used as a yardstick to assess student's Achievement or scholastic performance in that subject. This led the investigator to launch the investigation.

Homes and schools should provide proper learning environment for the child to achieve success and independence. School should provide support for active learning by offering gentle guidance and supporting him to discover own solution. If this is done in sincere way, we can foster the child's development as a self confident, logical, creative, flexible and independent thinking which would promote academic and social success. Problem solving helps an individual to develop a strong and more cohesive sense of self among students.

Furthermore; the finding of the present study will be useful for the modification of mathematics curriculum and also bringing in new holistic method of assessment in mathematics if necessary.

## OBJECTIVES OF THE STUDY

1. To find out the level of Problem Solving Ability of XI standard students.

2. To find out the level of Achievement in Mathematics of XI standard students.
3. To find out the influence of Problem Solving Ability and Achievement in Mathematics among XI standard students.

### NULL HYPOTHESIS OF THE STUDY

1. There is no significant difference between XI standard students' Problem Solving Ability with reference to the following background variables (i) gender (ii) medium of instruction (iii) location of the school.
2. There is no significant difference between XI standard students' Achievement in Mathematics with reference to the following background variables (i) gender (ii) medium of instruction (iii) location of the school.
3. There is no significant relationship between Problem Solving Ability and Achievement in Mathematics of XI standard students.

### Population of the study

The population for the present study is confined with students studying in XI standard in Cheranmahadevi Educational district.

### Sample

In the present study, the investigator has selected a sample of 300 XI standard students using simple stratified random sampling technique from various schools of Cheranmahadevi Educational district.

### Tools

The investigator has used a self made questionnaire in the present study. In order to study the relationship between the Problem Solving Ability and Achievement in Mathematics of XI standard Students, the investigator has chosen the following tools:

1. Problem Solving Ability scale was developed and validated by Nirmala Devi. S and her guide Dr. A. Faritha Begam.
2. For the Achievement in Mathematics, marks obtained by students in their quarterly examination.

### STATISTICAL TECHNIQUES USED

Mean, Standard Deviation, 't' test and Pearson Product Moment Correlation were used to analyze the data.

### ANALYSIS OF DATA

**Table: 1**

#### *Level of Problem Solving Ability of XI standard students with respect to gender*

Variable	Gender	Low		Moderate		High	
		N	%	N	%	N	%
Problem Solving Ability	Male	50	34.2	74	50.7	22	15.1
	Female	24	15.6	84	54.5	46	29.9

It is inferred from the above table that among the male XI standard students, 34.2% of them have low, 50.7% of them

have moderate and 15.1% of them have high level of Problem solving ability.

Among the female XI standard of them have moderate and 29.9% of them students, 15.6% of them have low, 54.5% have high level of Problem solving ability.

**Table: 2**

***Level of Problem Solving Ability of XI standard students with respect to locality of school***

Variable	Locality of School	Low		Moderate		High	
		N	%	N	%	N	%
Problem Solving Ability	Rural	20	17.4	60	52.2	35	30.4
	Urban	54	29.2	98	53.0	33	17.8

It is inferred from the above table that among the rural school XI standard students, 17.4% of them have low, 52.2% of them have moderate and 30.4% of them have high level of Problem solving ability.

Among the urban school XI standard students, 29.2% of them have low, 53.0% of them have moderate and 17.8% of them have high level of Problem solving ability.

**Table: 3**

***Level of Problem Solving Ability of XI standard students with respect to medium of instruction***

Variable	Medium of Instruction	Low		Moderate		High	
		N	%	N	%	N	%
Problem Solving Ability	Tamil	55	28.8	108	56.5	28	14.7
	English	19	17.4	50	45.9	40	36.7

It is inferred from the above table that among the Tamil medium XI standard students, 28.8% of them have low, 56.5% of them have moderate and 14.7% of them have high level of Problem solving ability.

Among the English medium XI standard students, 17.4% of them have low, 45.9% of them have moderate and 36.7% of them have high level of Problem solving ability.

**Table: 4**

***Level of Achievement in Mathematics of XI standard students with respect to gender***

Variable	Gender	Low		Moderate		High	
		N	%	N	%	N	%
Achievement in Mathematics	Male	51	34.9	78	53.4	17	11.7
	Female	21	13.6	81	52.6	52	33.8

It is inferred from the above table that among the male XI standard students, 34.9% of them have low, 53.4% of them have moderate and 11.7% of them have high level of Achievement in Mathematics.

Among the female XI standard students, 13.6% of them have low, 52.6% of them have moderate and 33.8% of them have high level of Achievement in Mathematics.

**Table: 5**

***Level of Achievement in Mathematics of XI standard students with respect to locality of school***

Variable	Locality of School	Low		Moderate		High	
		N	%	N	%	N	%
Achievement in Mathematics	Rural	9	7.8	66	57.4	40	34.8
	Urban	63	34.1	93	50.3	29	15.6

It is inferred from the above table that among the rural school XI standard students, 7.8% of them have low, 57.4% of them have moderate and 34.8% of them have high level of Achievement in Mathematics.

Among the urban school XI standard students, 34.1% of them have low, 50.3% of them have moderate and 15.6% of them have high level of Achievement in Mathematics.

**Table: 6**

***Level of Achievement in Mathematics of XI standard students with respect to medium of instruction***

Variable	Medium of Instruction	Low		Moderate		High	
		N	%	N	%	N	%
Achievement in Mathematics	Tamil	62	32.5	102	53.4	27	14.1
	English	10	9.2	57	52.3	42	38.5

It is inferred from the above table that among the Tamil medium XI standard students, 32.5% of them have low, 53.4% of them have moderate and 14.1% of them have high level of Achievement in Mathematics.

Among the English medium XI standard students, 9.2% of them have low, 52.3% of them have moderate and 38.5% of them have high level of Achievement in Mathematics.

**TABLE: 7**

***Relationship between Problem Solving Ability and Achievement in Mathematics of XI standard students***

N	$\Sigma X$	$\Sigma Y$	$\Sigma X^2$	$\Sigma Y^2$	$\Sigma XY$	Calculated 'γ' value	Remarks
300	5699	18500.5	113295	1275038.8	366120.5	0.564	S

(At 5% level of significance, for 298 df the table value of 'γ' is 0.113)

It is inferred from the above table that the calculated 'γ' value (0.564) is greater than the table value (0.113) for 298 df at 5% level of significance. Hence null hypothesis is rejected. Thus, the result shows that there is significant relationship between Problem solving ability and Achievement in Mathematics of XI standard students.

**FINDINGS AND DISCUSSION**

*1. Significant difference is found between male and female XI standard students in their Problem solving ability. While comparing the mean scores, the female students have better Problem solving ability than the male students.*

The 't' test result reveals that there is significant difference between male and female XI standard students in their Problem solving ability. While comparing the mean scores, female (19.91) students are better than male (18.03) students in their Problem solving ability. Female students are generally alert and attentive in the classroom than male students. Results of research reveals that females have high multiple intelligence than male counterparts. This might have contributed to the difference in the Problem solving ability too. The findings of this study is not

in par with the findings of the previous study of Ushashri (2009), where result showed that male students are better than female students in their Problem solving ability.

*2 Significant difference is found between rural and urban school XI standard students in their Problem solving ability. While comparing the mean scores, the rural school students have better Problem solving ability than the urban school students.*

The 't' test result reveals that there is significant difference between rural and urban XI standard students in their Problem solving ability. While comparing the mean scores, the rural (19.77) school students are better than the urban (18.52) school students in their Problem solving ability. This may be due to the fact that the rural school students have more life experience and more exposed to the realities of life in rural set up. Rural children are self-dependent and self-made because rural parents' guidance in education of the wards when compared to urban parents is very significant. Through self-learning rural children might have learnt to identify the 'how and what' of the problem. Hence maybe the difference. The findings of this study support the findings of the previous

study of Gnanadevan (2006), where result showed that higher secondary students studying in rural and urban schools differ significantly in their problem solving ability.

*3. Significant difference is found between Tamil and English medium XI standard students in their Problem solving ability. While comparing the mean scores, the English medium students have better problem solving ability than the Tamil medium students*

The 't' test result reveals that there is significant difference between English medium and Tamil medium XI standard students in their Problem solving ability. While comparing the mean scores, the English medium (19.91) students are better than the Tamil medium (18.48) students in their Problem solving ability. English is said to be the window of the world and the library language. Students who have good English and communication skill are in an advantageous position to self-expose themselves to the modern information and communication technology. They might receive varied knowledge through internet and web media to a greater extent than the students from the Tamil medium. Moreover English medium might give students more of challenging project works to be done in individually.

*1. Significant difference is found between male and female XI standard students in their Achievement in Mathematics. While comparing the mean scores, the female students have better Achievement in Mathematics than the male students.*

The 't' test result reveals that there is significant difference between male and female XI standard students in their

Achievement in Mathematics. While comparing the mean scores, female (67.53) students are better than male (55.49) students in their Achievement in Mathematics. Female students score more marks in Mathematics when compared to male. This may be due to the fact that females put extra hard work and devote more hours to practice mathematical problems which give them an edge over the males who usually are easy going and hardly spend long hours in studying. Furthermore students who have low problem solving skills have poor learning of mathematics skills.

*2. Significant difference is found between rural and urban school XI standard students in their Achievement in Mathematics. While comparing the mean scores, the rural school students have better Achievement in Mathematics than the urban school students.*

The 't' test result reveals that there is significant difference between rural and urban XI standard students in their Achievement in Mathematics. While comparing the mean scores, the rural (72.57) school students are better than the urban (54.89) school students in their Achievement in Mathematics. This may be due to the fact that the students in the country side are hard working and sincere and tough. Mathematics is a subject which demands sincere and continuous hard work to gain mastery over the subject. Whereas the urban school students are lethargic thus their achievement is low compared to rural school students. The rural school students are serious about their future and they are motivated well to come up in their life than the urban school students. The



findings of this study are in par with the findings of the previous study of Prakash. K and Premalatha Sharma (2010), where the results showed that in total competency scores rural children were found to be better than urban children.

*3. Significant difference is found between Tamil and English medium XI standard students in their Achievement in Mathematics. While comparing the mean scores, the English medium students have better Achievement in Mathematics than the Tamil medium students.*

The 't' test result reveals that there is significant difference between English medium and Tamil medium XI standard students in their Achievement in Mathematics. While comparing the mean scores, the English medium (71.06) students are better than the Tamil medium (56.30) students in their Achievement in Mathematics. This may be due to the fact that the English medium students show interest in learning Mathematics. Further, the parental involvement is more among the English medium students. Moreover, the English medium students have high level of aspiration in academic affairs. English medium students are given enough coaching before they attend the exam. Coverage of syllabus, revision test, remedial classes are being done in English medium schools. This group of clientele has scored high on problem solving ability. Higher the problem solving ability naturally higher will be their Mathematical achievement.

*Significant relationship is found between Problem solving ability and Achievement in Mathematics of XI standard students.*

The correlation test result reveals that, there is a significant relationship between problem solving ability and Achievement in Mathematics of XI standard students. Problem solving ability is at the very heart of understanding Mathematics. Problem solving ability has importance in the study of Mathematics. A primary goal of Mathematics teaching and learning is to develop the ability to solve a wide variety of problems. From this we come to know that people who have low Problem solving ability have low learning of Mathematical concepts and people who have high Problem solving ability have high learning of Mathematical concepts. So, the Problem solving ability is directly related to their Achievement in Mathematics and vice-versa.

## CONCLUSION

We conclude that there is a positive relationship between Problem solving ability and Achievement of Mathematics of XI standard students. Problem solving ability is the cornerstone and best contributor of Achievement in Mathematics. Higher secondary education plays decisive role in every individual life since after higher secondary education all decisions are made for the future. Homes and school should provide proper learning environment for the child to achieve success and independence. School should provide support for active learning by offering gentle guidance and supporting him to discover own solutions. If this is done in a sincere way, we can foster the child's development as a self confident, logical, creative, flexible and independent thinking. Problem solving in the very heart of understanding Mathematics. The whole purpose of teaching the various concepts

which make up Mathematics as a tool is to give the learner the tools and the building blocks with which he can actually solve problems that is, resolve difficulties which he wants to resolve.

Besides that Problem solving ability helps not only in solving mathematical problems but also different day-to-day problems that are encountered by an individual in different occasions. Students

should be made to understand that solutions for problems reside only within themselves. They should also be trained to look at Life in positive way. They should be made to realize that Life is not a bed of roses. Thorns in the roses help them to appreciate the flower of Life and hardships help them to appreciate the beauty of Life. This motivation lies in the hands of parents and teachers, the loco-parents.

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## AWARENESS, ATTITUDES AND PRACTICES OF ENVIRONMENTAL EDUCATION AMONG COLLEGE TEACHERS IN COIMBATORE DISTRICT, TAMIL NADU

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### INTRODUCTION

Increasing threats to the resources of Earth and to the health and stability of societies justify the urgent need for an environmentally informed citizenry for a sustainable future. Presently, there are many environmental issues and challenges that India confronts such as air and water pollution, solid waste disposal and the degradation and fragmentation of natural environment. The situation has become worse in the recent years due to the so-called “liberalization”, “economic development” and “globalization”. India is making progress in addressing these environmental issues. In 2003, The Honorable Supreme Court of India mandated Environmental Education (EE) / Environmental Science (EE) as a compulsory subject in all stages of Education system (Sonowal, 2009). The ultimate goal of EE is to promote development of responsible environmental behavior among the learning communities (Hungerford and Volk, 1990). The Intergovernmental Conference on Environmental Education (UNESCO, 1978) had recommended the primary goals of environmental education curriculum as

(a) awareness, (b) knowledge, (c) attitudes, (d) skills, and (e) participation. Earlier study in this field clearly showed that the students were good in their awareness and attitudes towards environmental education but they are less active in environmental protection (Ximing and Chunzhao, 2011). Ultimately, mending this behavioural gap rests in the hands of teaching community that train the upcoming generations’ to become responsible and environmentally active citizens. Hence, the teachers must have a good understanding of environmental issues, desirable attitudes towards the environment in general and environmental education in particular and they should also be committed to act responsibly (Ernesto, 2014). Meantime, people also perceive that less competent teachers are the primary reason for students’ substandard interest in EE learning and poor participation in environmental protection. Taking these vital cues into consideration, this study is conducted to assess the college teachers’ awareness, attitude and practices of environmental education with reference to Coimbatore district, Tamil Nadu.

## **REVIEW OF RELATED LITERATURE**

Research reports are very limited to this area in India and abroad because most of the available research reports were confined to evaluating the students' level of environmental awareness and knowledge. Unfortunately, till now no study was reported on EE teachers' level of Awareness, Attitudes and Practices (AAP) in this state. This study is the first of its kind looking at the teachers' competence in handling EE.

The publication from Center for Environment Education (2002) was an important one in the field of Environmental Education (EE) and Education for Sustainable Development (ESD) in India. Priya (2014) studied factors that are most important in explaining different levels of awareness concerning environmental problems and the level of awareness among college students with regard to the usage of plastic and its disposal, alternative for plastic, toilet usage, its use in the cultivation of saplings, rainwater harvesting and also their participation in environment related programmes in Coimbatore District. Priyadarshini and Annakodi (2013) conducted a study on the level of environmental awareness in secondary students in Coimbatore. Their investigation was done among 40 students studying in the ninth standard of a Government School located in a semi urban area of Coimbatore. The study showed post-test awareness of the students with respect their level of understanding of environmental issues much higher than their pre-test state.

## **STATEMENT OF THE PROBLEM**

The problem of the study is study the teachers' awareness, attitude and practices

of environmental education in Coimbatore district, Tamil Nadu.

## **OBJECTIVES OF THE STUDY**

The objective of the study was to explore the level of awareness, attitude and practices of Environmental Education during the period of 2013-2016 among college teachers, and to find variability in these aspects with respect their demographic status.

## **HYPOTHESES FOR THE STUDY**

The hypothesis while taking up the study was that "there is no significant difference in Teachers' Awareness, Attitudes and Practices of EE with reference to demographic variables such as gender, age, resident location and nativity, teaching experience, educational qualification and EVS/EE subject qualification".

## **METHODOLOGY**

A custom-made questionnaire was used for the study and the investigators have adopted the convenience sampling technique for collecting responses from college teachers in Coimbatore. From 38 colleges in Coimbatore, 41 EE teachers were contacted as a cross-sectional sample for the study. The survey tool, the questionnaire, consisted of 94 question/ items classified under 9 categories. But, in this present study, in view of hypothesis to be tested and the objectives, the investigators have taken only 5 important categories, i) Teachers' Environmental awareness, ii) EE subject awareness, iii) Environmental attitude, iv) EE subject attitude, and v) Teaching Practices. The questions were of three type namely, multiple choice, Likert scale items and alternative (Yes or No) items. Detailed instructions were given to the subjects before

filling their questionnaire. For establishing the validity the tool was given to a panel of academicians and language experts. Based on their opinion and guidance some of the items in the questionnaire were modified. The reliability of the tool was also established using split-half method and the result was 0.82. Based on the subjects responses scores were assigned based on scoring key. The collected data were then tabulated and analyzed with the help of SPSS software.

### STUDY AREA

Coimbatore is the second largest district in Tamil Nadu with more than 3 million people and is known for its rich biodiversity and its resources. It is also a major business and educational hub in the south India

with several industries, educational and commercial institutions. For the study, the investigators have chosen colleges within the 30-40 km radius of the Coimbatore city. Of the selected colleges 17 were arts and science colleges, 11 engineering colleges, 5 polytechnic colleges, 3 teacher education colleges and 2 agriculture colleges.

### RESULTS AND DISCUSSION

From the table 1, it is evident that majority of EE teaching faculties are females (63.41%), age group between 30-45 years (48.75%), residing in urban area (70.73%), possessing doctoral degree (53.66%), lesser than six year experience in the field of teaching (51.22%) and do not possess any EVS/EE related subject qualification (70.73%).

**Table 1**  
*Demographic status of the teachers*

S. No	Variables	Category	No. Samples	Percentage (%)
1	Sex	Male	15	36.58
		<b>Female</b>	<b>26</b>	<b>63.41</b>
2	Age	<30	11	26.82
		<b>30-45</b>	<b>20</b>	<b>48.78</b>
		>46	10	24.39
3	Residence Location	Rural	12	29.27
		<b>Urban</b>	<b>29</b>	<b>70.73</b>
4	Nativity	Native	23	56.10
		Non-native	18	43.90
5	Educational Qualification	UG	3	7.32
		PG	6	14.63
		M.Phil.	10	24.39
		<b>Ph.D.</b>	<b>22</b>	<b>53.66</b>

S. No	Variables	Category	No. Samples	Percentage (%)
6	Teaching Experience	<6	21	51.22
		6-15	12	29.27
		15-25	4	9.76
		>25	4	9.76
7	EVS/EE qualification	Yes	12	29.27
		No	29	70.73

From the table 2, it could be seen that there is a significant difference ( $t = 2.029$ ,  $P = 0.049$ ) among EE teachers while looking at the overall AAP levels with respect to gender. No significant differences are noted in Teachers' Environmental Awareness, EE Awareness, Environmental Attitude,

EE Attitude and their EE subject teaching practices. Male teachers are better in overall AAP level than female teachers. This may be due to male teachers applying wide range of teaching exposure techniques while handling the EE classes than female teachers.

**Table 2**  
***Difference among EE teachers' in various dimensions of EE teaching with respect to gender***

Dimensions	Male		Female		't' value	p-value
	Mean	SD	Mean	SD		
Environmental Awareness	1.200	0.941	1.269	0.827	0.245	0.807
EE Awareness	2.400	0.736	2.730	1.401	0.846	0.403
EnvironmentalAttitude	52.733	4.620	50.230	6.166	1.364	0.181
EE Attitude	39.800	3.509	39.576	4.518	0.164	0.870
Teaching Practices	76.200	16.156	65.961	18.049	1.815	0.077
Overall difference	197.600	20.198	185.076	18.349	2.029	0.049*

Note: \* significant @ 5% level

Table 3, shows that there is no significant differences among EE teachers while looking at their AAP levels with respect to their location of their residence (urban or rural). Urban teachers are better

in overall AAP than those from rural areas are. This may be due to urban teachers are more directly exposed to environmental issues than their counterparts.

**Table 3**

*Difference among EE teachers' in various dimensions of EE teaching with respect to their resident area*

Dimensions	Rural		Urban		't' value	p-value
	Mean	SD	Mean	SD		
Environmental Awareness	1.166	0.7177	1.275	0.921	0.366	0.716
EE Awareness	2.416	1.083	2.689	1.256	0.657	0.515
Environmental Attitude	49.416	5.976	51.862	5.559	1.254	0.217
EE Attitude	38.833	4.174	40.000	4.140	0.819	0.418
Teaching Practices	73.166	12.897	68.275	19.606	0.739	0.433
Overall difference	188.166	17.198	190.275	20.984	0.307	0.760

From the table 4, it could be seen that there is a significant difference ( $t = 3.337$ ,  $P = 0.002$ ) among EE teachers while looking at the EE attitude with respect to their nativity. However, no significant differences are noted in the level of Teachers' Environmental Awareness, EE Awareness, Environmental Attitude and their EE subject

teaching practices. Non-native teachers are better in overall APA level than native teachers. This may be possibly to an extent due to fact that majority of non-native teachers were exposed to EVS/EE subject during their higher education, which was not the case in most native teachers.

**Table 4**

*Difference among EE teachers' in various dimensions of EE teaching with respect to their nativity*

Dimensions	Native		Non-Native		't' value	p-value
	Mean	SD	Mean	SD		
Environmental Awareness	1.260	0.963	1.222	0.732	0.141	0.889
EE Awareness	2.3478	1.11227	2.9444	1.25895	1.609	0.116
Environmental Attitude	50.260	5.154	52.277	6.341	1.124	0.268
EE Attitude	37.956	2.946	41.833	4.475	3.337	0.002*
Teaching Practices	68.434	16.275	71.333	20.123	0.510	0.613
Overall difference	186.043	20.988	194.277	17.566	1.337	0.189

Note: \* significant @ 1% level



Table 5 shows that there is a significant differences among EE teachers while looking at the level of Environmental awareness ( $t = 4.456, P = 0.018$ ), EE awareness ( $t = 4.409, P = 0.019$ ) and EE attitude ( $t = 5.335, P = 0.009$ ) with respect to age group. However, no significant differences are noted in the level of Teachers' Environmental Attitude,

EE subject teaching practices and overall AAP. More than 45 years old teachers are better in overall APA level than teachers in other two age groups, indicating possibly the influence of experience and expertise in EE teaching acquired during the course of their service.

**Table 5**  
*Difference among EE teachers' in various dimensions of EE teaching with respect to their age group*

Dimensions	<30 years		30-45 years		>45 years		F Ratio	p-value
	Mean	SD	Mean	SD	Mean	SD		
Environmental Awareness	1.363	0.504	1.500	1.000	0.600	0.516	4.456	0.018*
EE Awareness	3.454	1.507	2.350	0.988	2.200	0.788	4.409	0.019*
Environmental Attitude	52.090	7.725	50.800	5.237	50.800	4.442	0.197	0.822
EE Attitude	42.4545	4.90640	37.9000	3.32297	40.1000	3.03498	5.335	0.009**
Teaching Practices	61.4545	18.05748	69.2500	16.40242	79.7000	17.23079	3.014	0.061
Overall difference	187.0000	18.20440	186.1500	21.53400	199.6000	15.57919	1.742	0.189

Note: \* significant @ 5% level, \*\* significant @ 1% level

Table 6 shows that there is no significant difference among EE teachers looking at their AAP levels with respect to their educational qualification, even though there is a slight chance of significant difference ( $t = 2.721, P = 0.058$ ) in the level of EE awareness among the groups. Ph.D and

UG degree holders are moderately better in overall APA than PG and M.Phil teachers are. This may be due to the combination of fresh energy in thought process in UG teachers and EE subject expertise in Ph.D holders.

**Table 6**

*Difference among EE teachers' in various dimensions of EE teaching with respect to their educational qualification*

Dimensions	UG		PG		M.Phil		Ph.D		F-Ratio	p-value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Environmental Awareness	1.666	0.577	1.666	0.816	0.900	0.737	1.227	0.922	1.289	0.292
EE Awareness	2.666	0.577	3.666	1.211	2.000	1.490	2.590	0.959	2.721	0.058
Environmental Attitude	50.000	4.582	54.333	7.737	48.300	3.368	51.727	5.824	1.636	0.198
EE Attitude	38.333	1.527	42.333	4.966	38.300	3.164	39.727	4.355	1.336	0.278
Teaching Practices	73.666	20.744	57.666	21.369	65.400	14.198	74.409	17.250	1.748	0.174
Overall difference	192.333	22.678	186.333	24.614	179.600	14.400	194.772	19.544	1.481	0.236

Table 7 shows that there is no significant difference among EE teachers while looking at their AAP levels with respect to their teaching experience (number of years). 15 – 25 years experienced teachers are better

in overall APA than other three group teachers are. This may be because they follow relatively better teaching practices while handling EE subject than their counterparts falling in other age groups.

**Table 7**

*Difference among EE teachers' in various dimensions of EE teaching with respect to their teaching experience*

Dimensions	<6 yrs		6-15 yrs		15-25 yrs		>25 yrs		F-Ratio	p-value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Environmental Awareness	1.238	.830	1.500	1.000	0.750	0.957	1.000	0.000	0.896	0.453
EE Awareness	2.904	1.410	2.250	0.965	2.500	0.577	2.250	0.957	0.905	0.448
Environmental Attitude	50.476	6.353	52.666	5.033	49.250	5.251	52.000	5.354	0.535	0.661
EE Attitude	40.285	4.659	38.083	3.579	40.250	2.872	40.500	3.696	0.813	0.495

Dimensions	<6 yrs		6-15 yrs		15-25 yrs		>25 yrs		F-Ratio	p-value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Teaching Practices	67.476	18.803	70.333	18.157	80.750	16.357	68.500	15.198	0.610	0.613
Overall difference	186.809	18.859	190.250	23.429	201.750	13.524	190.750	19.636	0.634	0.598

From the above table 8, it could be seen that there is a significant difference ( $t = 2.081$ ,  $P = 0.044$ ) among EE teachers in the overall AAP levels with respect to they having EVS/EE subject qualification or not. No significant differences are noted in Teachers' Environmental Awareness, EE Awareness, Environmental Attitude, EE Attitude and their EE subject teaching practices. Non-qualified teachers are better in overall APA levels than the

qualified teachers. This may be due to the non-qualified teachers' extra cautious approach while handling EE subject than the qualified group. Furthermore, it also perhaps suggests that the conventional courses do not inculcate a general value of the environment among the learners and most of the attitudes and awareness about environment is perhaps acquired by direct exposure to issues or through non-formal learning process in life.

**Table 8**

*Difference among EE teachers' in various dimensions of EE teaching with respect to EVS/EE subject qualification*

Dimensions	Qualified		Non-Qualified		t' value	p-value
	Mean	SD	Mean	SD		
Environmental Awareness	1.103	0.817	1.583	0.900	1.662	0.105
EE Awareness	2.551	1.270	2.750	1.055	0.476	0.637
Environmental Attitude	50.137	5.323	53.583	6.141	1.803	0.079
EE Attitude	39.069	3.963	41.083	4.358	1.439	0.158
Teaching Practices	68.862	17.876	71.750	18.533	0.466	0.644
Overall difference	185.689	20.012	199.250	16.085	2.081	0.044*

## CONCLUSION

Environmental Education has been seen as a basic tool to contribute to the change in conceptions, values, and attitudes among people. Hence, it is getting attention from those concerned with the problem

of environmental conservation and sustainable environment. In present global scenario, still India has a long way to achieve environmental quality keeping in mind the welfare of billions of people. The children and youth of India have a major role to play

in realizing the importance of preserving the natural resources and in creating a better India. EE teachers' contributions are very crucial in keeping this objective alive and achievable. In general, teachers are considered instrumental in implementing successful curricula and inculcating values among the younger generation. The present study reveals that the teachers possess positive attitudes towards both environmental issues and environmental education though their awareness of environmental issues was low. Due to their inadequate EE qualifications and exposures, though an array of activities are adopted in EE teaching that were mostly restricted to classroom coaching and to

a lesser extent extracurricular and out of college activities. The present study suggests that teacher in the field of EE must not only have extensive awareness and understanding of environmental problems, but also they must be acquainted to a series of environmental activities. They must be committed "to initiate action, based upon knowledge and understanding". Preferably, teaching appointments for EE must be made from EVS/EE qualified candidates and opportunities should be provided to them for exposure to issues or to people who are directly involved in handling environmental issues. It would also be appropriate that the EE curriculum is also revamped with innovative approaches.

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## ESTIMATION OF VITAL CAPACITY AND VITAMIN 'C'

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### INTRODUCTION

Vital capacity is the maximum amount of air a person can expel from the lungs after a maximum inhalation. It is equal to the sum of inspiratory reserve volume, tidal volume and expiratory reserve volume. A normal adult has a vital capacity between 3 and 5 liters'. A human's vital capacity depends on age, sex, height, mass and ethnicity. Lung volumes and lung capacities refer to the volume of air associated with different phases of the respiratory cycle. Vital capacity does two important things. First, we can maintain and improve our oxygen availability to the brain and secondly, we can keep our lungs open and functioning well enough to minimize the chances of having health problems. The present study aims to estimate the vital capacity of student teachers and the ways of enhancing it through relevant exercises and nutritional intake of vitamin C.

#### Physical exercise and vital capacity

The effect of yoga (asanas and pranayama) and swimming, on the lungs as pulmonary function has been identified as a long-term predicted for overall survival

rates as well as a tool in general health assessment. Both yoga and swimming have been reported to improve the pulmonary functions to a greater extent as both the modalities involve physical activity as well as breathing exercise.

#### Vital Capacity and Vitamin C

Multiple medical studies have found that intake of fresh fruits and vegetables directly improves breathing including general lung function; lung capacity, FEV1 (forced Expiratory volume in one second) and FVC (Forced Vital Capacity). A fresh fruit has also been shown to have a protective effect on respiratory function from decline due to age.

#### Spirometer

A spirometer is an apparatus for measuring the volume of air inspired and expired by the lungs. A spirometer measures ventilation, the movement of air into and out of the lungs. The spirogram will identify two different types of abnormal ventilation patterns, obstructive and restrictive. There are various types of spirometers which use a number of different methods for measurement. It is measured in liters'.

## **Significance of the study**

In these days of increased pollution and prevalence of respiratory problems, this study would have been an eye opener to realize the importance of improving the vital capacity of student teachers through relevant exercises and nutritional intake of antioxidant vitamins especially vitamin C. This would help them to pass on the information as teachers to the future generation.

## **Sample**

A sample of 50 B.Ed., students who volunteered to be the subjects for serum vitamin C assay and measurement of vital capacity were selected for the study.

## **Personal data sheet**

Personal data relating to the subjects age, height, and weight were collected in order to find out the correlates of vital capacity.

## **Measurement of vital capacity**

The PC based spirometer (MIR - Spiro Lab III) was used to find out the vital capacity of the subjects. Each subjects name, age, height and weight were recorded in the PC before the test. The subjects were asked to keep the mouthpiece of the spirometer into their mouth. They were asked to inhale deeply and blow into the mouth piece of the spirometer forcefully until all the inhaled air was exhaled. Individual mouth pieces were used.

The spirometer with PC calculated the vital capacity in accordance with the age, height and weight of the subjects and recorded the same with graphical representation. The printed copy gave the

predicted value, the actually measured value and the percentage of predicted value. The vital capacity is measured in liters. Based on the studies conducted earlier, the percentage of predicted value is categorized as below average (<75), average (76-100) and above average (>100).

## **Intake of vitamin C rich foods**

The top ten vitamin C rich foods were carefully selected and listed in the descending order. And four point rating scale was used to assess the frequency of intake, i.e., frequently, sometimes, rarely and never.

## **Symptoms of Vitamin C deficiency**

Ten symptoms of Vitamin C deficiency were listed and four point rating scale was used to find out the frequency of occurrence of those symptoms, i.e., Always, often, rarely and never.

Both the above tools were validated after being subjected to expert opinion in the field of nutrition.

## **Serum Vitamin C level**

To assess serum vitamin C level, the blood samples of the selected students were collected by technicians from Lister Metropolis laboratory, Chennai (under sterile conditions using disposable syringes for each) where the Biochemical assay of serum vitamin C (ascorbic acid) was done and reported in mg/L.

## **ANALYSIS AND INTERPRETATION**

The data obtained were tabulated and analysed. Correlation co-efficient between vital capacity and vitamin C deficiency symptoms was computed.

## 1. Descriptive statistics

This is used to describe the group under study.

**Table 1**  
*Classification of vital capacity*

S.No.	Vital capacity	Percentage
1.	Below average (<75)	22
2.	Average (76-100)	30
3.	Above average (>100)	48

From the above table, it could be found were below average, 30% average and 48% that the vital capacity of 22% of the subjects above average.

**Table 2**  
*Intake of vitamin C rich fruits and vegetables*

Fruits / Vegetables	Response (%)			
	Frequently	Sometimes	Rarely	Never
Citrus fruits	18	60	20	2
Melons	26	30	34	10
Greens	12	36	36	16
Bell peppers (Capsicum)	0	40	26	34
Cauliflower	10	38	34	18
Cabbage	22	48	28	2
Broccoli	2	18	36	22
Potatoes	50	34	14	2
Tomatoes	70	22	4	4

From the above table it could be found that out of the ten food items rich in vitamin C, 70% of the respondents consumed tomatoes frequently, 60% consumed citrus fruits sometimes, 36% consumed greens, broccoli and sprouted grams rarely and 44% of them never consumed broccoli.

Apart from tomatoes frequently consumed vitamin C rich foods are potatoes (50% of the respondents), melons (26%), cabbage (22%), citrus fruits (18%), sprouted grams (16%), green leafy vegetables (12%), cauliflower (10%) and broccoli (2%).

Sprouted grams which are rich sources of vitamin C are consumed rarely by 36% of the respondents. Commonly available citrus fruits are rarely used by 20% of the respondents.

Broccoli and bell peppers (capsicum) are never consumed by 44% and 34% of the

respondents respectively. These food items which are now available everywhere in the market are rich in vitamin C and have anti-oxidant properties. The respondents were encouraged to take these food items often. Frequent intake of citrus fruits, cabbage and sprouted grams was emphasized to improve vitamin C intake.

**Table 3**  
*Symptoms of Vitamin C deficiency*

Symptoms	Response (%)			
	Always	Often	Rarely	Never
Tiredness	12	26	60	2
Irritation and mood swings	2	28	60	10
Bruised Easily	4	14	56	26
Cold and Fever	2	18	68	12
Bleeding Gums	0	10	22	68
Loosened teeth	2	10	14	74
Wheezing	2	2	10	86
Delayed wound healing	0	2	20	78
Joint and muscle ache	2	8	48	42
Skin Allergy	4	18	18	60

From the above table, it was found that out of the 10 items representing the symptoms of vitamin C deficiency, tiredness was exhibited 'always' by 12% of the respondents, irritation and mood swings 'often' by 28% of them, cold and fever 'rarely' by 68% of them and wheezing 'never' by 86% of the respondents.

Some of the other symptoms which were exhibited 'often' by the respondents were tiredness (26%), cold and fever (18%), skin allergy (18%), getting bruised easily (14%), bleeding gums (10%), loosening of teeth (10%), joint and muscle ache (8%) wheezing (2%), delayed wound healing (2%).



**Table 4**  
**Classification of Serum Vitamin C level**

S.No.	Serum Vitamin C level	Percentage
1.	Very low (<0.5mg/dl)	58
2.	Low (0.5 to 2.0mg/dl)	6
3.	Normal (2.0 to 14mg /dl)	36

From the above table, it was found that 58% of the subjects had low serum vitamin C and 36% of the subjects were found to have normal serum vitamin C levels, 6% of them had very low serum vitamin C levels.

## 2. Inferential Analysis

**Table 5**  
**Correlation between variables**

S.No.	Variable 1	Variable 2	Correlation	'p' value
1.	Vital capacity	Symptoms of Vitamin C deficiency	-0.413	0.003*

Vital capacity is negatively correlated with symptoms of vitamin C deficiency which is significant at 0.01 level. As the intensity of deficiency symptoms increased, the vital capacity of the students decreased. Hence it can be concluded that for effective increase in vital capacity, we should take care to prevent deficiency of vitamin C by improving the intake of dietary vitamin C levels.

## RECOMMENDATIONS TO ENHANCE VITAL CAPACITY

Since the study revealed a negative correlation of vital capacity with symptoms of vitamin C deficiency, the importance of increasing vitamin C rich food intake as a measure to overcome vitamin C deficiency thereby increasing vital capacity was greatly recommended. Since those students whose vital capacity level is 'average' and 'below average' are prone to lung diseases in future, they are advised to do jogging, walking, swimming, cycling and aerobic exercises.

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## A STUDY OF EMOTIONAL MATURITY AND ACADEMIC ACHIEVEMENT OF ADOLESCENTS OF GOVERNMENT AND PRIVATE SCHOOL IN AMRAVATI CITY

5

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### INTRODUCTION

Adolescence is called the age of storm and tension. When, the adolescent is neither a child nor an adult. This is called the age of transformation because several changes. The form of their emotional, social and moral life changes altogether. The characteristics of the childhood start to disappear and new characteristics develop in them. Adolescence is also called period of storming, because the boys and girls face the problems related to family, school, health, profession. As the state of mind of an infant is unstable, so is the case with adolescents. Their behaviour is very changeable. Thus, we see that there are many problems that the adolescents face. In the adolescence stage the students are not emotionally mature. The aims of the seducation is all round development in secondary education the physical, Intectual, mentally girls and spiritual development of boys and girls is essential Emotional development reaches its maturity in adult hood. In these the various emotions such as fear, anger, harted, decimations pleasure etc. can be distinctly seen in an individual

and generally their patterns of expressions com also be recognized emotional reactions to this age are influenced by such complex view points and common ethos of the society. There is a correction between the emotional maturity and achievement. Because the students are weak in emotional maturity, they do not score more marks in the examination and the students who are emotionally strong they score more marks. That means the emotional maturity affects the score of the students, so in the present study researcher has considered the above subject to studied.

Researches on under emotional maturity conducted in India and abroad have to certain areas. Some of the studies are reviewed below Gupta (1980) study of the Emotional Maturity of male and female adolescent school going students the result show that the girl was more sober and well behave as compare to boys. And boys behave more openly and more interested in bold activities. Bheena (1986) to study whether Emotional Maturity and academic achievement of the three group of students. Emotional Maturity

was related to their in discipline behavior and Emotional instability was related to behavior in classroom. Emotional regression was related to student's union activities. The emotional unstability was related home environmental and economic condition Sabapthy, T. (1986) examined the relationship between the variables anxiety, emotional, social maturity, socio-economic status and academic achievements of students. He noted emotional maturity was positively and significantly related to achievement in individual subjects and academic achievement in particular. Cherian,V.( 1990) noted that there was no significant relation between the frequency of punishments experienced by pupil and their academic achievements.

### STATEMENT OF THE PROBLEM

A study of emotional maturity and academic achievements of adolescents of government and private school in amravati city.

### HYPOTHESES OF THE STUDY

- There is no significant difference between the Emotional Maturity of student's government and private school students.
- There is no significant difference between the Emotional Maturity of boys and girls of government school.
- There is no significant difference between the Emotional Maturity of boys and girls of private schools.
- There is no significant difference between the Academic Achievement

of students of government and private schools.

- There is no significant difference between the Academic Achievement of boys and girls of government school.
- There is no significant difference between the Academic Achievement of boys and girls of private school.

### METHODOLOGY

The present research paper deals with a study of Emotional Maturity and Academic achievement of government and private school in Amravati city. For the present research work Test developed by Dr. Sign and Dr. Bargave (1987) has been used. Sample of Amravati city was selected for the study. The selected 50 students as a sample of government and private school respectively. Academic Achievement scores have been taken of ninth standard students of final examination. Total sample of 100 students has been collected governments and private school. Survey research method has been used. The data was analyzed using Mean, S.D., t-test. The finding of the study revealed that Emotional Maturity and Academic Achievement differ significantly between students of government and private school.

### Statistical analysis and interpretation hypothesis wise:

**Hypothesis -1:** There is no significant difference between the Emotional Maturity of of government and private school students.

**Table: 1**

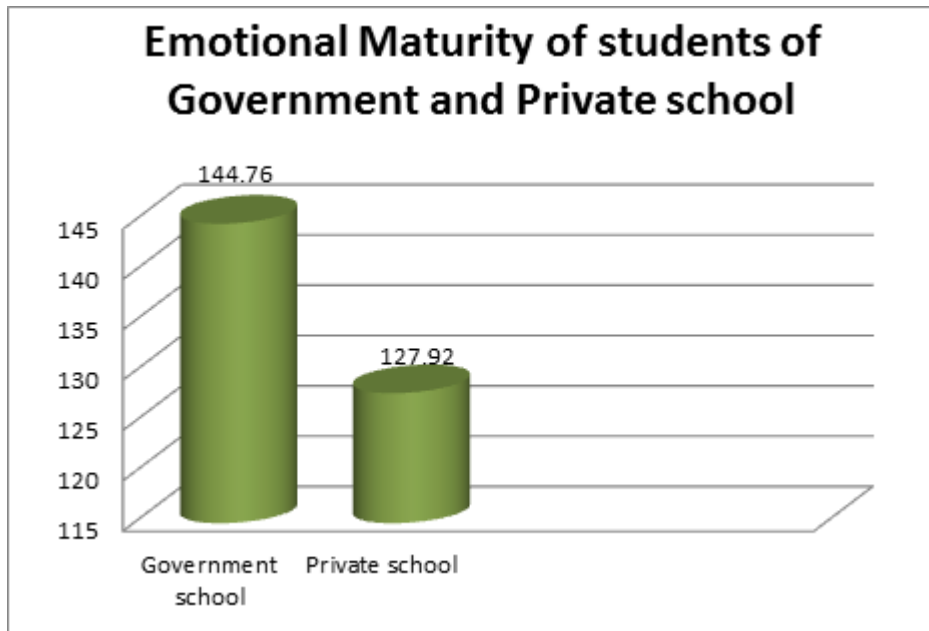
***The significance to 't' value between students of government and private school in respect of their academic achievement***

<b>Variables</b>	<b>Number of Students</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>'t' value</b>	<b>Level of significance</b>
Students of Government school	100	144.76	43.0629	2.92	0.05
Students of private school	100	127.92	49.7130		0.01

Table 1 shows that the calculated 't' value is 2.92 which is greater than table value at 0.05 and 0.01 level of significance. Hence the hypothesis is rejected. That means there is a significant difference between the Emotional Maturity of students of government and private schools. It is clear

that Emotional Maturity of government school students is better than the private school students. The reason may be that the teachers in governments schools are very strict than the teachers of private schools. It is clear from the diagram also.

**Graph No: 1**



**Hypothesis-2:** There is no significant difference between the Emotional Maturity

of boys and girls of government schools.

**Table: 2**

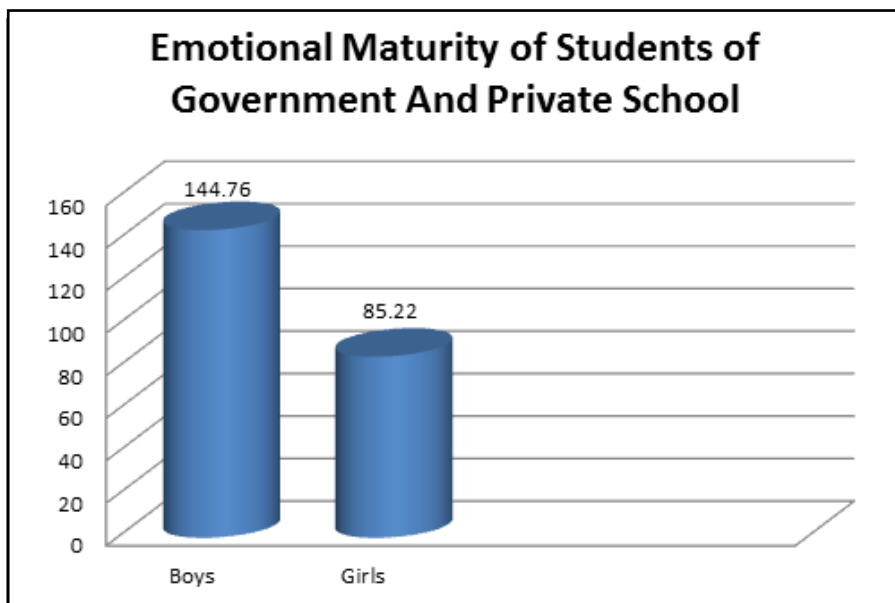
*The significance to 't' value between boys and girls of government school in respect of their emotional maturity*

Variables	Number of Students	Mean	Standard Deviation	't' value	Level of significance
Boys of Government School	50	146.44	30.8633	4.47	0.05
Girls of Government School	50	85.22	15.6366		0.01

Table 2 shows that the calculated 't' value is 4.47 which is greater than table value at 0.05 and 0.01 level of significance. Hence the hypothesis is rejected. That means there is a significant difference between the Emotional Maturity of boys and girls of government school. It is clear that Emotional Maturity of boys is better

than the girls of the government school. The reason may be that government school boys are stronger in emotional maturity than the girls. Now-a-days the boys are becoming very strong and they are ready to face the problems than the girls. It is clear from the diagram also.

**Graph No: 02**



**Hypothesis -3** There is no significant difference between the Emotional Maturity of boys and girls private schools.

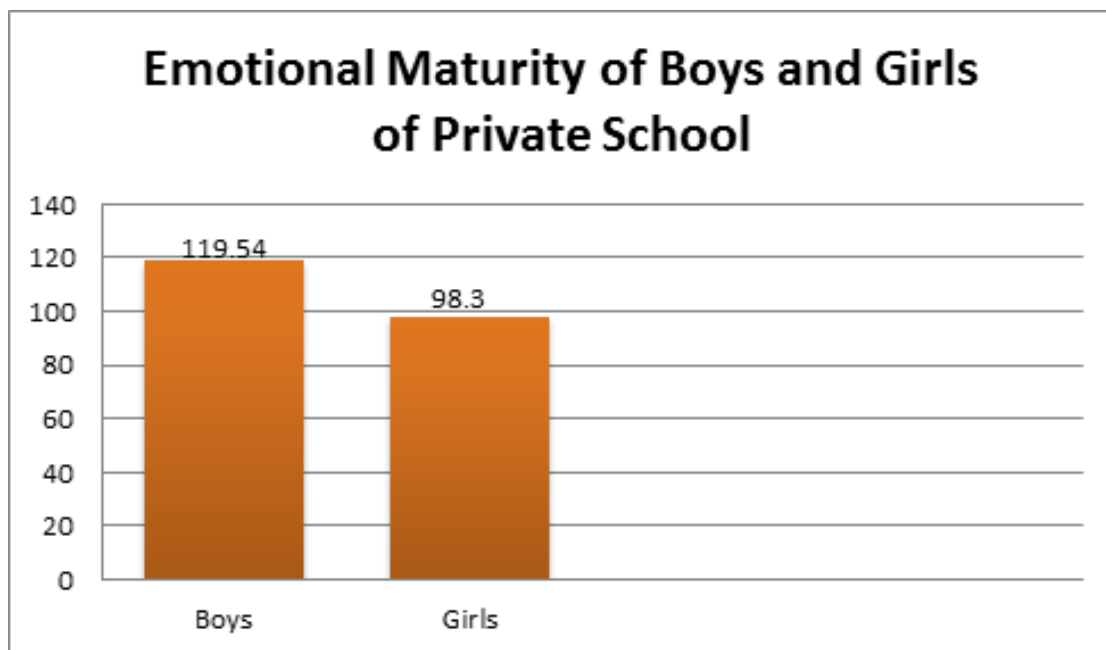
**Table: 3**

*The significance to 't' value between boys and girls of private school in respect of their emotional maturity*

Variables	Number of Students	Mean	Standard Deviation	't' value	Level of significance
Boys of Private School	50	119.54	51.7826	1.14	0.05
Girls of Private School	50	98.3	40.2950		0.01

Table 3 shows that the calculated 't' value is 1.14, which is less than table value at 0.05 and 0.01 level of significance. Hence the hypothesis is accepted. Thus, we can say that both groups are similar and there is no significant difference between the emotional maturity of boys and girls of private school. In the private school teachers give same treatment to boys and girls. Now a days treatment are given to the boys and girls same by the parents. It is clear from the diagram also.

**Graph No: 03**



**Hypothesis-4:** There is no significant difference between the Academic Achievement of student's government and private schools.

**Table: 4**

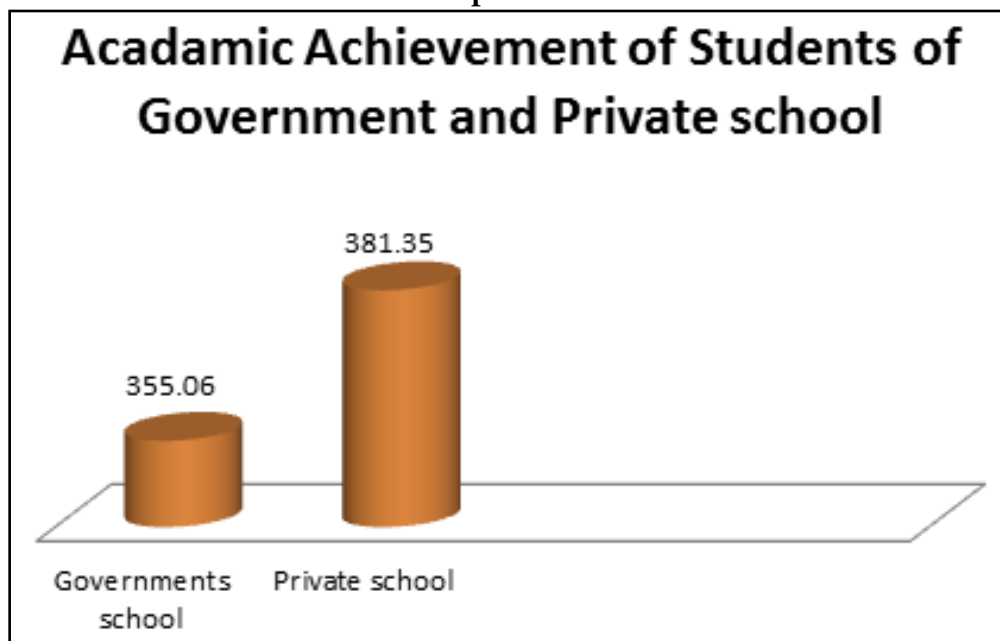
***The significance 't' value between students of government and private school in respect of their academic achievement***

Variables	Number of Students	Mean	Standard Deviation	't' value	Level of significance
Students of Government School	100	355.06	126.6784	6.62	0.05
Students of Private School	100	381.35	120.5839		0.01

Table 4 shows that the calculated 't' value is 6.62 which is greater than table value at 0.05 and 0.01 level of significance. Hence the hypothesis is rejected. That means there is a significant difference between the Academic Achievement of students of governments and private school. It is clear that of Academic Achievement

of private school students is better than the government school students are more conscious about academic performance and they get more facilities and the teachers of private school give more attention towards the students than the government school students. It is clear from the diagram also.

**Graph No: 04**



**Hypothesis -5** There is no significant difference between the academic achievement of boys and girls government school.



**Table: 5**

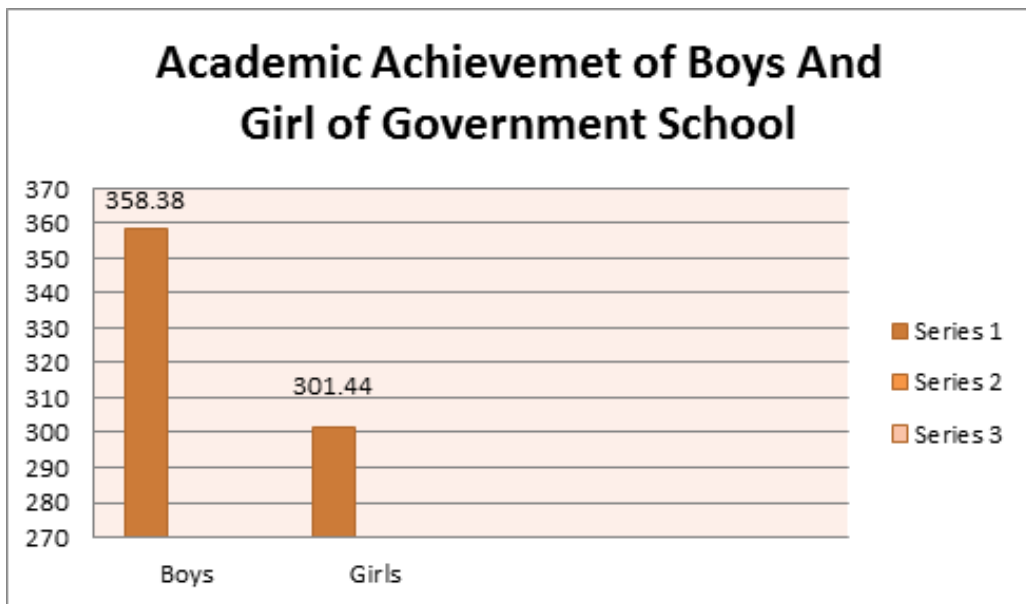
***The significance 't' value between boys and girls of government school in respect of their academic achievement***

<b>Variables</b>	<b>Number of Students</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>'t' value</b>	<b>Level of significance</b>
Boys of Government school	50	358.38	110.3676	2.57	0.05
Girls of Government school	50	301.44	111.6447		0.01

Table 5 shows that the calculated 't' value is 2.57 which is greater than table value at 0.05 level of significance. Hence the hypothesis is rejected. That means there is a significant difference between the Academic Achievement of boys and girls of government schools. It is clear

that Academic Achievement of boys of the government school is better than the girls of government school. The reason may be that the boys of the government school are more conscious about academic performance than girls and they are very regular in their study than the girls.

**Graph No: 05**



**Hypothesis - 6** There is no significant difference between the Academic Achievement of boys and girls of private schools.

**Table: 6**

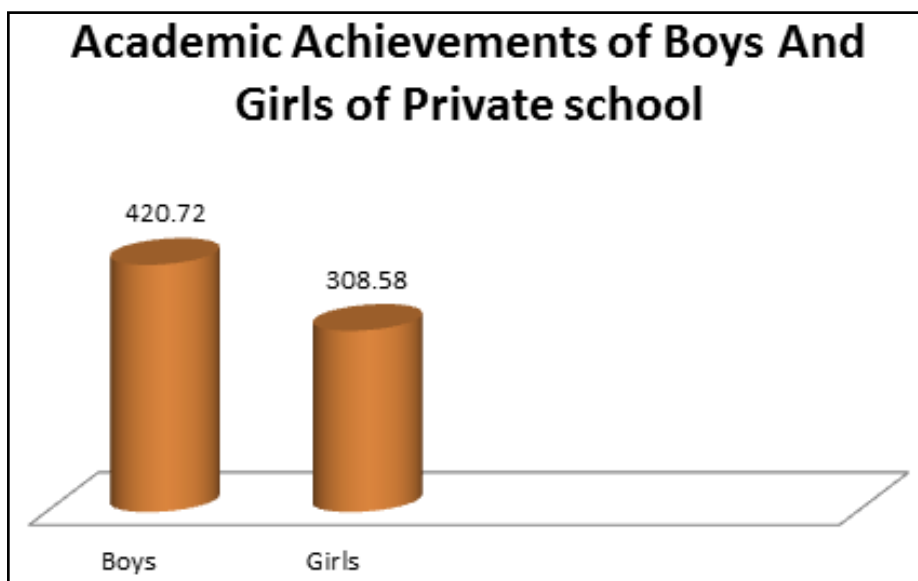
***The significance to 't' value between boys and girls of private school in respect of their academic achievement***

<b>Variables</b>	<b>Number of Students</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>'t' value</b>	<b>Level of significance</b>
Boys of Private School	50	420.72.	104.2087	4.60	0.05
Girls of Private School	50	308.58	106.5882		0.01

Table 6 shows that the calculated 't' value is 4.60 which is greater than table value at 0.05 and 0.01 level of significance. Hence the hypothesis is rejected. That means there is a significant difference between the Academic Achievement of boys and girls

of private school. It is clear that Academic Achievement of boys is better than the girls. The reason may be that boys are very sincere and regular in their studies than girls. Hence, boys score more than the girls.

**Graph No: 06**



**CONCLUSIONS**

➤ There is a significant difference between the Emotional Maturity of student of government and private schools. Emotional Maturity of government

school students is better than the students of private school.

➤ There is a significant difference between the Emotional Maturity of boys and girls of government school.

Emotional Maturity boys is better than the girls of the of government school.

- There is no significant difference between Emotional Maturity of boys and girls of private school. In private school give same treatment to boys and girls so also their emotions are same.
- There is a significant difference between the Academic Achievement of students of government and private school. Academic Achievement of student's private school is better than the government school students.
- There is a significant difference between the Academic Achievement of boys and girls of government school. Academic Achievement of boys of the government school is better than the girls of government school.
- There is a significant difference between the Academic Achievement of boys and girls of private school. It is clear that Academic Achievement of boys is better than the girls.

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## COMMUNICATION IN MATHEMATICS LEARNING AND WAYS TO DEVELOP IT IN THE CLASSROOMS

6

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### INTRODUCTION

“Teachers can stimulate student’s growth of mathematical knowledge through the ways they ask and respond to questions” (Piccolo, Harbaugh, Carter, Capraro, & Capraro, 2008, p. 380). According to NCTM (2000), “Teachers must help students clarify their statements, focus carefully on problem conditions and mathematical explanations and refine their ideas” (p. 351).

All teachers can help students to be comfortable in classrooms. The more comfortable they are, the more they may be willing to communicate. “Teachers are encouraged to provide opportunities for students to discuss their ideas about mathematics and to listen closely to what students say” (Sherin, 2000, p. 122). It is important to listen to students when they communicate so they can be encouraged and helped in their task of solving mathematical problems.

Communication is not just vital for the mathematics classroom, but in all classrooms. All educators know the importance of being able to communicate with students, to have students communicate with one another, and to have students

understand what they are communicating about. “The need for meaningful classroom discourse is now universally accepted among educational researchers and teachers are encouraged to use ‘higher order’ questions” (Kabasakalian, 2007, p. 843). Both oral and written communications are key skills for any student. Educators have to be willing to push students to become good communicators.

Capraro and Joffrion (2006) discuss how children can learn the meanings of words through everyday experiences using both oral and written language. Capraro and Joffrion were interested in determining the success rate of middle school students when translating written words into algebraic equations. They researched seventh and eighth grade students for a year by giving pre-tests and post-tests that consisted of multiple choice and short answer questions. Students need to have time to process information that is given to them, either through oral or written communication. The results of the research showed that students need to understand the information given before solving the problem. “Reading in mathematics necessitates that one understand the

meaning of the words” (Capraro and Joffrion, 2006, p. 162).

The symbolic nature of mathematics is one of the most evident features of mathematics (Pimm, 1987). The importance of language in the learning of mathematics has always been underestimated as mathematics has always been thought of as a solitary subject, and the belief that mathematics is mechanical, not creative. However, this thinking is slowly changing with the emphasis on process-based teaching approach represented by communication in the classroom. Developing classroom communication is important because it helps in the development of thinking ability. Mathematics is the most appropriate subject to develop communications because both mathematical way of communication and mathematical thinking is necessary for students to achieve success in life especially when working in real-life.

### **Focus On Mathematical Communication**

With the adoption of a constructivist philosophy, mathematics educators now advocate more active learning on the part of students and a more facilitative role for teachers. A key component of most new instructional strategies is that students are expected to discuss mathematics with their peers and their teachers. This new emphasis upon mathematical communication is a challenge for teachers and students in classrooms everywhere. Esty (1992) regarded the language used in mathematics as both a means of communication and an instrument of thought. Communication is one of the processes that need to be developed with the teaching of

mathematical content. In fact, together with mathematical thinking, the ability to communicate, findings and provide explanations is considered as an important outcome of education.

According to Esty (1992), the mathematics provides a powerful means of communication which can be used to present information in figures, tables, charts, graphs and symbols and the process of communication is to be developed at the same time with the teaching of mathematics content together with other skills such as mathematical skills and problem solving. Among the main aims stated in the mathematics curriculum is to develop children’s ability to interpret and communicate mathematical ideas. In addition, the document also stated that among the main objective of the curriculum is to provide learners with the opportunity to develop the ability to communicate mathematical ideas clearly and work with others and value their contribution.

### **Teacher Communication**

Good communication skills start with the teacher. “We know that mathematics instruction should be more than teachers’ writing on their chalkboards and explaining algorithms as they solve problems, hoping that students can follow along” (Piccolo, Harbaugh, Carter, Capraro, & Capraro, 2008, p. 376). Piccolo and others researched student communication with peers and with teachers. During the three-year study, mathematics classrooms were videotaped to look at teacher-student discourse. The videotapes were then coded for the different types of questions that the teachers used

to engage students in more meaningful discourse.

In the study, it was determined that the teachers dominated the conversations when conversing with students. The students simply responded to the teacher's questions without asking a lot of new questions. The students did a better job of communicating with their peers. They were able to talk about the material being taught and made a lot of mathematical advancements in their discussion with their peers. Knuth and Peressini (2001) state that "in any social interaction involving spoken communication, each individual must both decipher what is said and generate his or her own meaning from it" (p. 325).

### **Components of Mathematical Communication**

Communication in mathematics can be in the form of argumentation as well as communication where argumentation involves knowing what mathematical proofs are, while the latter involves expressing oneself. The sub-processes of communication are written communication, oral communication and using ICT. It can be contended that we need both oral and written communication to argue and communicate about mathematics and with the presence and popularity of the new technology; ICT can be brought in to help make communication effortless. ICT is helping children to communicate better especially for students with English as a second language. As mentioned before, language is considered as an instrument of thought, and many studies have shown that the interaction of the procedural knowledge

and language facility in mathematics significantly contribute to conceptual development (Aiken, 1972).

Therefore, communication through language would benefit students to make sense of topics in mathematics taught by teachers through procedural knowledge. Mathematics teaching style has been critiqued as very procedural and algorithmic and students resort to rote memorization in preparation for examination. Communicating in mathematics classes is supposed to change this situation and make students learn with better understanding. Conceptual understanding develops when students reason out or justify their thinking using the language of mathematics, which is made up of the everyday language used together with a set of special vocabulary, symbols, tables, graphs etc.

### **Social Constructivism and Language**

From the social constructivist perspective, cognitive development of mathematics in a classroom is socially constructed by students from their past experiences and from teachers through communication. It is therefore necessary for students to participate actively in a conversational interaction that goes in a mathematics classroom to be able to "make sense" of mathematics. For Vygotsky (1978), "thought is not merely expressed in words; it comes into existence through them" (p. 218). A student working alone on a problem depends entirely on self-mediation of previously appropriated mathematical knowledge, while another student working with friends and employing teachers' help

receives additional help from interactive mathematical meaning mediation.

Vygotsky (1978) again stressed that learning takes place when the learner first collaborates with an adult or more competent peer to accomplish a task just beyond the learner's level of independent functioning, within the "zone of proximal development." The question remains as to what is the implication of the social constructivist philosophy to students studying mathematics in a second language and what are the best approaches for them to feel comfortable communicating.

### **Approaches to Develop Communication in Classrooms**

In any mathematics lesson, communication cannot be separated from problem solving and mathematical thinking. In a problem solving process, besides playing a role as an instrument for thinking mathematically, language is also important for verbal representations, and together with other representations such as diagrams, concrete materials, symbols, and ICT, students should be communicating effectively. A study conducted by Martin (1996) in Brunei reported that students are reluctant to speak in class and he said that apart from the choral chanting, there is very little verbal output by students in the classroom, which to him is a disturbing feature. He added that when there is verbal output it is very often in the form of simple verbal recall statements. Single word responses generally do not promote students' thinking ability. Is it the language or culture which is abtaining our students from speaking up. The truth is that despite

being very expressive, pupils are not used to giving their views in a classroom setting. The following activities will be helpful for a teacher to improve and enhance motivation in daily classrooms:

#### **1. Co-operative Learning**

Small group format is also favored by Brenner (1998), who thinks that for many language minority students in California, it may prove to be a comfortable and culturally appropriate instructional format. This is also the format for cooperative learning, which can be a recommended learning technique for students.

#### **2. Honouring Student Voice in the Mathematics Classroom**

The students discuss the importance of perseverance and of learning from their mistakes. As they work, they question and challenge each others' thinking and clarify, explain and justify their solutions. They demonstrate how to listen, how to withhold judgment and how to disagree respectfully. They deepen their understanding of the mathematics through focused conversation. Constructive and meaningful working relationships have been developed, creating engaged and motivated learners who give voice to their individual and collective thinking. Learning from children's voices allows us to know a deeper level of children. They are learners and, because we have that knowledge, to expand and enrich our sense of what it means to teach."Oldfather, 1995.

### **3. Plan for Math by Doing Math**

Solving the problem featured in this resource is a critical step in laying the groundwork for active engagement with the mathematical ideas and conversations that thread their way through the segments. This segment shows the teacher introducing the problem to the class and asks viewers to pause the video to solve the problem themselves. Working through a problem and solving it in more than one way before the lesson helps educators to begin to decompress their own mathematical knowledge and understandings. The students explore the relationship between volume and surface area as they solve problems.

### **4. Language and Communication in Assessment**

The emphasis of communication should be reflected in the assessment and evaluation methods. Continuous school-based assessment is supposed to include assessment tasks that have the communication component and are as follows:

- Class discussions or oral presentations
- Written assignments
- Creative work
- Use of ICT

### **5. Assessment for Learning and Communication**

In this segment, the teacher talks about how she manages assessment in the mathematics classroom. She stresses

the importance of gaining information through observing, listening, questioning and conversing with students. In this way, the teacher makes informed decisions about next steps for the class. The students comment on how their interactions with their teacher support their learning.

### **6. Open-end Questions**

Piccolo, Harbaugh, Carter, Capraro, & Capraro, (2008) agrees that questions requiring only short one-word answers are insufficient to generate discussion and suggests: "One method of stimulation is asking open-ended questions that are designed to initiate problem solving and aid conceptual understanding" (p. 380). It is important to ask students questions that allow them to show their understanding of the math content, and to this end, teacher listening skills are important (Piccolo, Harbaugh, Carter, Capraro, & Capraro, 2008). It is also important, as Kabasakalian (2007) suggests, that teachers have a good understanding of the mathematical content teaching.

### **7. Discussion in the Classroom**

Sherin's (2000) study looked at one teacher's attempt to encourage more student discourse in the classroom. The teacher in the study, experimented with different techniques in order to encourage more discourse in the classroom. He wanted his students to be able to lead discussions while sticking to the mathematical concepts being taught. "Teachers are encouraged to provide opportunities for students to



discuss their ideas about mathematics and to listen closely to what students say” (Sherin, 2000, p. 122).

### **8. Give weight to student voice through dialogue.**

When engaging students in dialogue, we give their voice the weight required for them to develop critical thought as they clarify, articulate, justify and synthesize their ideas. Dialogue involves responding to others’ ideas, sometimes in agreement, sometimes not. It is in this “bumping of ideas” that students’ knowledge and understanding will grow. As teachers, we support this process by inviting different students to contribute and to rephrase what others have said. Sometimes the teacher will “revoice” students’ contributions to help the progression of the dialogue. Dialogue occurs among all members of the learning community; students talk back and forth with each other, not just in response to teacher prompts. They may question each other’s ideas and clarify their own, thus deepening the conceptual understanding of the group.

### **9. Focus on student solutions and interpretations.**

In dialogue, we shift our focus away from the answer as being the point of discussion to processes and strategies. Even when a student gives a correct answer or fully explained account, we ask, “How do you know that?” or “Tell us more about this!”, to ensure the thinking is solid. When a student gives an incorrect answer or an incomplete account, asking questions and

inviting other students to share their perspectives helps clarify the thinking.

Dialogue that is centred on student solutions and interpretations supports the idea that concepts and ideas are connected to one another and that there are multiple ways to view a problem or interpret a text. Students are expected to support their thinking with evidence and examples from their work and the work of others. As students become used to looking beyond the answer and/or the interpretation, they will begin to see the similarities and differences in the various solutions. When they learn to disagree respectfully with the ideas of others, their own conceptual understanding will deepen. Viewed from this perspective, diversity becomes strength.

When students are investigating options for dealing with bullies, victims and bystanders, they may take different perspectives to develop a realization of the responsibility for fairness and respect that they all share.

### **10. Encourage real-world problem solving.**

When students are given opportunities to solve real-world problems that are important and relevant to them, they see the significance of the real world in their school learning environment. Students are naturally curious, and when they are intellectually engaged, they are developing the higher-order thinking skills and habits of mind that lead to deep learning. Asking questions and engaging in dialogue to

make sense of information also helps students to stay on task and persist in their efforts to understand and solve a problem. Instructional strategies to support the creation of learning environments conducive to real-world problem-solving might include: Selecting interesting problems that connect to students' experience and life outside of school and will engage their imagination. Encouraging collaborative learning and creating intellectual spaces for students to engage in rich talk about their thinking and learning.

in it provides access to the whole world of mathematics" (Esty, 1992, p. 32). Much of the attention to mathematical discourse focuses on students' ability to communicate by clarifying and justifying their ideas and procedures (National Council of Teachers of Mathematics, 2000). However, the teacher's role in fostering productive mathematical discourse in the classroom is central. In addition to being responsible for creating the opportunities for students to engage in discussions, exploring, negotiating, and sharing knowledge (Manouchehri & Enderson, 1999), the teacher's own use of language in the mathematics classroom serves as an important example of effective communication.

## CONCLUSION

Language plays a key role in the mathematics classroom. In fact, "fluency

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## OPEN BOOK EVALUATION SYSTEM TO IMPROVE THE COGNITIVE AND ANALYTICAL SKILLS OF THE STUDENTS OF B.ED. IN SOCIAL SCIENCE

7

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Scope of evaluation at present is excessively quantitative in nature. It is not Continuous and Comprehensive, it does not cover entire gamut of conceptual dimensions. It is confined mainly to rote learning.

There is a dire need to move away from rote-learning to understanding of **Concepts, developing good comprehension and communication skills and learning to access knowledge independently.** This requires substantial changes in the Examination system at every level.

A fresh thinking has to start in the process of evaluation. Open book Examination may be a good alternative for new tryout and it can be a new challenge to teachers. Self assessment is another aspect which could be introduced with this. Here not only learning outcomes are evaluated but also process of learning experiences.

**Purni Krishna kumar**, consultant special educationist and psychologist said that the new evaluation pattern will improve the **cognitive and analytical skills** of students if implemented properly.

The student is evaluated based on understanding of the content rather than the recall and memorization. The students are expected to apply the knowledge to new situations by analyzing the elements of the content and their relationships.

**K. P. Mohan** in his book “Open Book Examinations” has spoken a lot about the importance. An “open book examination” is one in which examinees are allowed to consult their class notes, textbooks, and other approved material while answering questions. It is ideally suited to teaching programme that especially aim at developing the skills of **critical and creative thinking.**

Teaching should equip students with the ability to acquire knowledge, to modify existing knowledge on the basis of new experience, to build new knowledge, and to apply available knowledge to solve problems and make intelligent decisions.

If we accept this view of education, then the main focus of teaching will be on the **skills of acquiring, modifying and creating knowledge**, that is, on

**processing information, rather than on the information itself.**

In other words, the focus shifts from rote learning to the development of certain mental faculties. The teacher's function then is not summarizing the information of the textbook but ensuring an environment that triggers the development of the **creative and critical faculties.**

This can be done by activating learning through questions, exercises, projects, assignments, and so on, and sustaining and guiding it by providing comments, criticisms, and other forms of feedback.

### **There are Two Types of Open Book Examinations:**

One is **restricted type** and the other is **unrestricted.** In the **restricted type** of open book examinations, students are permitted to bring into the examination room one or more specific documents approved by the course instructor.

In this kind of open book examination teacher prepares the question paper to implement in the class room. The time is limited; it can be given to any subject and to any class.

In the **unrestricted type** of open book examinations, students are free to bring whatever they like. In the restricted open book examination, students may be permitted to consult printed Documents such as the logarithmic tables, dictionaries, etc, but no handwritten material or printed

documents which have not had prior approval.

They do not present any special problems, irrespective of the nature of the course. The use of such examinations presupposes certain teaching strategies and types of questions. In particular, it demands that the course focuses on a set of intellectual skills, rather than on the information content, and that no content based questions be asked in the examination.

If the course instructor has concentrated on handing down currently available knowledge, and the question paper contains traditional content based questions like "Write an essay on the difference between British and American English", the use of the unrestricted open book examinations would be disastrous.

When used properly, it will be pointless for students taking the unrestricted open book examinations to consult any material they have brought, because the **questions will be designed in such a way the answers will not be found in the textbooks, handouts or class notes.**

An intelligent student who has had the experience of such examinations once, will not bother to bring anything for the next examination, since (s) he will know that no prepared material will be of any use. The use of **these examinations then acts as symbolic gesture that makes the students realize the nature of the course and the examinations, and shocks them into a**

## **mode of studying that does not involve cramming.**

A more important reason for using open book examinations is that they have a tremendous impact on promoting the right mental sets in both learning and teaching. The most immediate result on students will be that they will stop “mugging” or rote learning. Most students used to conventional examinations think of “studying” as the mechanical memorization of information in textbooks and class notes in order to reproduce it in examinations. Open book examinations will effect a fundamental change in this attitude. If textbooks can be consulted in the examination rooms, why bother to memorize them?

Does this mean that students don't need to “study” for examinations? No. **It implies that studying should not be equated with memorizing; instead, it should be of understanding of concepts, and using these concepts (along with available information) to practice the skills of modifying and building knowledge, thinking critically, and solving problems.**

Given open book examinations, there will be no more mugging. Once the burden of mugging is taken away, education can be a **pleasurable activity**, not a painful drudgery. What is learnt with pleasure is learnt more effectively, and retained better.

If the nature of the **questions** changes, strategies for preparing students to take those examinations will also have to change. Teachers will have to design tasks that will

provide exercises for the appropriate mental skills required in each subject. Instead of the teacher talking all the time and students taking down notes, classes will have discussions, questions, and other active processes. In other words, teaching will no longer be the transfer of information from the teacher to student: it will be the training of the mind in certain intellectual skills. Thus, open book examinations can restore the true meaning of the word education for both teachers and students.

Bases for Criteria for Evaluation may include: Observing learners and Observational records, Checklists, rubrics, open-ended questions may also guide the student in his/her self-assessment.

### **Rubrics:**

Rubrics are scoring guides or sets of expectations used to assess student's level of understanding and allow students to know the expectations to learn at a higher level. It is true that it will take some time and effort on the part of students and teachers to adapt themselves to the demands of open book examinations. But the changes will be inevitable. When combined with the mode of teaching that focuses on thinking skills, they will make education an exciting and enjoyable intellectual adventure, the beginning of a lifelong quest for knowledge.

The efforts are made to know the actual implementation of this new technique of evaluation at B.Ed. level in social science content Knowledge. The emphasis in this investigation has been made to find out

that open book **evaluation really develops cognitive and analytical skills among students of Social science.**

Teachers of Social Science should equip students with the ability to acquire **knowledge, to modify existing knowledge on the basis of new experience, to build new knowledge, and to apply available knowledge to solve problems and make intelligent decisions.**

### **OBJECTIVES OF THE STUDY**

1. To study the process of conducting open book examination and developing cognitive and analytical skills.
2. To study the effectiveness of open book evaluation technique in the development of cognitive and analytical skills.

### **HYPOTHESIS**

There is no significant difference in the development of cognitive and analytical skills with the use of open book evaluation system.

### **Variables**

- Independent variable: open book evaluation technique.
- Dependent variable: cognitive and analytical skills.

### **Research Design of the study**

The study was experimental in nature and involves two groups of students' i.e.

### **Experimental and control group.**

- To the Experimental group, the text books of IX STD social science were

given along with some critical thinking questions to answer. the analytical and critical thinking skills are assessed.

- The rote memory of Control group was assessed with regular technique of evaluation.

### **Sample**

The present study was focused on the B.Ed., student trainees. The students of social science pedagogy were divided into two groups with 20 students in each group.

### **Tools**

Two different Question papers were prepared for social science topics, one is open ended and another traditional (developed by the investigator). The data collected from both the groups is assessed later.

### **Findings**

Many students were tensed in the beginning, few relaxed, few tried to exchange their books, some took it seriously and after some time later, each one started thinking, analyzing the questions and they got engrossed in writing on their own answer.

When the answer sheets were assessed and the key was told to the students, they understood that there are no readymade answers for the questions and they have to analyze the question and write the answers with their own comprehension.

A **rubric** (developed by the investigator) was used to assess cognitive and analytical skills developed through this experimental intervention.

Observation details of the students performance	Able to Respond %	Unable to Response %
Comprehend the meaning by identifying the issues from facts and figures.	90	10
Analyze the issues with various examples or situations	82	18
Having their stand with the general visual Perception of the issue	92	08
Gave Reasonable arguments for their perspectives	80	20
Logically concluded with the probable Solutions and Synthesize	68	32

The above analysis reveals that the objectives of cognitive and analytical thinking skills were fulfilled by open book evaluation technique.

The result of the study revealed the superiority of inquiry open book evaluation technique verses Traditional Method. By having positive effect on experimental group, this technique has produced a great effect on students thinking. So it is more psychological to view this as a **highly effective learning technique, which helps in development of cognitive and analytical thinking ability.**

The repeated open book tests developed healthy respect for knowledge and thinking with the involvement of students **in genuine issues of inquiry.** It was one of the most effective teaching-learning strategies used in social sciences to make learning a joyful activity. The study encouraged students to develop their own rational faculties, by inviting them to design the ways of overcoming the issue.

## LIMITATIONS

1. This approach is tailored to B.Ed. teacher trainees.
2. This model demands mastery over social sciences
3. This model demands lots of teacher's instructions and psychological support.

## CONCLUSION

Today Information Technology plays an important role in providing children with various opportunities to learn to the fullest possible extent. The atmosphere which is created with inquiry oriented approach provides sufficient motivation to the learners to learn with sustained attention, interest by active involvement. This study has provided opportunities for generating ideas to design innovative strategies, and it also throws light on the emerging trends and application of new techniques in teaching learning process.



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