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NCERT BIOLOGY TEXT BOOK OF CLASS XII – A CRITICAL ANALYSIS

1

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INTRODUCTION

Curriculum materials are central elements or the main means to achieve the purpose of education. Having appropriate curricular materials like textbooks, teacher's guide helps to promote student centred learning and ensure quality education. In designing curricular materials, it becomes very important to recognize the inevitability of mixed groups in terms of proficiency and also in terms of preferred learning styles, so that they can be used in variety of ways. Science education is an important component of education for all learners not only for future scientists. Although only a small percentage of students are destined to follow scientific careers and every person needs some understanding of science, mathematics and technology to succeed in today's technologically oriented world, (Lederman, 2008).

Science education of high quality is therefore, essential not only to prepare learners to enter scientific careers but to contribute to providing the country with a scientifically literate population that can address the global challenges that humanity now faces, (wieman, 2007). In this regard science education aids the realization of

the learner's potential and contributes to the development of our country's human resources.

Despite the increasing role that computer technologies play in many class rooms, the importance of textbook endures. In majority of schools textbook is the prime curriculum resource and in Indian science class rooms, National council of educational research and training (NCERT) science textbooks are the only instructional tool available. Therefore the quality of these prescribed textbooks should be a major policy concern.

Text book is the most significant tool in the teaching- learning process and is the guide for teachers and students. A text book is usually regarded by educators throughout the world as a good source of information for teaching. Abimbola and Baba (1996) stated that 90% American biology teachers use a textbook 90% of the time. In India too science teachers depends on text books for the appropriate content materials that satisfy the requirements of the science syllabus and the national curricula. Text books are a part of the large social process and to serve to legitimize a view of science conveying the approach for

understanding and teaching of science by providing tasks, questions, problem and other informations (Apple and Christian-smith, 1991). Anderson (1950) in his work, “principles and procedures for curriculum”, emphasized the use of text book as a resource and a common base for study and investigation.

The current text of biology of class xii, introduced by NCERT in the year 2006 deals with the physiological process of reproduction in flowering plants and humans, the principles of inheritance, nature of genetic materials and its function, contributions of biology to human welfare, basic principles of biotechnological processes, applications and achievements and finally ecology. The text book development committees establish that, book is prepared keeping in mind the guidelines of NCF-2005, especially the emphasis on reducing the learning load. So a thorough study of the text book is necessary to check whether the guidelines are followed or not and also with the norms of American association for the advancement of science (AAAS) and NIED-2005. So the investigator proposed a critical analysis of the text book of biology of class xii.

OBJECTIVE OF THE INVESTIGATION

The objective of the investigation was to analyze critically the biology text book of class xii developed by NCERT based on identified criteria with respect to NCF 2005, American Association for the Advancement of science (AAAS) 2016

and National Institute for Educational Development (NIED)- Namibian 2005.

METHODOLOGY

The investigation followed analytical method of research involving document analysis which is associated with the analysis or systematic analysis of documents as sources of data like text books, editorials. To full fill the characteristic features of the analytical study, a comprehensive and systematic analysis of the text book was done, based on identified criteria. The text book was analyzed with reference to physical aspects, presentation of the content, organization of the content, illustrations and enhancing science learning environment.

Themes, indicators and sub-indicators were identified with the help of standard books, guidelines from NCF 2005, AAAS project 2016 and National institute for educational development (NIED), guide for the evaluation of text books and teaching and learning materials.

Major Themes Selected

- ★ Physical aspects of the textbook
- ★ Presentation of the content
- ★ Organization of the content
- ★ Illustrations in the text books
- ★ Enhancing science learning environment

Based on those criteria the biology text book was analyzed quantitatively by converting the qualitative description to letter grades like A, B and C and the total

grade of the text book was analyzed. If the content is fully capable to meet the indicators it is given “A” grade. If the content is partially capable to meet the indicators is given “B” grade and if the content is not at all capable to meet the indicators given it is graded with “C” grade. The grade point

assigned are (3- 2.1) A grade, (2- 1.1) B grade and (1-0) C grade. Then summed up scores of each criterion is divided by the total number of units and then find out the total grade of each criterion and the overall grade of the text book was analysed and presented in a tabulated form.

ANALYSIS OF DATA

Table-1
Physical Aspects of Textbook

SI. No.	Indicators	A	B	C	Grade	Total Grade
I	Attractive cover page				A	A
1.1	Cover page colorful	✓				
1.2	Appealing	✓				
1.3	Title of the book	✓				
1.4	Emblem	✓				
1.5	Cover page related to content	✓				
II	Paper quality				A	
1.6	Paper is good for printing photographs	✓				
1.7	Printing on one side didn't spread to other side	✓				
1.8	Not easily torn	✓				
1.9	Paper GSM	✓				
III	Nature of binding				B	
1.10	Open type	✓				
1.11	Durability			✓		
IV	Margin space		✓		B	
V	Caption and size of letters	✓			A	
VI	Size of the book		✓		B	

Table-2
Presentation of the Content

Sl. No.	Indicators	A	B	C	Grade		Total Grade
I	Reproduction				A	B	B
2.1	Reproduction in organisms						
2.2	Sexual reproduction in flowering plants				C		
2.3	Human reproduction				C		
2.4	Reproductive health				A		
II	Genetics and evolution				C	C	
2.5	Principles of inheritance and variations						
2.6	Molecular basis of inheritance				C		
2.7	Evolution				C	A	
III	Biology in human welfare				B		
2.8	Human health and diseases						
2.9	Strategies for enhancement in food production				B		
2.10	Microbes in human welfare				A		
IV	Biotechnology				C	B	
2.11	Biotechnology principles and process						
2.12	Biotechnology and its application				B		
V	Ecology				B	B	
2.13	Organisms and populations						
2.14	Ecosystem				B		
2.15	Biodiversity and conservation				B		
2.16	Environmental issues				B		

Table-3
Organization of the Content

Sl. No.	INDICATORS	Unit VI			Unit VII			Unit VIII			Unit IX			Unit X			Grade	Total Grade	
		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C			
I 3.1	Unit wise organization Sequencing of units	x			x			x					x	x			A	A	
	3.2	Continuity of the content is maintained	x			x			x					x	x				
	3.3	Followed a common pattern		x			x			x				x					x
II 3.4	Chapter wise analysis Dividing units into different chapters	x				x				x					x		A		
	3.5	Sequencing of chapters	x				x							x		x			
	3.6	Follows a common pattern	x				x				x				x				
	3.7	Follows a logical and psychological approach	x				x				x				x				
III 3.8	Topic wise analysis Topic properly explained			x			x			x					x		B		
	3.9	Adequate photos, illustrations or pictures are given	x				x				x					x			
	3.10	Activities are adequate and up to level		x				x											
	3.11	Continuity of topics are maintained		x				x							x			x	

Table-4
Illustrations in the Text Book

Sl. No.	Indicators	Unit VI			Unit VII			Unit VIII			Unit IX			Unit X			Grade	Total Grade
		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C		
I 4.1	Types of illustrations																A	
	Real photographs			x		x		x			x				x			
	4.2	Pie-diagrams												x				
	4.3	Graphs												x				
	4.4	Tables			x		x		x							x		
	4.5	Table-format	x			x			x						x			
	4.51	Table-number																
	4.52	Suitable title	x			x			x						x			
	4.53	Captions and stubs	x			x			x						x			
	4.54	Types of tabulation	x			x			x						x			
4.55	Color of the table	x			x			x						x				
4.6	Colorful illustrations are presented	x			x			x			x			x				
4.7	Properly labeled	x			x			x			x			x				
II 4.8	Nature of illustrations																B	
	Active involvement			x												x		
	4.9	Passive involvement	x			x			x			x			x			
4.10	Not clear																	

Table-5

Enhancing Science Learning Environment

Sl. No.	Indicators	Unit VI			Unit VII			Unit VIII			Unit IX			Unit X			Grade	Total Grade
		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C		
I	Level of questions																	
5.1	Passive involvement questions	x			x			x			x							
5.11	Literal questions													x				
5.2	Active involvement questions																A	
5.21	Inferential questions			x			x			x			x			x		
5.22	Critical questions			x			x			x			x					
5.3	Not clear	x			x									x				
II	Provision for practical work																	
5.4	Collections of specimens			x														
5.5	Project work			x					x								C	
5.6	Case study																	
5.7	Field trip																	
5.8	Laboratory work			x														

Table-6**Overall Grade of Biology Text Book**

Sl. No.	Themes	Grade	Total Grade
1	Analysis of physical aspects of text book	A	A
2	Analysis of presentation of the content	B	
3	Analysis of organization of the content	A	
4	Analysis of illustration in the text book	A	
5	Analysis of enhancing science learning environment	B	

MAJOR FINDINGS

The important findings of the analysis of biology textbook for class xii based on the identified five major themes are given below,

Physical Aspects of Textbook

The major findings of the analysis of physical aspects of the textbook are,

- The cover page of the textbook is attractive
- Quality of paper used for printing is good
- Biology textbook as an open type binding but the durability of the textbook is very poor.
- Sufficient margins were not provided in the textbook
- Caption and size of letters were satisfactory
- Size of the textbook was not of convenient size.

The overall grade of the analysis of physical aspect of the textbook is 'A' grade.

Presentation of the Content

The major findings of analysis of presentation of the content in biology textbook are:

- The contents presented in the biology textbook was not satisfactory as many topics like genetics, molecular biology and evolution lack necessary information and not properly explained. Topics like transcription, pedigree analysis, DNA replication need improvement in the content part.
- In the chapter human reproduction the event of gametogenesis was not properly explained
- In biotechnology process and principle unit the process of recombinant DNA and PCR technique was not clearly explained.
- In the unit ecology various ecological related terms and phenomenon was found to be insufficient.
- The overall grade obtained for the analysis of presentation of the content is 'B' grade.

Organization of the Content

The organization of the content in the biology textbook were analysed on the bases of indicator and the major findings are:

- ★ The unit wise organization of the content was capable to meet the

indicator, but the continuity of the content and sequencing of the unit in unit ix was not properly done.

- ★ Unit wise summary was not provided in the textbook.
- ★ The sequencing of chapters was not properly done in case of unit ix – biotechnology.
- ★ In majority of chapters topics was not properly explained and activities provided in the textbook was not up to the level of the learners.

Illustrations in the Textbook

Illustrations given in the biology textbook was analysed and following are the major findings:

- ★ Most of the chapters in the biology textbook lack real photographs
- ★ Sufficient tables were not provided in the textbook, some units like ix and x tables are completely absent.
- ★ Illustrations presented in the textbook were colourful and properly labeled.
- ★ Illustrations provided in the textbook were only meant for the passive involvement of the learners.

Enhancing Science Learning Environment

Analysis of biology textbook for the theme enhancing science learning environment were done and the major findings are,

- ★ The level of questions given in the biology textbook was only for the passive involvement of the learners and critical and inferential level questions were lesser in number.

Provision for practical work were found insufficient in the majority of chapters

- ★ Besides, this analysis of biology textbook revealed that glossary terms were not included in the textbook.
- ★ The findings of the ‘critical analysis of NCERT biology textbook of class xii’ can be summarized as follows.
- ★ The analysis of physical aspects of the textbook was ‘fully capable’ and given ‘A’ grade.
- ★ Analysis of presentation of the content was ‘partially capable’ and ‘B’ grade was given.
- ★ The analysis of organization of the content was ‘fully capable’ and given ‘A’ grade.
- ★ Analysis of illustration in the textbook was ‘fully capable’ and ‘A’ grade was given.
- ★ Analysis of enhancing science learning environment was ‘partially capable’ and ‘B’ grade was given.

The overall grade obtained for the biology textbook was ‘A’ grade.

CONCLUSION

The critical analysis of NCERT biology textbook of class xii was done on the basis of identified five themes in accordance with the guidelines of NCF 2005, AAAS project 2061. The analysis of the textbook revealed many draw backs of the textbook. It highlights the importance of revising the textbook according to the recent innovations in science especially in the field of biology. Mere telling of science is not useful; the need is to exhibit science in operation. It leads to generation of ideas

and developing questions. It engages the learners in the process of thinking, self questioning, search for answers and thus getting new knowledge and understanding of science. The analysis of the text book reveals that physical aspects of the text book, organization of the content, illustrations in the text book are fully capable to achieve the objectives and 'A' grade is given. The presentation of the content and enhancing

science learning environment is partially capable to meet the indicators. This indicates a relevant change is necessary to enhance the quality of the content and illustrations in the biology textbook. The overall grade obtained for the biology text book is 'A' grade. The various themes selected for the present study can be used for analyzing the text books of other subjects for ensuring the quality of the learning material.

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INFORMATION PROCESSING SKILLS OF B.Ed. TEACHER TRAINEES IN PUDUCHERRY

2

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INTRODUCTION

Information processing skills assist students to satisfy their changing information needs, pursue independent lifelong learning and contribute to the development of an informed society. Information skills prepare students to meet the particular demands of the information age. A well-organized, integrated plan for teaching Locating Information processing skills throughout the system would clearly strengthen the entire educational program. To become an independent life long learner, develops a critical thinking approach which is important for the progress of a society. Information processing skills is important to assess and filter the information in the electronic environment, as on the face of it, all web pages look alike. It is important to respect the ownership of information, especially in the digital environment to avoid the 'copy-paste' culture. It is important for ethical use of information, for sound decision making and personal empowerment, understand different cultures and empathize with the view point of others. It is essential for students to develop skills in using information as part of the knowledge, skills and attitudes necessary for lifelong learning. People who are aware of information and confidence to use these skills have better quality of life

than those who are unable to pursue their information needs.

Information processing skills

Information processing skills help people find solutions for information problems. The acquisition and competence in using these skills enables people to become independent, lifelong learners. These skills include:

- ★ ability to access and use resources found in print, pictorial and electronic format
- ★ understanding and using effective and efficient research strategies
- ★ defining, locating, selecting, organizing, presenting and assessing information from all sources and media
- ★ think critically and making decisions according to values and beliefs as well as factual evidence
- ★ sharing information and opinions and being able to justify these through reasonable discussion
- ★ understanding and respecting values and beliefs of other cultures

NEED AND SIGNIFICANCE OF THE STUDY

In the contemporary world the information environment is very complex

and multifaceted. It is not only the quantum of information that deluges us, but also the multiplicity of media in which it is served is often confounding (confusing). So to be successful today, one has to be information literate. The emergence of ICT and web technologies has literally shrunk the world, it is the time where you need not leave your desk for anything that you may want, be it banking, shopping, travelling or learning. Today the problem is not of lack of information but to survive the onslaught of information overload and intelligently use the precise information which is essential for success. Information processing skills assist students to satisfy their changing information needs, pursue independent lifelong learning and contribute to the development of an informed society. Information processing skills prepare students to meet the particular demands of the information age.

OBJECTIVES OF THE STUDY

- ★ To measure the level of information processing skills among B.Ed. teacher trainees.
- ★ To study the difference, if any, in information processing skills among B.Ed. teacher trainees in relation to their Gender, Type of Management, Locality, Family type, Medium of instruction, Teachers in the family, Parental education, Community.

HYPOTHESES OF THE STUDY

1. The level of information processing skills among B.Ed. teacher trainees is moderate in nature.

2. There exists significant difference in information processing skills among B.Ed. teacher trainees in relation to their Gender, Type of Management, Locality, Family type, Medium of instruction, Teachers in the family, Parental education, Community.

METHOD

Normative survey method was employed for this study.

Sample

The total sample consists of 327 B.Ed. teacher trainees from various colleges in Puducherry region which consists of 173 boys and 154 girls. As the population from which these samples are to be drawn does not constitute a homogeneous group, stratified sampling technique is applied to obtain the representative sample for the study. Due weightage was given to various sub-samples.

Tool used

Information processing skills scale was prepared and standardized by the investigator (2014) based on theoretical concept "Information skills in the school" engaging learners in constructing knowledge by State of New South Wales, Department of Education and Training (2007). There are 47 statements, the tool consists of six dimensions, such as defining, locating, selecting, organizing, presenting, assessing. Personal data sheet prepared by the investigator. A pilot study was conducted was conducted with a random sample of 100 B.Ed. teacher trainees in order to establish the reliability and validity of the tool.

Reliability and validity of the tool

Reliability of Information Processing Skills was established by test-retest method

and it was found to be 0.78. The validity of the tool was 0.77.

DATA ANALYSIS

Table-1

Information processing skills of B.Ed. Teacher trainees

Variable	Level	Frequency	Percent	Valid Percent	Cumulative Percent
Information processing skills	High	103	31.5	31.5	31.5
	Average	119	36.4	36.4	67.9
	Low	105	32.1	32.1	100.0
	Total	327	100.0	100.0	

Table-shows 36.4% of B.Ed. teacher trainees have average level of information Processing Skills, 31.5% of B.Ed. teacher trainees have high level of information

Processing Skills, 32.1% of B.Ed. teacher trainees have low level of information Processing Skills.

Table-2

Critical ratio for the differences in information processing skills among B.Ed. teacher trainees with respect to Gender, Locality, Type of Management, Family Type, Medium of Instruction, Teachers in the Family

Variable	Sub variables	N	Mean	SD	df	t value	p value	
Information Processing Skills	Gender	Boys	173	112.57	32.102	325	2.102	0.036*
		Girls	154	104.90	33.837			
	Type of Management	Govt.	160	107.39	35.962	325	0.837	0.403
		Private	167	110.46	30.143			
	Locality	Rural	144	109.03	32.326	325	0.036	0.972
		Urban	183	108.90	33.789			
	Family Type	Nuclear	197	108.13	34.361	325	0.552	0.581
		Joint	130	110.20	31.187			
	Medium of Instruction	English	158	108.22	33.852	325	0.386	0.699
		Tamil	169	109.64	32.473			
	Teachers in the Family	Yes	191	109.94	31.258	325	0.639	0.523
		No	136	107.57	35.604			

** - significant at 0.01 level, * - significant at 0.05 level

On comparing Mean IPS scores significant differences are observed in Gender alone as calculated 't' value is significant. Whereas not significant in the case of others. Therefore, there is significant difference in Information Processing Skills

among B.Ed. teacher trainees with respect to gender. There is significant difference in Information Processing Skills among B.Ed. teacher trainees with respect to Locality, Type of Management, Family Type, Medium of Instruction, Teachers in the Family.

Table-2(a)

One-way ANOVA showing the difference in Information Processing Skills among B.Ed. teacher trainees with respect to Community

Variable	Community	Sum of squares	df	Mean Square	F Value	p value
Information Processing Skills	Between Groups	5522.438	3	1840.813	1.691	.169
	Within Groups	351703.874	323	1088.866		
	Total	357226.312	326			

The calculated F value (1.691) which is less than the table value, hence the null hypothesis is retained and concluded that

there is no significant difference in the information processing skills with respect to community.

Table-2(b)

One-way ANOVA showing the difference in Information Processing Skills among B.Ed. teacher trainees with respect to Parental education

Variable	Community	Sum of squares	df	Mean Square	F Value	p value
Information Processing Skills	Between Groups	5920.967	3	1973.656	1.815	.144
	Within Groups	351305.345	323	1087.633		
	Total	357226.312	326			

The calculated F value (1.815) which is less than the table value, hence the null hypothesis is retained and concluded that there is no significant difference in the information processing skills with respect to parental education.

Educational Implications

The present study reveals that there is no significant difference in information processing skills with respect to Locality, Type of Management, Family Type,

Medium of Instruction, Teachers in the Family, community, parental education.

- ★ Government and private B.Ed. colleges should try to incorporate the information processing skills through various activities in their programmes.
- ★ Through conferences, workshops, orientation programs, efforts need to be carried out to improve the information processing skills in the process of shaping a better future teachers.
- ★ Parents from various localities of different educational background need to be given orientation in information processing skills so as it helps them in guiding their children's in a better way.

CONCLUSION

Quality education is the need of the hour in India at present. Information Processing Skills play a significant role in the development of Academic achievement. Teachers role is considered as important to develop these skills. As a teacher we have to inculcate these skills so as to build the level of academic achievement among the students. Students have gone on to greater heights in their professional careers with the incorporation of Information processing skills(IPS) in education. To be successful, one has to be information literate. That's why beside ICT integration, the college should develop healthy curriculum where Information processing skills is an integral component to enhance one's academic achievement.

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INFLUENCE OF CERTAIN DEMOGRAPHIC VARIABLES ON THE EFFECTIVENESS OF MULTIMEDIA INSTRUCTIONAL PACKAGE IN DEVELOPING READING COMPREHENSION IN ENGLISH AT UPPER PRIMARY LEVEL


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INTRODUCTION

English language plays an important role in education as well as to succeed in our life. English language is a foreign language which needs much effort for non-native English learners to comprehend the language. In India, English is included as a compulsory subject in our school curriculum. Even though it is included as a compulsory subject the level of comprehension is found to be low. It is clear from many studies that the level of reading comprehension is very low for our students. This shed light on the fact that making anything compulsory doesn't raise the standard of achievement. Our curriculum should cater the needs of students and thereby we can create wonders in learning of English.

With the advent of technology we witnessed many changes in many sectors including educational field. Now our classrooms turned to be smart and teaching methods are incorporated with technology assisted instructional materials. These are all peripheral changes in our educational environment but the real change should have to be reflected in our students. To achieve this goal more and more teaching

methods should be framed for instructing the students to arrive at the target.

NEED AND SIGNIFICANCE OF THE STUDY

Many studies conducted in India revealed the importance of teaching English with technology in improving the language proficiency of our students. English is a skill based subject and the skills are mainly divided into four- listening, speaking, reading and writing. All these skills have many components and sub components. It is a difficult job for a teacher to teach all these skills merely by chalk and talk method. Previous research studies established the effectiveness of attaining many skills in English through multimedia instructional packages. Hence the researcher turned towards multimedia instructional package in achieving the target. Here the researcher examined the influence of certain demographic variables which possibly affect the teaching learning process. The present study aimed on the influence of certain demographic variables on the effectiveness of multimedia instructional package in developing vocabulary acquisition and reading comprehension in English at upper primary level. The demographic variables

chosen for the study are locale, parental educational status and parental income.

Hence the study is entitled as “Influence of certain demographic variables on the effectiveness of multimedia instructional package in developing reading comprehension in English at upper primary level.”

HYPOTHESES

1. There is no significant difference in the reading comprehension scores of students of class seven with regard to the demographic variable-locale.
2. There is no significant difference in the reading comprehension scores of students of class seven with regard to the demographic variable-parental educational status.
3. There is no significant difference in the reading comprehension scores of students of class seven with regard to the demographic variable-parental income.

OBJECTIVES

1. To prepare a multimedia package to develop reading comprehension in English at upper primary level.
2. To know the difference in reading comprehension scores of students of class seven with regard to the demographic variables- locale, parental educational status and parental income.

METHODOLOGY

Method

Experimental method is chosen for the study.

Sample

The sample consists of forty students of class seven from a government school in Attingal.

TOOLS

1. A multimedia instructional package was prepared by the investigator for one lesson to develop reading comprehension in English.
2. A reading comprehension test in English prepared by the investigator.
3. Personal data sheet prepared by the investigator.

EXPERIMENTAL PROCEDURE

The research design adopted for the study was non equivalent group post test only design. The package was implemented in the classroom with the permission of the concerned officials of the school. The personal data sheet was distributed among the students to collect the demographic details. After the implementation of the package a reading comprehension test was conducted. The data was analysed statistically to arrive at conclusions.

ANALYSIS AND INTERPRETATION OF DATA

The obtained data was statistically analysed in this section based on the stated hypotheses.

1. Difference in reading comprehension scores of students regarding the demographic variable- locale is given in table-1.

Table-1***Difference in reading comprehension scores of students regarding the demographic variable- locale***

Variable	Category	No.	Mean	SD	CR	Level of Significance
Locale	Urban	18	16.1	7.9	0.54	NS
	Rural	22	14.5	9.8		

It is evident from table 1 that the 't' value is less than the table value (CR = 0.54; $p > 0.05$). The null hypothesis of the study- There is no significant difference in the reading comprehension scores of students of class seven with regard

to the demographic variable- locale is accepted.

2. Difference in reading comprehension scores of students regarding the demographic variable-parental educational status is given in table 2.

Table-2***Difference in reading comprehension scores of students regarding the demographic variable- parental educational status***

Variable	Category	No.	Mean	SD	CR	Level of Significance
Parental Educational Status	High	10	13.9	6.3	0.53	NS
	Low	30	15.6	9.7		

It is evident from table 2 that the 't' value is less than the table value (CR = 0.54; $p > 0.05$). The null hypothesis of the study- There is no significant difference in the reading comprehension scores of students of class seven with regard

to the demographic variable- parental educational status is accepted.

3. Difference in reading comprehension scores of students regarding the demographic variable- parental income is given in table 3.

Table-3***Difference in reading comprehension scores of students regarding the demographic variable- parental income***

Variable	Category	No.	Mean	SD	CR	Level of Significance
Parental Income	High	24	14.1	10.2	1.63	NS
	Low	16	16.8	8.6		

SD - Standard Deviation CR- Critical Ratio NS- Not Significant

It is evident from table 3 that the 't' value is less than the table value (CR =0.54; $p>0.05$).The null hypothesis of the study- There is no significant difference in the reading comprehension scores of students of class seven with regard to the demographic variable- parental income is accepted.

FINDINGS

The findings revealed that the select demographic variables do not show any significant difference in developing reading comprehension in English through multimedia instructional package.

EDUCATIONAL IMPLICATIONS

- Technology assisted instructional materials can be used in schools

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irrespective of locale, educational status and parental income.

- Multimedia teaching motivates students to learn.
- Multimedia teaching increases memory level of students.

CONCLUSION

The results arrived at a conclusion of using multimedia instructional package in developing reading comprehension of students irrespective of locale, parental educational status and parental income. This motivated the researcher to develop more simple and interesting multimedia packages for further areas in the teaching of English. A teacher should always find innovative methods to teach the students to attain the desired learning outcome.

A STUDY ON THE ATTITUDE OF SPECIAL EDUCATORS TOWARDS OVERCOMING THE PROBLEMS OF INCLUSIVE EDUCATION AND THEIR JOB-SATISFACTION

4

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INTRODUCTION

The National Curriculum Framework for School Education, 2000 recommended “inclusive school” for pupils with special educational needs. Segregation is not only unethical for students with special needs, it is not good for normal students. According to Mohanty & Mohanty (2011) inclusive schools are more acceptable from the view point of a modern society, not only for its equal treatment to all students and catering through modern educational practices but also for its cost effectiveness. Although internationally integration is in practice all over, in India it’s still in a developing stage. After Salamanca Statement was released by UNESCO, the scenario of inclusive education changed worldwide. While developed countries like Australia, USA and Canada made inclusive setup of education mandatory by implementing laws, some developing countries are still continuing with the segregated setup for education of specially abled children. In India, both the practices co-exist as depicted by Deppeler & Sharma (2005). As suggested by Mastropieri & Scruggs (2004) when necessary, resource rooms and resource teachers should be

incorporated in education system for proper running of inclusive practices. Now days in India the new setup formed by the government employs specially trained teachers or special educators to not only help the school teachers in implementing proper strategies in class room of an integrated setup, but also help and train specially abled pupil for adjustment into the inclusive education system. The special-educator’s speciality is that he/she has to work a kind of academic-work (educational approach) and therapeutic-work (medical, psychological approach) simultaneously. The special educator has to concentrate on the following 7 developmental fields to make the best educational conditions: behavior, social skills, language skills, emotional skills, self-care skills, cognitive skills and academic development. To sum-up, the special educator’s work is to “manage the teamwork, to make the developmental-plan for the children together with the others on the base of such knowledge, because he/she is the one, who is making the effective therapy with the children” (Matsuishi & Toth, ?).

In West Bengal a special educator's duty starts with the responsibility of enrolling all the children with special needs in schools. After enrolment, special educators interact with pupil with special needs either in the inclusive schools itself, or 'resource rooms'. Special educators help to develop an Individualized Education Program (IEP) for each child with special needs and set personalized goals for each student according to the student's individual learning style and ability. They also review the IEP with the student's general education teacher in schools, parents, and school administrators. The job description of special educators given by Teachers Support Network (2013) describes, with the help of equipments in the resource rooms, or the schools they train the pupil to make them able to cope with the integrated setup. From the above discussion, it is eminent that, if a properly functioning integrated education system is to be implemented in our present setup, the importance of special educator is pivotal in nature. There are two lakhs seventy thousand children with special needs in West Bengal, of whom only one lakh ninety three thousand are enrolled under integrated schools. To take care of the integration activity for the enrolled children with special needs, there are only thirteen hundred special educators in position. Faced with the reality of disproportionately high number of children with special needs, a special educator on field faces many other impediments like lack of motivation from parents of special children, non-cooperation from conventional teaching setup, and disproportionately inadequate number of aids and appliances and many

more. As stated in Disability News Asia (2012), even after this "many who take up the challenge are disheartened because they are recruited on a temporary, contractual basis under the Sarva Shiksha Abhiyaan". In the abysmally poor state of affairs as depicted in snap shots above is bound to be not very encouraging or stimulating for special educators on the job. In fact, it is most obvious that, the special educators being so poor in number, and having so huge a task at hand with non responsive stake-holders, may feel dissatisfied. This may result into impairment of their performance unless proper attitudinal positioning is incorporated in the thought process and plan for execution to achieve the desired goal. Working on the topic of factors enhancing special educators' intent to stay in the job, Garten (2001) stated that a lading negative factor was stress due to job design. B.S. Billingsley (2003) in his study on retention and attrition of special educators found that special educators are more likely to leave their job when they are less experienced. Their reasons for staying in the job include higher salaries, positive school climate, adequate support systems, opportunities for professional development, reasonable role demand and manageable case loads. In a recent study on job satisfaction of special educators, Md. Abushaira (2012) found no significant statistical differences in the level of job satisfaction due to gender. He also mentioned good working environment as an important factor enhancing job satisfaction. The present researchers undertook the study to inquire about the most concerning problems related to special

educators' working environment and their attitude to overcome those. This study also intended to find if there lies any relation between the above mentioned attitude and the job satisfaction of special educators.

OBJECTIVES OF THE STUDY

- ★ To study the problems faced by special educators in the field of inclusive education.
- ★ To study the attitude of special educators to overcome the problems present in the field of special education.
- ★ To find out if there is any significance difference in attitude and job satisfaction with relation to their gender and experience in the job.
- ★ To study if there is any relation between attitude and job-satisfaction of special educators.

HYPOTHESES

1. There is no significant difference in attitude towards overcoming the problems of inclusive education

2. There is no significant difference in attitude towards overcoming the problems of inclusive education between special educators in relation to their experience in the job.
3. There is no significant difference in job-satisfaction of male and female special educators.
4. There is no significant difference in job-satisfaction between special educators in relation to their experience in the job.
5. There is no significant co-relation between attitude and job-satisfaction of special educators.

METHODOLOGY OF THE STUDY

Sample

51 special educators working under SSA in Howrah and Hooghly district were selected randomly as sample for this particular study.

Table-1
Sample Frame

More experienced (more than 5 years) N=28		Less experienced (<= 5 years) N=23		Total
Male	Female	Male	Female	N=51
16	12	10	13	

Tools

1. An open-ended questionnaire was constructed for feedback from special educators for identifying the problems

prevailing in the field of inclusive education in West Bengal. This open ended questionnaire helped to generate items for item-pool.

2. Problem Overcoming Attitude Scale for Special Educators (POASSE)

A self-made attitude measuring scale was constructed by the researchers for measuring special educators' attitude to overcome the problems of inclusive education. The scale was made on the item-pool generated against the feedbacks from the previous questionnaire. It consists of 25 items (eg: Item no 1- 'In West Bengal, the total number of special educators is much less than required. But, it does not create any extra burden on special educators employed under SSA') having 5 categories of responses for each viz. 'totally agree', 'agree', 'neutral', 'disagree' and 'totally disagree'. Scores ranging from 5 to 1 is assigned to the respective options mentioned above in case of positive items and in case of negative items the scoring is reverse. Hence, the range of score obtained by a sample can be 125 maximum to 25 minimum.

3. Job Satisfaction Scale for Special Educators (JSSSE)

A self-made job satisfaction scale was constructed by the researchers. It consists of 23 items (eg: Item no 1- 'I feel comfortable in my working environment') having 5 categories of responses for each viz. 'totally agree', 'agree', 'neutral', 'disagree' and 'totally disagree'. Scores ranging from 5 to 1 is assigned to the respective options mentioned above in case of positive items and in case of negative items the scoring is reverse. Hence, the range

of score obtained by a sample can be maximum 115 to 23 minimum.

Reliability and Validity of the Tools

Reliability of the Problem Overcoming Attitude Scale for Special Educators (POASSE) and Job Satisfaction Scale for Special Educators (JSSSE) were calculated by using Cronbach's Alpha method. The reliability coefficient $r = 0.892$ and $r = 0.769$ for POASSE and JSSSE respectively.

Items of both the scales were checked by experienced persons in the field and necessary correction or dropping of items were done as per recommendation before finalising the scales.

Method of Data Collection

Collection of data was done by one of the researchers in three separate phases:

★ Phase 1

5 special educators from Hooghly and Howrah District were interviewed with the open ended questionnaire to identify the problems they are facing on the job.

★ Phase 2

One of the researchers visited resource rooms and District Project Coordinators' offices and POASSE and JSSSE were administered upon special educators working in different circles of Howrah and Hooghly district. The responses were collected and recorded in terms of scores.

★ Phase 3

Researchers again interviewed 10 special educators. 5 high scorers

and 5 low scorers were segregated based upon the scores obtained by administering the scales. They were interviewed based upon the responses they had given earlier and inquired about their earlier responses directly or indirectly. The researchers also tried to

gather as much information as possible by participatory observation.

Analysis of Data & Results:

The collected data was analysed using SPSS. Statistics such as Mean, SD, 'Z' values and Mann-Whitney U values were calculated and tested at 0.05 level of significance.

Table-2
Descriptive Statistics

	N	Mean	Std. Deviation	Skewness
Attitude towards Overcoming Problems	51	48.9608	12.56338	2.124
Job Satisfaction	51	73.9608	8.92404	.192

TESTING OF HYPOTHESES

As the distribution of scores obtained administering SEPOA test was not

distributed normally (Sk=2.142), non-parametric Mann-Whitney Test was done in case of testing H_01 , H_02 , H_03 and H_04 .

Testing of H_1

Table-3
Ranks

	Gender	N	Mean Rank	Sum of Ranks
Attitude towards Overcoming Problems	Female	25	24.40	610.00
	Male	26	27.54	716.00
	Total	51		

Table-4
Test Statics

	Attitude towards Overcoming Problems
Mann-Whitney U	285.000
Wilcoxon W	610.000
Z	-.755
Asymp. Sig. (2-tailed)	.450

a. Grouping Variable: Gender

The above test statistics (Table-4) shows that the Mann-Whitney U value = 285.0, Z value = -0.755, P = 0.450 ($P > 0.05$). Hence, it is insignificant and H_01 is retained.

Therefore, it can be said that, there is no significant difference in attitude towards overcoming problems between male and female special educators.

Testing of H₂

Table-5
Ranks

	Experience	N	Mean Rank	Sum of Ranks
Attitude towards Overcoming Problems	More Experienced	23	25.65	590.00
	Less Experienced	28	26.29	736.00
	Total	51		

Table-6
Test Statics

	Attitude towards Overcoming Problems
Mann-Whitney U	314.000
Wilcoxon W	590.000
Z	-.152
Asymp. Sig. (2-tailed)	.879

a. Grouping Variable: Experience

The previous test statistics (Table-6) shows that the Mann-Whitney U = 314.0, Z = -0.152, P = 0.879 (P>0.05). Hence, it is insignificant and H₀ is retained.

Therefore, it can be said that, there is no significant difference in attitude towards overcoming difficulty between more and less experienced special educators.

Testing of H₃

Table-7
Ranks

	Gender	N	Mean Rank	Sum of Ranks
Job Satisfaction	Female	25	26.18	654.50
	Male	26	25.83	671.50
	Total	51		

Table-8
Test Statics

	Job Satisfaction
Mann-Whitney U	320.500
Wilcoxon W	671.500
Z	-.085
Asymp. Sig. (2-tailed)	.932

a. Grouping Variable: Gender

The above test statistics (Table-8) shows that the Mann-Whitney U = 320.0, Z = -0.085, P = 0.932 (P>0.05). Hence, it is insignificant and H₀3 is retained. Therefore,

it can be said that, there is no significant difference in job satisfaction between male and female special educators.

Testing of H₀4:

Table-9
Ranks

	Experience	N	Mean Rank	Sum of Ranks
Job Satisfaction	More Experienced	23	27.59	634.50
	Less Experienced	28	24.70	691.50
	Total	51		

Table-10
Test Statics

	Job Satisfaction
Mann-Whitney U	285.500
Wilcoxon W	691.500
Z	-.692
Asymp. Sig. (2-tailed)	.489

a. Grouping Variable: Experience

The above test statistics (Table-10) shows that the Mann-Whitney U = 285.0, Z = -0.692, P = 0.489 (P > 0.05). Hence, it is insignificant and H₀4 is retained. Therefore,

it can be said that, there is no significant difference in job satisfaction between more and less experienced special educators.

Testing of H₅

Pearson's correlation was used to calculate the existing correlation between

attitude towards overcoming problems and job satisfaction.

Table-11
Correlation

		Attitude towards Overcoming Problems	Job Satisfaction
Attitude towards Overcoming Difficulty	Pearson Correlation	1	.471**
	Sig. (2-tailed)		.000
	N	51	51
Job Satisfaction	Pearson Correlation	.471**	1
	Sig. (2-tailed)	.000	
	N	51	51

Calculated coefficient of correlation (at 0.01 level of significance) is 0.471 (Table-11) which lies between +1 and 0. Hence, a correlation exists and H₀ is rejected. Therefore, it can be said that moderate positive correlation exists between attitude towards overcoming difficulty and job satisfaction.

ANALYSIS OF QUALITATIVE DATA

Data collected by interviewing special educators (the highest and lowest scorers of each scale) can be divided into two different sets- namely, feedback on topics of 'Attitude towards Overcoming Problems Scale' and feedback on topics of 'Job Satisfaction Scale'. Data obtained were analyzed in a comparative manner.

Table-12
Feedback of Special Educators on topics of POASSE

Topic	Higher scorers responses	Lower scorers responses
Over burden of Work	Manageable	Unmanageable. Each Special Educator should have been posted in a particular Resource Room of school.
Range of Work	Manageable	Schools are located far apart.
Resource Room Location	Manageable	Location of Resource Room is distant. Communication is very bad.

Topic	Higher scorers responses	Lower scorers responses
Number of Resource Room	2- So work gets divided.	Only one Resource Room for a large area.
Need of Specially trained therapists for Resource Room	Manageable without therapists, as Special Educators present, are diversely trained.	Physiotherapists, Psychiatrists, Speech therapists needed for proper functioning of Resource Room.
Frequency of visit to schools	More than once per month. Possible because no. Of schools less per Special Educator.	Not even once in a month. Huge number of schools under each Special Educator.
Cooperation of Guardians	Average. Low in slum area, otherwise good.	Most of the children concerned are 1 st generation learners, so very little help or co-operation obtained.
Supply of Equipments needed	Very active and young CPC, acts fast when asked to supply equipments.	Equipments supply system is very slow. In some cases, the delivery comes so late that the child concerned already drops out.

Table-13

Feedback of Special Educators on topics of JSSSE

Topic	Higher scorers responses	Lower scorers responses
Working Environment	Good. Good relation with higher authorities.	Average to bad. Many social and work related hindrances present.
Salary	Satisfactory. Have extra income from giving therapy to children at their homes.	Highly unsatisfactory. Have no extra source of income.
Freedom in decision making at work	Full freedom. As the Circle Project Coordinator is enthusiastic and encourages the Special Educators under them.	Freedom of decision making is very low.

Topic	Higher scorers responses	Lower scorers responses
No. of Schools	Manageable. Around 20.	High, around 35.
Relationship with School Teachers	Good. Especially teachers trained in topics related to inclusive education are more cooperative.	Not good most of them are indifferent.
Recommending relatives to become Special Educators	Already more than one relative became Special Educator inspired by the subjects.	Advice others not to take up this job.

DISCUSSION

From the present study it has been found that the attitude of special educators to overcome the difficulties does not vary significantly with gender. This finding is in line with the work of Ms. Monika (2013) findings that there is no difference in attitude among male and female teachers concerning problems of education. The attitude of special educators does not vary significantly with their experience either. The findings of Ridarick & Ringlaben (?) regarding special teachers' attitude towards issues of inclusion showed no significant difference between more and less experienced subjects as it is found in the present study.

Findings of the present study show no significance difference in job satisfaction between male and female special educators. The work of Tasnim (2006) concerning special teachers of primary level show similar results concerning job satisfaction. Similarity in result is observed in the work of Abushaira (2012) where it is shown that

there is no significant difference between male and female special education teachers.

Attitude towards overcoming problems and job satisfaction of special educators show moderate positive correlation. This finding is in line with Abushaira (2012), where it is shown that effective positive attitude and efficacy of special education teacher increase with job satisfaction.

Feedback collected from special educators show that negative attitude towards overcoming problems faced in the field of inclusive education is concerned with job profile, working environment and noncooperation from other teachers and management. More or less similar results are shown in the study of Gersten et al (2001). From this study it is eminent that stress due to job design has a negative effect over commitment of special educators towards their job. But help from other teachers and management can relief this stress resulting in positive attitude among them.

Qualitative data analysis shows that factors affecting special educators'

job satisfaction are healthy working environment, salary, attitude towards this profession and relationship with management. These findings are supported by the results of the work done by Tashnim (2006) where it is shown that job satisfaction of teachers is affected by factors like salary, career prospect, role of management and above all working environment. The factor of working atmosphere having a positive effect on job satisfaction is supported by findings of Abushaira (2012). Also the findings are in line with results of Billingsly (2003), who described work environment as an important factor for retention of special educators in the job.

CONCLUSION

Results of the study clearly suggests that factors like gender and experience does not have any significant effect on job satisfaction of special educators and their attitude to face the problems at hand in the field of inclusive education. On the other hand, positive correlation between attitude to overcome problems and job satisfaction indicates that special educators can be satisfied with their job only if they deal with the problems faced with a positive attitude. The problems faced by special educators in the present inclusive setup of

education programme in West Bengal are mainly concerned with hostile working environment, un adequate salary, irregular supply of resources and relationship with the higher authority and colleagues. From the essence of this particular study, it can be concluded that in spite of existing problems, improvement of the present condition can be brought about by positive attitude of special educators. It's a general phenomena that attitude defines the path. If the special educators have more positive attitude towards their job, then, it should be a matter of time when they get satisfied with their job and with new enthusiasm make the inclusive educational set up a remarkable story of success.

LIMITATIONS AND FURTHER SUGGESTIONS

There is always room for improvement especially in research work. Also this study has its limitations. For more accurate identification of problem areas, a bigger number of special educators can be interviewed and the number of items in the scales used can be moderated using the information. The sample size can be increased by sampling from a broader geographical region.

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A STUDY OF METACOGNITION AND LEARNING STYLE OF B.ED STUDENTS

5

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INTRODUCTION

Education which shapes and moulds the quality of life of the people of a country and whose goals are extremely sacred and whose influences are permanent and developmental should be placed in the hands of appropriate and dedicated teachers, who can be trusted to perform a noble, and a challenging role in the educational process. Learning plays a vital role in our life. Learning starts from one's birth and till to 'the end of his life. It shapes, moulds and modifies human behaviour. Experiences bring about a change in the behaviour of the individual. It is a universal human experience. It imparts an individual with all the power and necessities in making a remarkable mark in any of the field, it is one's education which decides what one can make out in their life.

Metacognitive learning is a new concept in the emerging field of education. Metacognition is one of the holy grains of education. People engage in metacognitive activities every day. Metacognition enables us to be successful learners and it has been associated with intelligence. Metacognition literally means cognition about cognition or knowledge about knowing of learning. Metacognition is simply defined as "thinking about

thinking". Metacognition refers to one's knowledge concerning one's own cognitive processes and products or anything related to them. It is high order thinking which involves active control over the cognitive processes engaged in learning. Metacognitive activities help the teacher to determine how students can be taught to apply their cognitive resources through metacognitive control.

Learning style addresses the biological uniqueness and developmental changes that make one person learn differently from another individuals do change in the way they learn similarly, development aspects relate to how we learn but more predictable follow a recognizable pattern. Learning styles as perception, thought, remembering or problem – solving of the individual in the way that student is used to do. Each person's individual learning style is unique as a signature. When a person has something difficult to learn, that students learn faster and enjoys learning more if student unique learning style affirmed by the way the teacher teaches.

SIGNIFICANCE OF THE STUDY

Today, all teachers are facing the ongoing challenges of making their teaching

more effective. Teachers must develop their skills to meet the student's educational needs during their training period. The teacher trainee has to put his heart and soul on the course. As the duration of the B.Ed programme is one year, the stress is more on the content than the development of attitudes, skills and competencies. All the B.Ed students may not develop the desired level of teaching competence within the short duration of time. Soundness of judgement and practical intelligence must be immediate in certain situations. The capacity to do the right thing in the right way at the right time should be developed. So, the students would be able to think about their thinking, understand and control their cognitive process.

GENERAL OBJECTIVES

1. To find out the level of metacognition of secondary education students.
2. To find out the level of learning style of secondary education students.
3. To find out the difference between male and female secondary education students in their metacognition.
4. To find out the difference between male and female secondary education students in their learning style.

5. To find out the relationship between metacognition and learning style of secondary education students.

HYPOTHESES

Suitable null hypotheses were framed by the investigator.

METHODOLOGY

The investigator has used the survey method for obtaining the data.

POPULATION AND SAMPLE FOR THE STUDY

All the students studying in the colleges of education in Tirunelveli District. The investigator has randomly selected 100 secondary education students from Tirunelveli District.

TOOLS USED

1. The Metacognitive inventory (MCI) by Punita Govil (2003).
2. The learning style tool developed by the investigator.

STATISTICAL TECHNIQUES USED

SD, 't'-test and Pearson Product Moment Correlation used for analysis of the data.

Table-1

Level of Metacognition of B.Ed. Students

Metacognition and its dimensions	Low		Moderate		High	
	N	%	N	%	N	%
Knowledge of cognition	20	20.0	61	61.0	19	19.0
Regulation of cognition	11	11.0	74	74.0	15	15.0
Metacognition	13	13.0	73	73.0	14	14.0

It is inferred from the above table that 20.0% of the B.Ed students have low, 61.0% of them have moderate and 19.0% of them have high level of knowledge of cognition. Also, it is inferred that 11.0% of the B.Ed students have low, 74.0% of them have

moderate and 15.0% of them have high level of regulation of cognition.

On the whole, 13.0% of the B.Ed students have low, 73.0% of them have moderate and 14.0 % of them have high level of metacognition.

Table-2

Level of Metacognition of B.Ed Students with Regard to Gender

Metacognition and its dimensions	Gender	Low		Moderate		High	
		N	%	N	%	N	%
Knowledge of cognition	Male	12	20.7	32	55.2	14	24.1
	Female	8	19.0	29	69.0	5	11.9
Regulation of cognition	Male	6	10.3	42	72.4	10	17.2
	Female	5	11.9	32	76.2	5	11.9
Metacognition	Male	8	13.8	40	69.0	10	17.2
	Female	5	11.9	33	78.6	4	9.5

It is inferred from the above table that 20.7% of the male B.Ed students have low, 55.2% of them have moderate and 24.1% of them have high level of knowledge of cognition. Also, it is inferred that 10.3% of the male B.Ed students have low, 72.4% of them have moderate and 17.2% of them have high level of regulation of cognition.

Again, it is inferred from the above table that 19.0% of the female B.Ed students have low, 69.0% of them have moderate and 11.9% of them have high level of knowledge of cognition. Also, it is inferred that 11.9% of the female B.Ed students have low, 76.2% of them have moderate and 11.9% of them have high level of regulation of cognition.

On the whole, 13.8% of the male B.Ed students have low, 69.0% of them have moderate and 17.2 % of them have high level of metacognition.

On the whole, 11.9% of the female B.Ed students have low, 78.6% of them have moderate and 9.5 % of them have high level of metacognition.

Table-3

Level of Learning Style of B.Ed Students

Learning style and its dimensions	Low		Moderate		High	
	N	%	N	%	N	%
Visual	27	27.0	61	61.0	12	12.0
Auditory	20	20.0	61	61.0	19	19.0
Kinesthetic	14	14.0	69	69.0	17	17.0
Learning style	22	22.0	62	62.0	16	16.0

It is inferred from the above table that 27.0% of the B.Ed students have low, 61.0% of them have moderate and 12.0% of them have high level of visual learning. Also, it is inferred that 20.0% of the B.Ed students have low, 61.0% of them have moderate and 19.0% of them have high level of auditory learning.

It is inferred from the above table that 14.0% of the B.Ed students have low, 69.0% of them have moderate and 17.0% of them have high level of kinesthetic learning.

On the whole, 22.0% of the B.Ed students have low, 62.0% of them have moderate and 16.0 % of them have high level of learning style.

Table-4

Level of Learning Style Of B.Ed Students with Regard to Gender

Learning style and its dimensions	Gender	Low		Moderate		High	
		N	%	N	%	N	%
Visual	Male	14	24.1	36	62.1	8	13.8
	Female	13	31.0	25	59.5	4	9.5
Auditory	Male	9	15.5	37	63.8	12	20.7
	Female	11	26.2	24	57.1	7	16.7
Kinesthetic	Male	8	13.8	39	67.2	11	19.0
	Female	6	14.3	30	71.4	6	14.3
Learning style	Male	10	17.2	38	65.5	10	17.2
	Female	12	28.6	24	57.1	6	14.3

It is inferred from the above table that 24.1% of the male B.Ed students have low, 62.1% of them have moderate and 13.8% of them have high level of visual learning. Also, it is inferred that 15.1% of the male B.Ed students have low, 63.8% of them have moderate and 20.7% of them have high level of auditory learning. Also, it is inferred from the above table that 13.8% of the male B.Ed students have low, 67.2% of them have moderate and 19.0% of them have high level of kinesthetic learning.

It is inferred from the above table that 31.0% of the female B.Ed students have low, 59.5% of them have moderate and 9.5% of them have high level of visual learning.

Also, it is inferred that 26.2% of the female B.Ed students have low, 57.1% of them have moderate and 16.7% of them have high level of auditory learning. Also, it is inferred from the above table that 14.3% of the female B.Ed students have low, 71.4% of them have moderate and 14.3% of them have high level of kinesthetic style.

On the whole, 17.2% of the male B.Ed students have low, 65.5% of them have moderate and 17.2 % of them have high level of learning style. 28.6% of the female B.Ed students have low, 57.1% of them have moderate and 14.3 % of them have high level of learning style.

Table-5***Difference between Aided and Un-Aided Students in their Metacognition***

Metacognition and its dimensions	Aided (N=42)		Un-aided (58)		Calculated 't' value	Remarks at 5% level
	Mean	S.D	Mean	S.D		
Knowledge of cognition	41.90	6.461	40.33	5.059	1.316	NS
Regulation of cognition	47.88	6.847	48.38	5.012	0.400	NS
Metacognition	89.79	12.371	88.71	9.409	0.474	NS

Table-value = 1.98, df= 98, NS- Not Significant

It is inferred from the above table that aided and un-aided B.Ed students in their there is no significant difference between metacognition.

Table-6***Difference between Aided and Un-Aided Students in their Learning Style***

Learning style and its dimensions	Aided (N=42)		Un-aided (N=58)		Calculated 't' value	Remarks at 5% level
	Mean	S.D	Mean	S.D		
Visual	40.12	3.927	39.21	3.563	2.190	S
Auditory	23.10	3.059	22.34	2.724	1.997	S
Kinesthetic	22.19	3.307	22.24	2.964	0.079	NS
Learning style	85.40	6.964	83.79	6.869	2.012	S

Table-value = 1.98, df=98, S- Significant, NS- Not Significant

It is inferred from the above table that aided and unaided college students in their there is significant difference between aided and un-aided college B.Ed students in their learning style.

While comparing the mean scores of aided (40.12, 23.10 & 85.40) and un-aided (39.21, 22.34 & 83.79), the aided college B.Ed students are better than the un-aided college students in their visual, auditory and learning style respectively.

Table-7
Relationship between Metacognition and Learning Style of
B.Ed Students

Metacognition		Learning style		ΣXY	df	Calculated 'r' value	Remarks at 5% level
ΣX	ΣX^2	ΣY	ΣY^2				
8916	806300	8447	718259	753502	98	0.203	S

Table-value = 0.195, S- Not Significant

It is inferred from the above table that there is significant relationship between metacognition and learning style of B.Ed students.

FINDINGS

- ★ The level of megacognition of male and female secondary education students are moderate.
- ★ There is no significant difference between male and female secondary education students in their knowledge of cognition, regulation of cognition and metacognition.
- ★ The level of learning style of male and female secondary education students are moderate.
- ★ There is significant difference between

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male and female secondary education students in their visual, auditory, kinaesthetic learning style.

- ★ There is significant relationship between metacognition and learning style of secondary education students.

CONCLUSION

From the above study the investigator found that metacognition and learning style are closely correlated. Therefore the investigator desires that educational institutions should provide training programmes and give importance to metacognition in their regular classroom teaching and learning process. It helps and enriches the skill of learning style of secondary education students in their walks of life.

SCIENTIFIC ATTITUDE AMONG THE SECONDARY SCHOOL STUDENTS IN SALEM

6

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INTRODUCTION

Science is the intellectual heritage of man which has come down to us. Advancement in science and technology has created a greater demand for more people to study science. Scientific and technological progress in many countries is associated with rapid growth. Part of this development is due to essential consideration to the field of science education.. With global growth of science and technology in the form is happening fast, low interest students in science courses and work, is a global concern that demands the reforms in science education in international scale. Because a student attitude toward science affects their future scholar and job choices, so measuring the effect of this reform on the attitudes of students is important. Scientific attitude is absolutely necessary to dispel ignorance and backwardness; it will bring a balanced perspective to face the social evils and conflicts and could lead to a better world. Attitude towards science denotes interest or feeling towards studying science. It is the student's disposition towards liking or disliking science.

REVIEW OF LITERATURE

Bhaskara Rao., (2000) conducted a comparative study of scientific attitude,

scientific aptitude and achievement in Biology at secondary school level. The main objectives of the investigation were to compare the scientific attitude of boys verses girls, English medium verses Telugu medium schools, private verses government schools, residential verses non-residential schools and rural verses urban schools. The major findings of the study were the scientific attitude in secondary school pupils was average there was no influence of sex on scientific attitude, but the pupils studying in private schools, English medium schools, Residential schools held better scientific attitudes than their counter parts.

According to Bricheno (2000) scientific attitude will be positive when students learn it from their own experience by involving in an activity where they can completely take part in that. Building a Scientific Attitude, students will have a chance to gain the balanced development between intellectual, emotional and social aspects.

According to Bennet (2003) attitude towards science is linked with the views and images that the individual develops about science as a result of interaction with different situations while scientific attitude is related to the ways of thinking

or scientific method, which covers the skills and undertaking of practical works.

NEED AND SCOPE OF THE STUDY

Scientific attitude, which is a mental state, is a collection of certain qualities of which are peculiar to the study of science. So, the investigator has opted to study the scientific attitude of secondary school students in Salem.

OBJECTIVES OF THE STUDY

To find out the significant difference among the secondary school students scientific attitude with respect to their demographic variables such as Gender, Locality, Family Occupation and Educational Qualification of Parents.

HYPOTHESIS OF THE STUDY

1. There is no significant difference between secondary school students Scientific Attitude with respect to their Gender.
2. There is no significant difference between secondary school students Scientific Attitude with respect to their Locality.
3. There is no significant difference between secondary school students Scientific Attitude with respect to their Family occupation.

4. There is no significant difference between secondary school students Scientific Attitude with respect to their Parental educational qualification.

METHODOLOGY

SAMPLING

The investigator has adopted survey method for this study. Population for this study were secondary school students studying in X standard at Salem.

TOOLS USED

The tool Scientific Attitude Inventory of Moore and Foy (1997) was used to assess the student's Scientific Attitude. The tool consists of 30 items in Likert scale with five categories, such as strongly agree, agree, neutral, disagree and strongly disagree with scores of 5, 4, 3, 2 and 1 respectively for items of positive polarity. For items of negative polarity the scoring system was reversed.

DATA ANALYSIS

Mean, SD and 't' test were computed to know the significant difference between the means of the different sub-groups in terms of Gender, Locality, Family Occupation and Parents Educational Qualification.

Table-1

Difference in Scientific Attitude of Secondary School Students by their Gender

	Gender	N	Mean	SD	't' value	0.05% of Significance
Scientific Attitude	Male	14	110.78	9.54	0.14	NS
	Female	16	110.31	7.59		

From the above table-1, it is found that there is no significant difference between Male and Female secondary school students towards their Scientific Attitude. The mean scores of male students are slightly higher than female students.

Table-2

Difference in Scientific Attitude of Secondary School Students by their Locality

Scientific Attitude	Locality	N	Mean	SD	't' value	0.05% of Significance
	Urban	19	111.57	9.35	0.95	NS
	Rural	11	108.72	6.45		

From the above table-2, It is found that there is no significant difference between Urban and Rural secondary school students towards their Scientific Attitude. The mean score of Urban students are slightly higher than Rural students.

Table-3

Difference in Scientific Attitude of Secondary School Students by their Family Occupation

Scientific Attitude	Family Occupation	N	Mean	SD	't' value	0.05% of Significance
	others	22	111.54	5.63	1.03	NS
	Labour	8	107.75	9.11		

From the above table-3, It is found that there is no significant difference between secondary school students based on their family occupation towards their scientific attitude. The mean attitude score of students whose family occupation is other than labour is slightly higher.

Table-4

Difference in Scientific Attitude of Secondary School Students by their Parents Educational Qualification

Scientific Attitude	Parental Educational Qualification	N	Mean	SD	't' value	0.05% of Significance
	Illiterate	5	120.20	2.86	5.44	S
	Literate	25	108.60	7.78		

From the above Table-4, it has been found that there is significant difference between secondary school students based on Parent's educational qualification towards their scientific attitude. The mean attitude score of students whose parents are illiterate are higher than those parents who are literate. Educational and cultural gaps may hinder easy and effective communication of parents and children.

Educated parents are less inclined to be involved as children get older due to their profession etc.,

FINDINGS

- ★ There is no significant difference between Male and Female secondary school students in their Scientific Attitude.
- ★ There is no significant difference between Urban and Rural secondary school students in their Scientific Attitude.
- ★ There is no significant difference between secondary school students Scientific Attitude based on their Family occupation.
- ★ There is significant difference between secondary school students Scientific Attitude based on their Parental educational qualification.

DISCUSSION

The result of the study indicates that there is no significant difference in scientific attitude between students based on Gender, Locality and Occupation of Parents. It means that these demographic variables does not affect the scientific attitude of students to a greater extend. . Certain variable like Parental Educational Qualification have a significant difference over scientific attitude of students. Parents'

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involvement in the children's learning enhances children's academic achievement, intellectual skills, motivation to study, attitude towards learning etc. In addition to quality of teachers and schools, focusing on improving parents' efforts towards their children's education can also have a significant impact that could complement the efforts of teachers and schools in improving science achievement. Attention needs to be paid also to the role of the family in improving science performance. Among the home factors that can affect student science achievement, many studies have focused on the role played by socioeconomic status, educational status, parenting styles and involvement.

EDUCATIONAL IMPLICATIONS

On the basis of the findings of the study a few educational implications of the study may be indicated as follows;

- ★ The programs for developing scientific attitude among the school students such as selected reading, question & answers, experimentations, demonstrations, group discussion, role play, science quiz, science exhibition, dramatization, interactions with experts in the field should be arranged.
- ★ CD show & discussion and audio presentation & discussion should be prepared and implemented.

ACHIEVEMENT IN MATHEMATICS OF STANDARD IX STUDENTS IN RELATION TO THEIR LOGICAL MATHEMATICAL INTELLIGENCE

7

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INTRODUCTION

“Education is the key that opens the door of life”. Education aims at tapping the potential of an individual to the maximum. Educational efforts must secure for each one the conditions under which individuality is most completely developed. In considering educational ideas, every thoughtful teacher must realize that our schools fall far below it. We find pupils who show great promise on coming to school but who altogether fail to ‘make good’ as they reach the higher forms. Others who do well at school but whose school career does not fit them for useful work in later life and we realize that in many schools there is little scope for originality or for the development of individual powers. Considering these things, one may wonder how these failures happen. Such instances show that many students work far below than what could be expected of their level of intellectual functioning consequently a great deal of intellectual potential is wasted. Performance of the students in the institution constitutes other aspects of cognitive growth. About three decades back the excellence in academic performance was viewed in terms of scores alone irrespective of the basic potential. An under achiever is one whose academic performance falls

below the normative range in his potential. By under achievement we refer to that level of attainment, which does not measure up to the potential capabilities of the individual. There is a huge concern among the Heads of the institutions, teachers and parents that the academic Achievement is deteriorating now-a-days. Therefore, discussing the means and ways through which academic Achievement could be increased is the need of the hour.

REVIEW OF RELATED LITERATURE

The investigators have reviewed a good quantum of research findings related to the present investigation. Flegas, Konstantinos; Charalampos, and Lemonidis (2013) studied on Exploring Logical Reasoning and Mathematical Proof in Grade VI Elementary School Students. Nunes, Terezinha; Bryant, Peter; Barros, Rossana; Sylva, and Kathy (2012) examined The Relative Importance of Two Different Mathematical Abilities to Mathematical Achievement. Bandhana Bandhana and Darshana (2012) conducted a study on Home Environment and Reasoning Ability among Secondary School Students. Sabita Mahanta, Mofidul Islam (2012) conducted a study on Attitude of Secondary Students

towards Mathematics and its Relationship to Achievement in Mathematics. Kanmani and Annaraja (2009) studied Logical Mathematical Intelligence and Achievement of Computer Science Students. The survey of related studies has revealed clearly that, not much work has been carried out on the relationship between Logical Mathematical Intelligence and Achievement in Mathematics of standard IX students.

SIGNIFICANCE OF THE STUDY

Education is a character building process enhancing one's personality and making one rational, capable, responsive and intelligently independent. It generates the will to refashion one's heart, head and life. Till 90's intelligence quotient was the measure of success and intelligence of an individual. Greater the intelligence quotient, the more intelligent the individual was and more successful one was considered to be. Being aware of one's logical mathematical intelligence can have wide educational implication in learning Mathematics. Reasoning, problem solving and decision – making represent different but it is an overlapping aspect of human intelligence. Although interrelated, research on each of these three aspects of thinking is enormous. Achievement refers to the knowledge attained or skills developed in the school subjects. Therefore intelligence and Achievement are very closely related. Furthermore, the finding of the present study will be useful for the modification of mathematics curriculum, amendment of syllabus, revision of evaluation pattern and also bringing in new, and holistic method of assessment in mathematics. Moreover students use many of the ways to learn their subject. One of the techniques they use is

'Rote Memorization'. The fact is that students start to memorize even mathematics today. Mathematics is a subject which needs logical thinking and reasoning ability to solve the problems. Rote memorization does not improve their skills like abstract thinking, logical thinking, reasoning skills, etc. The students could not analyze and synthesize the mathematical problems. Thus this study is an effort on the part of the investigator to find out significant relations if any between logical mathematical intelligence and Achievement in Mathematics.

OBJECTIVES OF THE STUDY

1. To find out the difference if any in Logical Mathematical Intelligence and its dimensions of standard IX students with reference to background variables such as Gender, Locality of school, Internet usage and Medium of instruction.
2. To find out the difference if any in Achievement in Mathematics of standard IX students with reference to background variables such as Gender, Locality of school, Internet usage and Medium of instruction.
3. To find out the significant relationship between if any in Logical Mathematical Intelligence and Achievement in Mathematics of standard IX students with reference to background variables such as Gender, Locality of school, Internet usage and Medium of instruction.

HYPOTHESES OF THE STUDY

1. There is no significant difference in Logical Mathematical Intelligence and its dimensions of standard IX students with reference to background

variables such as Gender, Locality of school, Internet usage and Medium of instruction.

2. There is no significant difference in Achievement in Mathematics of standard IX students with reference to background variables such as Gender, Locality of school, Internet usage and Medium of instruction.
3. There is no significant relationship between Logical Mathematical Intelligence and Achievement in Mathematics of standard IX students with reference to background variables such as Gender, Locality of school, Internet usage and Medium of instruction.

POPULATION OF THE STUDY

The population includes standard IX students of Tirunelveli district.

SAMPLE

The investigators has used the simple random sampling technique and randomly

selected 300 standard IX students from Tirunelveli district.

TOOLS

- i) Logical Mathematical Intelligence Scale constructed and validated by Maria Saroja.M and Meenakshi Kirthika. S (2013).
- ii) Mathematics marks obtained in the quarterly examination of standard IX students.

STATISTICAL TECHNIQUES USED

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

ANALYSIS OF DATA

Null hypothesis 1: There is no significant difference in Logical Mathematical Intelligence and its dimensions of standard IX students in terms of background variables such as Gender, Locality of school, Internet usage and Medium of instruction.

Table-1
Difference in Logical Mathematical Intelligence of Standard IX Students in Terms of Background Variables

Dimensions	Variables	Categories	N	Mean	SD	Calculated value	Table value	Remarks
Logical Reasoning	Gender	Male	144	5.46	2.171	7.69	1.96	S
		Female	156	7.23	1.817			
	Locality of school	Rural	124	6.55	1.805	1.12	1.96	NS
		Urban	176	6.26	2.407			
	Internet Usage	Yes	136	6.60	2.192	1.56	1.96	NS
		No	164	6.20	2.160			
	Medium of instruction	English	200	6.88	2.173	5.86	1.96	S
		Tamil	100	5.39	1.836			

Dimensions	Variables	Categories	N	Mean	SD	Calculated value	Table value	Remarks
Mathematical Reasoning	Gender	Male	144	6.01	2.089	6.11	1.96	S
		Female	156	7.43	1.921			
	Locality of school	Rural	124	7.12	2.090	2.56	1.96	S
		Urban	176	6.49	2.111			
	Internet Usage	Yes	136	6.90	2.113	1.09	1.96	NS
		No	164	6.63	2.128			
	Medium of instruction	English	200	7.12	2.171	4.33	1.96	S
		Tamil	100	6.02	1.820			
Everyday Mathematics	Gender	Male	144	5.73	2.339	5.21	1.96	S
		Female	156	7.15	2.366			
	Locality of school	Rural	124	6.84	2.307	2.21	1.96	S
		Urban	176	6.20	2.526			
	Internet Usage	Yes	136	6.85	2.496	2.50	1.96	S
		No	164	6.15	2.379			
	Medium of instruction	English	200	6.79	2.594	3.28	1.96	S
		Tamil	100	5.82	2.007			
Figure Reasoning	Gender	Male	144	7.27	2.120	4.58	1.96	S
		Female	156	8.38	2.090			
	Locality of school	Rural	124	7.94	1.941	0.57	1.96	N.S
		Urban	176	7.79	2.327			
	Internet Usage	Yes	136	8.18	1.975	2.44	1.96	S
		No	164	7.57	2.294			
	Medium of instruction	English	200	8.19	2.219	3.86	1.96	S
		Tamil	100	7.18	1.919			

Dimensions	Variables	Categories	N	Mean	SD	Calculated value	Table value	Remarks
Overall Logical Mathematical Intelligence	Gender	Male	144	24.49	6.776	7.44	1.96	S
		Female	156	30.20	6.513			
	Locality of school	Rural	124	28.48	6.790	2.06	1.96	S
		Urban	176	26.74	7.443			
	Internet Usage	Yes	136	28.53	7.523	2.36	1.96	S
		No	164	26.57	6.854			
	Medium of instruction	English	200	28.98	7.510	5.40	1.96	S
		Tamil	100	24.41	5.476			

It is inferred from table 1 that, there is a significant difference between male and female students in the dimensions of logical reasoning, mathematical reasoning, everyday mathematics, figure reasoning and overall logical mathematical intelligence. There is no significant difference between rural and urban school students in the dimensions of logical reasoning and figure reasoning, but there is a significant difference between rural and urban school students in the dimensions of mathematical reasoning, everyday mathematics and overall logical mathematical intelligence. There is no significant difference between internet using and internet not using students in the dimensions of logical reasoning and mathematical reasoning,

but there is a significant difference between internet using and internet not using students in the dimensions of everyday mathematics, figure reasoning and overall logical mathematical intelligence. There is a significant difference between English and Tamil medium students in the dimensions of logical reasoning, mathematical reasoning, everyday mathematics, figure reasoning and overall logical mathematical intelligence.

Null hypothesis-2: There is no significant difference in Achievement in Mathematics of standard IX students in terms of background variables such as Gender, Locality of school, Internet usage and Medium of instruction.

Table-2
Difference in Achievement in Mathematics of Standard IX Students in Terms of Background Variables

Variables	Categories	N	Mean	SD	Calculated Value	Table Value	Remarks
Gender	Male	144	63.87	16.754	3.21	1.96	S
	Female	156	70.17	17.211			

Variables	Categories	N	Mean	SD	Calculated Value	Table Value	Remarks
Locality of School	Rural	124	65.09	16.621	1.74	1.96	NS
	Urban	176	68.60	17.592			
Internet usage	Yes	136	69.38	18.560	2.04	1.96	S
	No	164	65.30	15.916			
Medium of instruction	English	200	69.16	17.932	2.89	1.96	S
	Tamil	100	63.12	15.111			

It is inferred from table-2 that there is no significant difference between rural and urban school students. Whereas there is a significant difference between male and female, internet using and internet not using, English and Tamil Medium standard IX students in their Achievement in Mathematics.

Null hypothesis-3: There is no significant relationship between Logical Mathematical Intelligence and Achievement in Mathematics of standard IX students in terms of background variables such as Gender, Locality of school, Internet usage and Medium of instruction.

Table-3

Relationship between Logical Mathematical Intelligence and Achievement in Mathematics of Standard IX Students in Terms of Background Variables

Variables	Categories	N	Calculated value	Table-value	Remarks
Gender	Male	144	0.314	0.159	S
	Female	156	0.191	0.138	S
Locality	Rural	124	0.282	0.174	S
	Urban	176	0.334	0.138	S
Internet Usage	Yes	136	0.324	0.159	S
	No	164	0.249	0.138	S
Medium of instruction	English	200	0.317	0.138	S
	Tamil	100	0.098	0.195	NS

It is inferred from the table 3 that there is a significant relationship between Logical Mathematical Intelligence and Achievement in Mathematics of male and

female, rural and urban school, internet using and internet not using, English medium standard IX Students. Furthermore there is no significant relationship between

Logical Mathematical Intelligence and Achievement in mathematics of Tamil medium standard IX students.

FINDINGS AND DISCUSSION

The 't' test result reveals that the female students are better than the male students in their logical reasoning, mathematical reasoning, everyday mathematics, figure reasoning and overall logical mathematical intelligence. This may be due to the fact that the female students think always logically and systematically. They could provide solution for the problem easily. In their day to day activities with knowing or without knowing problem solving ability develop in female instinctively. They analyze the problem and take decision rationally. This may be the reason that female students have high estimate of Logical Mathematical Intelligence compared to male students.

The 't' test result reveals that the rural school students are better than the urban school students in their mathematical reasoning, everyday mathematics and overall logical mathematical intelligence. This may be due to the fact that rural school students are aware of their responsibility. Moreover the number of student in the rural school is comparatively low. As a result the teacher can pay more individual attention to develop life skills. So automatically they develop themselves some skills like, experimentation, constructional and problem solving ability. In Rural school the compassion between the students and teacher may act as a catalyst in developing the intelligence of the students. So they put a combined effort for the enrichment in academic activities of the school. This may

be the reason that rural school students are better than the urban school students in their Logical Mathematical Intelligence.

The 't' test result reveals that the internet using students are better than the students who do not use internet in their everyday mathematics, figure reasoning and overall logical mathematical intelligence. This may be due to the fact that internet using students have more exposure. Many online websites are available to improve their logical skill. Self-learning can also be done through internet. By playing online puzzles, riddles, quizzes, their brain get sharpened. So they automatically start to think logically. This may be the reason that internet using students have better Logical Mathematical Intelligence than that of those students who do not use internet.

The 't' test result reveals that the English medium students are better than the Tamil medium students in their logical reasoning, mathematical reasoning, everyday mathematics, figure reasoning and overall logical mathematical intelligence. This may be due to the fact that English medium students have more opportunities to access E-resources. Most of the Mathematical websites are in English only. Many resources like E – Learning, E– Book, are also available only in English. They can use these facilities and develop their rational thinking skill. This may be the reason that English medium students are better than Tamil medium students in their Logical Mathematical Intelligence.

The 't' test result reveals that the female students are better than the male students in their Achievement in mathematics. This may be due to the fact that female students

know their responsibilities well. They put forth their effort sincerely and work hard to compete with their peer groups to achieve their target. They practice mathematical problems which gives them an edge over the boys who usually are easy going and hardly spend long hours in studying. This may be the reason that female students score more in Mathematics than the male students.

The 't' test result reveals that the internet using students are better than the internet not using students in their Achievement in mathematics. This may be due to the fact that internet can be used for solving many problems related to the academic difficulties. Through online they can write many tests and even they can clarify their doubt from experts. Step by step procedure of solving mathematical problems can be learned through internet. This may be the reason that students those who use internet are better than that of those students who do not use internet in their Achievement in mathematics.

The 't' test result reveals that the English medium students are better than the Tamil medium students in their Achievement in mathematics. This may be due to the fact that English medium students understand and learn each and every concept in solving the maths problems clearly. They put extra effort and work out all the problems before they appear for their exam. Moreover their ability in maths is periodically evaluated through test and which in turn foster their score. This may be the reason that English medium students are better than Tamil medium students in their Achievement in mathematics.

The 'γ' test result reveals that there is significant relationship between logical mathematical intelligence and Achievement in mathematics of standard IX students. This may be due to the fact that logical mathematical intelligence involves a strong ability to analyze problems and issues logically, excel at mathematical operations and carry out scientific investigations. Mathematics is a subject that requires logical thinking. Every problems in mathematics needs to reason out clearly. Without understanding reasoning is not possible. One of the very important requirements of solving a mathematical problem is ability to analyze and synthesize. So there exists a significant relationship between logical mathematical intelligence and Achievement in mathematics of standard IX students.

The 'γ' test result reveals that there is significant relationship between logical mathematical intelligence and Achievement in mathematics of male standard IX students. This may be due to the fact that male students are able to learn just about anything using their logical skills. They are ready to face mental challenges, seeking out solutions very quickly to logical and mathematical problems and have good deductive reasoning. So they achieve high in mathematics also. Hence there exists a significant relationship between logical mathematical intelligence and Achievement in mathematics of male students.

The 'γ' test result reveals that there is significant relationship between logical mathematical intelligence and Achievement in mathematics of female standard IX students. This may be due to the fact that

female students have scientific approach to thinking. They can perceive relationships and connections and also use abstracts, symbolic thoughts, and sequential reasoning skills, inductive and deductive thinking patterns. They use higher order thinking skills and their involvement is more in participating quizzes and solving puzzles. So there exists a significant relationship between logical mathematical intelligence and Achievement in mathematics of female students.

The 'γ' test result reveals that there is significant relationship between logical mathematical intelligence and Achievement in mathematics of rural school standard IX students. This may be due to the fact that rural school students are good at reasoning. Basically the rural school students have problem solving ability and have an ability to use numbers effectively. Each and every aspects of the problem are reasoned out by them through probing questions. They use different strategy and methods to do the problem. It is very easier for them to mentally carry out complicated calculations. So there exists a significant relationship between logical mathematical intelligence and Achievement in mathematics of rural school students.

The 'γ' test result reveals that there is significant relationship between logical mathematical intelligence and Achievement in mathematics of urban school standard IX students. This may be due to the fact that urban school students have many opportunities in their school itself. They always understand the concept and think

in numerical terms, mathematical patterns and logical sequence. They are also given training to use their logical intelligence to accomplish their everyday activities. They look for rational explanations and are capable of inventing their own algorithms to solve a problem. So there exists a significant relationship between logical mathematical intelligence and Achievement in mathematics of urban school students.

The 'γ' test result reveals that there is significant relationship between logical mathematical intelligence and Achievement in mathematics of internet using standard IX students. This may be due to the fact that internet using students love computer. They play puzzle oriented games in internet which develop their abstract thinking. They use their higher order thinking skills and develop their own mathematics quizzes also. They have more interested in doing experiments in a logical way and hence they solve problems easily. So there exists a significant relationship between logical mathematical intelligence and Achievement in mathematics of internet using students.

The 'γ' test result reveals that there is significant relationship between logical mathematical intelligence and Achievement in mathematics of internet not using standard IX students. This may be due to the fact that internet not using students can engage in a variety of logical intelligences activities in the class room, including brain teasers, strategically games, logical puzzles and any games that challenge their mental activities. This in turn develops their scientific thinking

and widens their knowledge. Therefore automatically their achievement also rises up. So there exists a significant relationship between logical mathematical intelligence and Achievement in mathematics of internet not using students

The 'γ' test result reveals that there is significant relationship between logical mathematical intelligence and Achievement in mathematics of English medium standard IX students. This may be due to the fact that English medium students adapt different learning techniques like demonstration strategy, deductive and inductive method. Most of the books on quizzes, puzzles, riddles are in English. So they grasp variety of problem solving skills and possible approaches to understand the concept. Many of these students can compute the answers mentally without using scrape paper. They always have creative thinking and are good at solving complex problems. So there exists a significant relationship between logical mathematical intelligence

and Achievement in mathematics of English medium students.

CONCLUSION

In the present study investigator points out that there is a significant relationship between Logical Mathematical intelligence and Achievement in Mathematics of Standard IX students. It reveals that students who have good Logical Mathematical intelligence, score good marks in Mathematics. The knowledge of the study would be useful for the students, parents, teachers, teacher educators, educational planners, administrators and society at large. The results may be an eye opener for the teachers to enhance in students the logical thinking, reasoning ability and to promote various skills. Furthermore, the finding of the present study will be useful for the modification of mathematics curriculum, amendment of syllabus, revision of evaluation pattern and also bringing in new, and holistic method of assessment in mathematics.

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A COMPARATIVE STUDY BETWEEN RURAL AND URBAN HIGH SCHOOL STUDENTS REGARDING THE INFLUENCE OF EXTRA CURRICULAR ACTIVITIES ON ACADEMIC ACHIEVEMENT

8

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INTRODUCTION

Curriculum is the most vital phase of educational process. It has been widely acknowledged that, if the curriculum is designed with suitable components, the development of education will be faster and in proper perspective. The co-curricular activities and extra-curricular activities as the All India Educational Survey has stressed is an essential and interrelated component of the curriculum. At the same time to cater to the needs of the growing children growing with all modern amenities and new gadgets, it is necessary to provide them with more opportunities to develop their multi faced skills. But all such things cannot be brought under the umbrella of curriculum which aims at giving the best of basic skills. Reacting to this urgent need, the co-curricular and the extra-curricular activities were included as part of the curriculum. They realize that the extra-curricular and the co-curricular activities as an integral part of a school programme lend themselves to enriching student's learning and enlivening the school atmosphere, students acquire many extra learning skills like human values, beliefs, manners and thinking patterns through hidden curriculum which is also

manifested in co-curricular and extra-curricular activities. The importance of extra-curricular activities in education had been established by many researchers over a long period of time. Therefore whenever curriculum is modified or restructured, the domain of extra-curricular activities attracts educationalists in the design of curriculum.

NEED FOR THE STUDY

Curriculum as noted earlier is very vital in education. The enrichment of curriculum can be realized only if its supplemental components are also considered essential and granted due place for them in the curriculum. The main supplement is extra-curricular activities. Though various researchers have established the importance of extra-curricular activities based on the prevailing conditions at present, the contribution to the main stream that is, curricular activities has not yet been brought out fully. In the past years, various revisions of curriculum were undertaken. But new variants and varieties of extra-curricular activities have not been identified and included in the syllabi. The justification for the inclusion of extra-curricular activities must have some basis, as the achievement

in curricular subjects is considered to be the main goal of educational process. Therefore the supplemental nature of extra-curricular activities is to be studied. While thinking of the inclusion of extra-curricular activities in the syllabus, the identification of different extra-curricular activities becomes very essential. In identifying the extra-curricular activities, the sociological and psychological aspects are to be taken into account. Hence a study on the correlated nature of extra-curricular activities and achievement is thought to be essential.

OBJECTIVES OF THE STUDY

The objectives of the study are

- ★ To find out the level of extra-curricular activities among the high school students.
- ★ To find out the level of academic achievement in science and other subjects among the high school students.
- ★ To find out the influence of extra-curricular activities on academic achievements with respect to location of school.
- ★ To find out the influence of Extra-curricular activities and academic achievement with respect to Low and High Level of Extra-curricular Activities students.

HYPOTHESES OF THE STUDY

The hypotheses of the study are given below

1. There is no significant mean difference in the extra-curricular activities in total

and the academic achievement in total of the students with low and high extra-curricular Activities.

2. There is no significant mean difference in the extra-curricular activities in total and the academic achievement with regard to the demographic variable locality.

METHODOLOGY

The present study belongs to Survey research, as it measures the existing level of extra – curricular activities and academic achievement of the high school students.

Sample of the study

The Stratified Random Sampling Technique was followed in the study. Various schools of Vellore District were selected for the sample. The size of the sample is 862 students among which 435 Students are selected from schools located in rural areas and 427 students from schools located in urban areas.

Tools used

Two types of questionnaires were taken as tools for collection of data. In the first type of Extra-curricular Activities Questionnaire consists of 42 questions in five points rating scale. It deals with Extra-Curricular Activities like Physical Activities, Art activities, Citizenship Activities and Information Technology Activities. In the second type, Academic Achievement Questionnaire consists of 96 questions with 4 point rating scale. It deals with Academic Achievement in Mathematics, Science and Social Science.

ANALYSIS AND INTERPRETATION

The collected data were analysed with different statistical techniques and the results are presented in two types as follows.

- **Descriptive Analysis**

Mean and Standard Deviation scores of the extra-curricular and academic achievement for Low and High level of extra-curricular activities, students were presented under this section.

- **Inferential Analysis**

The 't' test was used to analyze the significant difference and correlation co-efficient 'r' was used to find out the

significant relationship between the Mean scores of extra-curricular and academic achievement, among the Low and High level of extra-curricular Activities students and the results are presented under this section.

1. LOW LEVEL EXTRA-CURRICULAR ACTIVITIES AND THE ACADEMIC ACHIEVEMENTS

This section deals with the analysis of the Mean Scores and Standard Deviation of the Low Level of Extra-curricular Activities. The results are presented in the following Tables 1 and 2.

Table-1

Mean and SD of the Low Level Extra-curricular Activities

Category	Mean	SD
Physical Activities	38.96	15.68
Arts Activities	43.87	13.90
Citizenship Activities	46.32	15.19
Information Technology Activities	37.35	15.99
Total	41.63	15.19

From the Table-1, it is understood that Mean Average Scores of the Low Level of Extra-curricular Activities in Total among the Students is 41.63 and Standard Deviation is 15.19. Further on observing the results it

is be noticed that the scores are high among the factor Citizenship Activities 46.32 and is least among the Information Technology Activities 37.35.

Table-2

Mean and SD of the Low Level Academic Achievements

Category	Mean	SD
Achievement in Mathematics	33.72	14.47
Achievement in Science	45.24	17.09
Achievement in Social Science	37.18	23.35
Total	38.71	18.30

From the Table-2 it is clearly seen that Mean Scores of the Academic Achievement in Low Level of Extra-curricular Activities Students is 38.71 and Standard Deviation is 18.30 Further on observing the results it is obviously that the Mean Scores are high in the Science subject 45.24 and is least in the Mathematics is 33.72 whereas regarding the subject Social Science it is moderate is 37.18.

2. HIGH LEVEL OF EXTRA-CURRICULAR ACTIVITIES AND THE ACADEMIC ACHIEVEMENTS

This section deals with the analysis of the Mean Scores and Standard Deviation of the High Level of Extra-curricular Activities. The results are presented in the following Tables 3 and 4.

Table-3

Mean and SD of the High Level of Extra-curricular Activities

Category	Mean	SD
Physical Activities	66.37	20.38
Arts Activities	72.12	17.03
Citizenship Activities	76.51	17.03
Information Technology Activities	73.83	20.58
Total	72.21	18.75

From the Table-3 it is understood that Mean Scores of the High Level of Extra-curricular Activities is 72.21 and Standard Deviation is 18.75. Further on observing the results it is be noticed that the scores

are high among the factor Citizenship Activities 76.51 and is least among the Physical Activities 66.37, whereas the arts activities mean score is 72.12.

Table-4

't' Values of the Mean Scores of Extra-curricular Activities in Total and its components between Rural and Urban Students of Low and High Level of Extra-curricular Activities

Category N		Low Extra Curricular Activities				High Extra Curricular Activities			
		Mean	SD	't' value	N	Mean	SD	't' value	
Extra-curricular Activities in Total	R	435	40.95	10.75	1.93**	133	71.43	8.74	1.28**
	U	427	42.32	10.13		183	72.48	9.87	
Physical Activities	R	435	39.08	15.59	0.22**	133	62.96	17.98	2.63*
	U	427	38.85	15.79		183	68.85	21.67	

Category N		Low Extra Curricular Activities				High Extra Curricular Activities			
		Mean	SD	't' value	N	Mean	SD	't' value	
Arts Activities	R	435	42.70	13.80	2.50*	133	71.39	16.79	0.65**
	U	427	45.06	13.92		183	72.65	17.22	
Citizenship Activities	R	435	45.27	15.54	2.05*	133	77.23	17.30	0.64**
	U	427	47.39	14.77		183	75.99	16.86	
Information Technology Activities	R	435	36.76	16.24	1.10**	133	74.14	19.08	0.23**
	U	427	37.96	15.72		183	73.61	21.65	

*Significant at 0.05 Level

**Not Significant at 0.05 Level

From the Table-4 it is clearly seen that the 't' values 2.52, 2.05 and 2.63 are Significant whereas the values 1.93, 0.22, 1.10, 1.28, 0.65, 0.64 and 0.23 are not Significant at 0.05 level. It is inferred that, the influence of the Arts and Citizenship

Activities of Low Level of Extra-curricular Activities students and Physical Activities of High Level of Extra-curricular Activities students among the urban students are more than the rural students.

Table-5

't' Values of the Mean Scores of Academic Achievement in Total and the other subjects of Low and High Level of Extra-curricular Activities between the Rural and Urban Students

Category N		Low Extra-curricular Activities				High Extra-curricular Activities			
		Mean	SD	't' value	N	Mean	SD	't' value	
Achievement in Total	R	435	39.78	16.10	2.12*	133	42.49	17.32	4.00*
	U	427	37.63	13.53		183	35.47	13.81	
Achievement in Mathematics	R	435	35.40	15.34	3.47*	133	37.59	18.13	2.76*
	U	427	32.01	13.32		183	32.54	14.36	
Achievement in Science	R	435	44.20	18.89	1.81**	133	42.53	19.90	0.08**
	U	427	46.30	14.99		183	42.38	15.12	
Achievement in Social Science	R	435	39.74	23.71	3.27*	133	47.34	25.03	6.06*
	U	427	34.57	22.70		183	31.48	21.33	

*Significant at 0.05 Level

**Not Significant at 0.05 Level

From the Table-5 it is understood that the 't' values 2.12, 3.47, 3.27, 4.00, 2.76 and 6.06 are Significant and the values 1.81 and 0.08 are not Significant at 0.05 level. By means of the results it implements that both Low and High Extra-curricular Activities Students, the Academic Achievement in

Total and in the Subjects Mathematics and Social Science among the Rural students were better than the Urban students whereas the Achievement in Science among the students of both Low and High Level of Extra-curricular Activities irrespective of the Locality Rural or Urban were similar.

Table-6
Mean and SD of the Academic Achievements of High Level of Extra-curricular Activities

Category	Mean	SD
Academic Achievement in Mathematics	34.67	16.22
Academic Achievement in Science	42.44	17.26
Academic Achievement in Social Science	38.16	24.23
Total	38.42	19.23

From the Table-6 it is clearly seen that Mean Scores of the Academic Achievement in High Level of Extra-curricular Activities is 38.42 and Standard Deviation is 19.23. Further on observing the results it is

obvious that the Mean Scores are high in the Science subject 42.44 and is least in the Mathematics is 34.67 whereas regarding the subject Social Science it is moderate i.e., 38.16.

Table-7
'r' Values between the Mean Scores of Extra-curricular Activities and the Academic Achievements in Total of the Low Level of Extra-curricular Activities Students with regard to the Demographic Variables

Category		N	Achievement in Total		Extra-curricular Activities		'r' Value
			Mean	SD	Mean	SD	
Total		862	41.63	10.47	38.71	18.30	0.31**
Locality	Rural	435	40.95	10.75	39.78	16.10	0.03**
	Urban	427	42.32	10.13	37.63	13.53	0.12**

*Significant at 0.05 Level

**Not Significant at 0.05 Level

From the Table-7 it is understood that the 'r' values 0.03 and 0.12 are not Significant at 0.05 levels. It is inferred from the results that there is no significant relationship between the Mean Scores

of Extra-curricular Activities and the Academic Achievements in Total of the Low Level of Extra-curricular Activities Students with regard to the locality of the school.

Table-8

'r' Values between Mean Scores of Extra-curricular Activities and the academic Achievements in Total of the High Level of Extra-curricular Activities Students with regard to the Demographic Variables

Category	N	Achievement in Total		Extra-curricular Activities		'r' Value	
		Mean	SD	Mean	SD		
Total	316	72.21	18.75	38.42	19.23	0.02**	
Locality	Rural	133	71.43	8.74	42.49	17.32	0.07**
	Urban	183	72.78	9.87	35.47	13.81	0.002**

*Significant at 0.05 Level

**Not Significant at 0.05 Level

From the Table-8 it is understood that the 'r' values, 0.07 and 0.002 are not Significant at 0.05 levels. It is inferred from the results that there is no significant relationship between the Mean Scores of Extra-curricular Activities and the Academic Achievements in Total of the High Extra-curricular Activities Students with respect to their locality.

FINDINGS OF THE STUDY

The findings of the study are given below

1. Low Level Extra-curricular Activities in Total among the Students is 41.63 and is high among Citizenship Activities 46.32 and is least among Information Technology Activities 37.35.
2. Academic Achievement in Total among the Low Level Extra-curricular

Activities Students is 38.71 and is high in the Science subject 45.24 and is least in the Mathematics i.e., 33.72 whereas regarding the subject Social Science it is 37.18.

3. High Level Extra-curricular Activities in Total among the Students is 72.21 and is high among Citizenship Activities 76.51 and is least among the Physical Activities 66.37.
4. The Academic Achievement in Total among the High Level Extra-curricular Activities Students is 38.42 and is high in the Science subject 42.44 and is least in the Mathematics i.e., 34.67 whereas regarding the subject Social Science it is 38.16.
5. The influence of the Arts and Citizenship Activities of Low Level Extra-curricular Activities and Physical Activities of

High Level Extra-curricular Activities students of Urban Locality are more than the Rural Locality students.

6. In both Low and High Level Extra-curricular Activities Students, the Academic Achievement in Total and in the Subjects Mathematics and Social Science among the rural students were better than the urban students whereas the Achievement in Science among the students of both Low and High Level Extra-curricular Activities irrespective of the Locality Rural or Urban were similar.

CONCLUSION

The study found that the level of extra curricular activities and achievement in academic subjects are found to be less

than average among both rural and urban students. It also found that the citizenship activities have more influence than the other extra curricular components. It is inferred that the influence of the Arts and Citizenship Activities of the students of Low Level of Extra-curricular Activities and Physical Activities of High Level of Extra-curricular Activities students among the urban students are more than the rural students. The awareness found in the academic achievement with low and high level of Extra-curricular Activities, mathematics subject was comparatively low among all variables and for the subject of social science it is moderate. It is to be found that the urban students achieved more in science in comparison to the rural students.

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ACHIEVEMENT IN CHEMISTRY OF FIRST YEAR HIGHER SECONDARY STUDENT'S IN RELATION TO THEIR SCIENTIFIC APTITUDE

9

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INTRODUCTION

Education is a continuous and vital process through which an individual acquires knowledge, skills, aptitude and attitude which are essential for achieving success in one's life. Therefore, education must impart academic knowledge, efficiency and skill which makes the learner to contribute his own to the development of the country. Society expect more from the schools. School is a place where an individual gain all sorts of experiences and their achievement is periodically evaluated to fulfil the educational goals. Science is the systematized and classified knowledge achieved by the experimental studies of nature. Secondary and Higher secondary schools in all countries given a higher priority and status to science education.

The Kothari commission (1964-66) clearly stated about compulsory teaching of physics, chemistry, biology and earth sciences. Chemistry is a branch of science which deals about understanding of the matter which makes up our world. Modern society looks to chemists to produce many things such as healing drugs, pesticides,

fertilizers to ensure better crop production, and chemicals for the many synthetic materials which are fulfilling man's sophisticated way of living. Chemistry is a dynamic and vital force in our daily life. It touches every phase of human activity. The modern world requires scientific training. A good programs of chemistry education shall aim at imparting a sufficient quantum of scientific knowledge in various fields to all and ultimately developing a scientific out look in them. This should be done from the school level onwards when they are learning science. Hence the student's achievement in chemistry is very important for a healthy achievement.

According to Padma, (1989), Desire for a high level of achievement puts a lot of pressure on students, teachers, schools and in general the educational system itself. Various factors which influence the achievement are identified through research(Shankar 2011). Scientific aptitude is a potentiality of future accomplishment in science without past training and experience. An individual with right aptitude towards science develops better scientific aptitude which is useful in

selecting a career. Scientific aptitude is the application of general intellectual capacity to scientific materials and problems. In the field of education scientific aptitude tests are used principally for guidance and Counselling classification.

REVIEW OF RELATED LITERATURE

Moraddhwaj varma (1967) under took a study to investigate the relationship between achievement in science and scientific aptitude.

Padmanaban.K (2007) conducted a study on the achievement in Science of Higher secondary students as related to their scientific Aptitude.

STATEMENT OF THE PROBLEM

Achievement in chemistry of first year Higher secondary student's in relation to their scientific aptitude.

OBJECTIVES OF THE STUDY

- ★ To know the level of scientific aptitude of first year higher secondary students.
- ★ To find out the significant difference between scientific aptitude of first year higher secondary students with respect to the
 - Gender (Boys/Girls),
 - Location of schools (Urban/Rural),
 - Types of schools (Govt/ Aided/ Private),
 - Parental annual income (>Rs.12,000/ < Rs.12,000), and
 - Parental educational qualification (School education/ College education)

- ★ To find out the relationship between chemistry achievement and scientific aptitude & its dimensions of first year higher secondary students.
- ★ To find out the relationship between chemistry achievement and reasoning ability of first year higher secondary students.
- ★ To find out the relationship between chemistry achievement and numerical ability of first year higher secondary students.
- ★ To find out the relationship between chemistry achievement and scientific information of first year higher secondary students.
- ★ To find out the relationship between chemistry achievement and scientific vocabulary of first year higher secondary students.

HYPOTHESES

1. The scientific aptitude of first year higher secondary student is very low
2. There is no significant difference between scientific aptitude of first year higher secondary students with respect to
 - Gender (Boys & Girls),
 - School location (Urban & rural),
 - Types of schools (Govt, Aided and private),
 - Parental annual income (>Rs.12,000 Per year and < Rs.12,000 Per year), and
 - Parental educational qualification (School education & College education).

3. There is no relationship between the chemistry achievement and scientific aptitude of first year higher secondary students.
4. There is no relationship between the chemistry achievement and reasoning ability of first year higher secondary students.
5. There is no relationship between the chemistry achievement and numerical ability of first year higher secondary students.
6. There is no relationship between the chemistry achievement and scientific information of first year higher secondary students.
7. There is no relationship between the chemistry achievement and scientific vocabulary of first year higher secondary students.

OPERATIONAL DEFINITION USED

1. Achievement in chemistry

Achievement in chemistry is the percentage of mark secured by the student in chemistry subject of first year higher secondary education.

2. Scientific aptitude

A test that measure the reasoning ability, numerical ability, science information and science Vocabulary level of students.

3. Higher secondary School

Schools which impart +2 pattern of study after secondary education.

METHODOLOGY

For the present investigation, Normative survey method was employed.

POPULATION OF THE STUDY

Both boys and girls studying in first year higher secondary school from the general education stream was considered as a population for this research study during the academic year 2011-2012. Namakkal district consist of number of higher secondary schools, from which three school were selected for this pilot study.

SAMPLE AND SAMPLING TECHNIQUE

The investigator have selected a sample of 60 first year higher secondary chemistry students from three schools in Namakkal district. The sample has been selected by applying simple random technique.

TOOL DEVELOPMENT AND STANDARDIZATION

Achievement questionnaire was constructed for the syllabus of eleventh standard chemistry subject. Questions were taken from all the twenty units. Then it was scrutinized to ensure the genuineness of the tool to be used. From 105 questions, 50 questions based on multiple choice was finalized and standardized. The face validity was ensured by arriving Jurie opinion from subject experts and reliability of the tool based on test-retest method was found as 0.85. The square root of reliability gives the intrinsic validity. Therefore the intrinsic validity of the CAQ - 0.85 is 0.9219.

The standardized scientific tool devised by K.K Agarwal – Scientific aptitude Test

year Battery – SATB(1970) was used to quantify the scientific ability. The SATB consisted of the following sub tests. a. Reasoning ability (52 items), b. Numerical ability (52 items) c. Scientific information (52 items) and d. Science vocabulary test (56 items). Science information test and science vocabulary test totally measures the scientific interest. The reliability of the test – retest was 0.94.

SCORING PROCEDURE

For both the tools, the wrong and left out

Range of Marks	Level of Achievement in Chemistry
Less than 25	Low Achievers
Marks between 25-30	Average Achievers
Greater than 30	Higher achievers

For SATB (Scientific Aptitude Test and the following norms are interpreted. Battery-1970), the maximum score is 210

S.No	Score Range	Level of Scientific Aptitude
1	171 and above	High
2	170-133	Above Average
3	132-80	Average
4	79-48	Below Average
5	Less than 48	Low

DATA COLLECTION PROCEDURE

After getting prior permission from the head of the schools, the investigator met

questions from collected answer sheets were crossed out and then the number of correct answer is counted. The maximum score for chemistry Achievement questionnaire (CAQ) is 50 and for the Scientific Aptitude test Battery (SATB) is 210.

NORMS AND INTERPRETATION

For CAQ, the maximum score is fifty and norms for interpretation of achievement is given below.

the students and explaining the procedure for answering the tools without leaving any options. The completed answer sheets

were collected and subjected to correction based on scoring Key. The scored data was subjected to following statistical analysis.

- ★ Descriptive Analysis (Mean and Standard Deviation)
- ★ Differential Analysis (t- test)
- ★ Correlational Analysis (r- correlation)

LIMITATIONS OF THE STUDY

- ★ Study restricted to first year higher secondary chemistry subject during the

academic year 2011-2012 and those in the vocational stream could not be selected.

- ★ Sample restricted to 60 as it is of pilot study.
- ★ Only three schools(Government, aided and management) were taken for this study.
- ★ Schools of special category doesn't taken for this study.

FINDINGS

Table-1

Mean and standard deviation value of scientific aptitude of Higher secondary first year chemistry students

S.No	Total Sample (N)	Mean (M)	Standard Deviation (SD)	Level of Scientific Aptitude
1	60	92.382	14.15	Average

Maximum Score : 210 Percentage: 44.20%

Table-2

Mean values of low, average & high achiever's and scientific aptitude of higher secondary first year chemistry students.

S.No	Level of achievement maximum score	Scientific Aptitude	Chemistry Achievement
1	Chemistry - Higher Achievers (Scores > 30, N=8)	98.79	31.12
2	Chemistry- Average Achievers (Scores between 25 & 30, N= 12)	90.12	26.42
3	Chemistry - Low Achievers (Scores < 25, N=30)	88.23	17.31
	Total	92.382	24.66

Table-3

The test of significance (t- test) values of scientific aptitude of Higher secondary first year chemistry students

S. No	Demographic Variables	Sub Variables	N	M	S.D	t-value	Significance at 0.05level
1	Gender	Boys	35	72.11	16.53	1.8374	S
		Girls	25	80.23	17.12		
2	Type of School	Government	18	81.12	15.32	0.9287	NS
		Aided	16	86.32	17.12		
		Aided	16	86.32	17.12	2.2744	S
		Management	26	98.16	19.12		
		Management	26	98.16	19.12	3.2733	S
		Government	18	81.12	15.35		
3	Parental Annual income	>Rs.12,000 per Year	36	88.16	17.86	1.6673	S
		< Rs.12,000 per year	24	79.99	19.11		
4	Parental Educational Qualification	School Education	22	92.31	18.13	2.4499	S
		College Education	38	103.12	13.12		

S- Significant

NS- Not Significant

Table-4

Correlation co-efficient values of chemistry achievement and scientific aptitude and its dimensions

S.No	Dependent Variable	Independent Variable	N	r	Level of Significance
1	Chemistry achievement	Scientific aptitude	60	0.4182	0.01
2	Chemistry achievement	Reasoning ability	60	0.3669	0.01
3	Chemistry achievement	Numerical ability	60	0.3275	0.01
4	Chemistry achievement	Scientific information	60	0.2732	0.01
5	Chemistry achievement	Scientific Vocabulary	60	0.3712	0.01

ANALYSIS AND INTERPRETATION

1. Descriptive Analysis

From Table-1&2, it was found that the overall scientific aptitude of first year chemistry student is 92.382 and their achievement in chemistry is 24.06. Therefore, they have average scientific aptitude (43.99%) and low achievement (41.10%) in chemistry.

2. Differential analysis

It was found from the Table: 3, there is significant difference between scientific aptitude of first year chemistry students with respect to gender (Boys/Girls), Type of schools (Aided / Management and / Government), Parental annual income (>Rs.12,000 Per year and < Rs.12,000 Per year), Parental Educational qualification (School Education/ College Education). There is no significant difference between scientific aptitude of first year chemistry students of Government and aided schools.

3. Correlational Analysis

It is also confirmed from the table-4, that there is a positive relationship exist between chemistry achievement and scientific aptitude & its dimensions (Such as Reasoning ability, Numerical ability, Scientific information and scientific vocabulary)

CONCLUSION

The above study shows that the first year chemistry students have poor scientific aptitude and low achievement in chemistry. There is an expected level of relationship exist between above chosen variables. Therefore, it is confirmed that

scientific aptitude of students influences their achievement in chemistry

EDUCATIONAL IMPLICATIONS

- ★ Only (8/60= 13.33%) of first year higher secondary students of higher achievers have (98.79/210) = 47.04% of scientific aptitude. As higher secondary education is the gateway of professional and higher degree courses, students must avoid their distractions and may concentrate more in their studies. A self regulatory learning strategies practiced by students will definitely improve their achievement. (Chung, Ed. D, 2006)
- ★ Highly self regulated teacher plan and hard work will improve students achievement (Bandura, 1993). So, teacher must concentrate towards students liking, interest, aptitude and their achievement. They have to motivate higher achievers and also help to average and poor achievers to excel from their achievement by remedial strategies or personalised assisted instruction or individualised instruction.
- ★ Parents must support their wards in developing appropriate skill, attitude and aptitude by individual and friendly care. Students studying at higher secondary education level are adolescents. Parents are the first teachers of their children. So, parents take more responsible steps to improve students achievement as well as scientific aptitude.
- ★ Lack of attendance, minimum infrastuctural facilities like laboratories, library, no provision for science

club activities, non-conductance of exhibition, science fair and field work by schools put a stay in students scientific aptitude. Schools must conduct exam periodically and other such curricula & co-curricular activities to motivate their potential excellence.

- ★ Rapid science and technical development leads to inclusion of more syllabus in the present curricula put a lot of stress to students in learning. Schools also insist and appreciate regular parent and teacher meeting to know their level of wards achievement, scientific aptitude and their difficulties faced while learning during their course of study.
- ★ Government must insist and pay a way to implement normal student teacher ratio as suggested by Kothari Commission (1964) as 30:1.
- ★ Science Fair, Science Corner , Science exhibition, science forum, science club activities should be conducted

and make students to participate to promote Scientific aptitude.

- ★ More strength in particular class section lacks care from teachers by individual attention. Another fate is the mere passing percentage for theory science subjects like physics, chemistry, Biology, Botany, zoology, Home science, Bio-Chemistry and computer science are from 40/150 to 30/150. This may enhanced to atleast 75/150 so that students may concentrate more in their subjects.
- ★ Educational authorities at state and district level must insist more attention in percentage of public results.
- ★ Education ministry and state government must revised exist norms and must implement laboratory as a compulsory aspect in present curricula from primary education level to develop appropriate scientific aptitude among the students.

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OPINION OF THE B. ED. TEACHER TRAINEES TOWARDS LIFE SKILLS EDUCATION

10

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INTRODUCTION

The role of education is to prepare healthy human beings for the society. These human beings are the assets of the country. The development of society & nation is carried by these human resources. So, the preparation of human resources is most important and crucial. The task of preparation of human resources is carried out by the education system. The aim of education is to achieve holistic development of the students. Therefore, the role of education is not just to enable the children to acquire knowledge but also to equip them with the ability to handle the stress and strain, ups and down of life. There are number of approaches to develop the human capital; however the approach should be holistic, in this sense, emphasizes development of knowledge, skills, intellectuality & professionalism and also involves inculcation of progressive attitude & high ethical & moral values. That is why the 164 nations committed to "Education for All" have included "Life Skills" as a basic learning need for all young people. School should incorporate

components of life skills education to train young minds to combat stress and anxiety. For this purpose, the present day, teachers need to become proactive. First and for most, they should themselves learn and then teach their students the tricks of handling their problems, needs etc. The school environment is likely to facilitate the acquisition of competencies in Indian children, as it is viewed as a place of learning (Rambaldo, et.al., 2001). Life Skill Education should be included as a major practical component of teacher education curricula across the country so that the future teachers being trained in College of Education will be well equipped to handle & guide their students in this area.

RATIONAL

The country having healthy human resources can develop faster. So, education has to develop healthy human resources. Now a day, Indian society has been facing number of problems. Near about 70 to 80 percentage population suffer from physical diseases such as cancer, diabetics, heart attacks, blood pressure etc. mental diseases like, depression, phobia, anxiety, stress &

strain etc. also there are so many social problems like, pollution, lack of drinking water, shortage of energy resources, waste management, and depletion of ozone layer and so on. People are suffering from social abuse due to increase in suicides, rape cases, miss/damsel mothers, dearth, and dowry system. At globe terrorism is the biggest problem. India is also facing this problem. Today India is experiencing threat of terrorism very frequently. All these problems are due to lack of appropriate education. If we observe into the reason causes of these problems, it is clear that the people lack in skills of thinking and managing. The education is not able to develop such kind of abilities in the persons and due to that reason imbalance is found in the Indian society. So, there is a need to bring out the necessary changes in education system. Life Skill Education is one of the ways to produce competent citizens for future Indian society.

In this context, teacher is not instructor but a molder of human personality. Teacher is not only a transmitter of knowledge but also as an innovator, agent of change. The teacher's pleasant privilege is to shape the children to the nation into useful citizens of tomorrow. To do this he/she is expected to be a good person, competent in his/her subject and full of enthusiasm with meaningful social relationships.

The quality of education depends upon various factors such as teaching,

approach of the teacher towards teaching, educational facilities, the environment available in the school/colleges. Teacher plays a prominent role in these factors which are most important in enhancing quality of education. So, it is necessary for a teacher to acquire all the skills which are essential for his/her teaching profession. Updating the teachers with life skills is not only important for his/her career proficiency but also it helps to mould the future generations as integrated personality. The teacher should helps the students not only to acquire the right knowledge but also values, attitudes, habits & skills. These are necessary to cope with the world of tomorrow. Teacher trainees are to become a good teacher as they cater to the development of student's personality. They have a great responsibility in developing the society with values & culture. To transmit the values & culture to the students, the life skills education is needed at various levels. Teacher trainees have to play the important role in inculcating the life skills among students, so their opinion towards life skills education should become positive. They should be life skills education oriented. From this point of view, it is necessary to study the teacher trainees approach towards life skills education; whether it is positive or negative. Therefore, the investigator has decided to study the opinion of teacher trainees towards life skills education.

OBJECTIVES

The main objectives of the study are the following.

1. To measure the level of opinion towards Life Skill Education among the teacher trainees.
2. To find out the significant difference between mean values of opinion towards Life Skill Education among Men & Women and Science & Arts group teacher trainees.

HYPOTHESES

The following hypotheses were formulated.

1. There is no significant positive opinion towards Life Skill Education among the teacher trainees.
2. There is no significant difference between mean scores of opinion towards Life Skill Education among Men & Women teacher trainees.
3. There is no significant difference between mean scores of opinion towards Life Skill Education among Science & Arts teacher trainees.

SAMPLE

Investigator randomly selected three Colleges of Education from Jalgaon District. There are 280 teacher trainees admitted in these colleges but at the time of administration of the opinionnaire some students were absent. So the sample consisted of 200 teacher trainees from whom data were collected.

TOOL

Investigator constructed a tool on the opinion of teacher trainees towards Life Skill Education consisting 30 items with three point scale such as 'Agree', 'Unable to Say' and 'Disagree'. There are 15 positive statements and 15 negative statements in the opinionnaire. The validity of the tool was checked by self and the experts. The reliability was found 0.83 by test-retest method.

METHODOLOGY

The main aim of the study was to measure the level of opinion towards Life Skill Education among the teacher trainees, so survey method was used. The opinionnaire was administered on teacher trainees in the selected Colleges of Education located in Jalgaon District. At that time 200 teacher trainees were present in the colleges.

DATA ANALYSIS

The opinionnaire was administered on 200 teacher trainees in the selected Colleges of Education and scored the responses noted by the teacher trainees. Various statistical techniques such as Mean, Standard Deviation (SD) and 't' test were used to analyze the data. The following table shows Mean and SD of Men & Women and Science & Arts faculty teacher trainees on the level of opinion towards Life Skill Education.

Table 1
Statistics of Opinion Scores towards Life Skill Education of Teacher Trainees

Sr. No.	Component	N	M	Mdn	Mo	SD	Sk	Ku
1	Total	200	71.10	71.00	70.00	6.06	0.255	0.642
2	Male	89	69.79	70.00	64.00	6.04	-0.411	-0.272
3	Female	111	72.14	72.00	70.00	5.89	0.124	1.386
4	Arts Faculty	108	70.16	70.00	70.00	6.34	-0.537	0.567
5	Science Faculty	92	72.21	71.50	70.00	5.56	0.389	-0.122

From table 01, it is revealed that the average mean score of the opinion towards life skills education score is 71.10. It shows that the total as well as the components such as gender and faculty of education has positive opinion towards life skills education

among teacher trainees. Moreover, the minimum and maximum scores are 51 and 87 respectively, this reveals the positive opinion towards life skills education among teacher trainees.

Table-2
Mean, SD & 't' Values of Scores of Male & Female Teacher Trainees on the Level of Opinion towards Life Skills Education

Sr. No.	Component	Gender	Number	Mean	SD	df	't' value	Remarks
1	Total	Male	89	69.79	6.04	198	2.77	S
		Female	111	72.14	5.90			
2	Arts	Male	50	68.54	6.62	106	2.52	S
		Female	58	71.55	5.78			
3	Science	Male	39	71.41	4.83	90	1.18	NS
		Female	53	72.79	6.01			

Where, S = Mean difference is significant, NS = Mean difference is not significant

Table-2 shows that there is a significant difference in mean scores of male and female teacher trainees on the level of opinion towards life skills education. Again there is a significant difference in mean scores of Arts faculty male and female teacher trainees on the level of opinion towards life skills education. But there is no significant difference in mean scores of Science faculty male and female teacher trainees on the level of opinion towards

life skills education. Even though, there is no significant difference in mean scores of Science faculty male and female teacher trainees on the level of opinion towards life skills education, it can be concluded that there is a significant difference in mean scores of male and female teacher trainees on the level of opinion towards life skills education. The female teacher trainees show high positive opinion towards life skills education than male teacher trainees.

Table-3

Mean, SD & 't' Values of Scores of Arts & Science Faculty Teacher Trainees on the Level of Opinion towards Life Skills Education

Sr. No.	Component	Faculty	Number	Mean	SD	df	't' value	Remarks
1	Total	Arts	108	70.15	6.33	198	2.41	S
		Science	92	72.20	5.56			
2	Male	Arts	50	68.54	6.62	87	2.28	S
		Science	39	71.41	4.83			
3	Female	Arts	58	71.55	5.78	109	1.11	NS
		Science	53	72.79	6.01			

Where, S = Mean difference is significant, NS = Mean difference is not significant

Table-3 shows that there is a significant difference in mean scores of Arts and Science faculty teacher trainees on the level of opinion towards life skills education. Again there is a significant difference in mean scores of Arts and Science faculty

male teacher trainees on the level of opinion towards life skills education. But there is no significant difference in mean scores of Arts and Science faculty female teacher trainees on the level of opinion towards life skills education. Even though, there is

no significant difference in mean scores of Arts and Science faculty female teacher trainees on the level of opinion towards life skills education, it can be concluded that there is a significant difference in mean scores of Arts and Science faculty teacher trainees on the level of opinion towards life skills education. The Science faculty teacher trainees show high positive opinion towards life skills education than Arts faculty teacher trainees.

FINDINGS AND DISCUSSION

The findings of the study are the following.

Significant positive opinion was seen among the teacher trainees towards life skills education.

The Science faculty teacher trainees show high positive opinion towards life skills education than Arts faculty teacher trainees.

The female teacher trainees show high positive opinion towards life skills education than male teacher trainees.

Today in every field of life of life, effective and impressive personality is demanded. Everyone is expected to become smart in all aspects of life. The teacher trainees are also aware to update and improve the quality of life. Therefore, teacher trainees show positive opinion towards life skills education. Female is more

emotional, sensitive and sincere than male in doing everything. She is concentrated in her work very easily. So, female teacher trainees show high positive opinion towards life skills education than male. The finding 3 may occur due to the study of science subject. Science is defined as an accumulation of systematic knowledge. While learning science subjects, such as physics, chemistry, mathematics etc. the logical reasoning ability, accurate observation, problem solving skills, critical thinking, and analytic-synthetic skills are developed.

The results of the study show that the opinion of teacher trainees towards life skills education is high. Hence, all teacher training institutions must be tightened in such a way that theory and practical aspects of life skills education programme of high quality are provided. Life skills education is to be integrated in teaching learning strategies and teacher training strategies. The teacher educators in training institutes are to be well trained in all aspects life skills education. Proper orientation and refresher training must be provided to teacher trainees in teacher education. By implementing all the above suggestions, certainly the educational institutes will be produced healthy, virtuous, almighty and prudent personality human resources which will be contributed in the development of the Nation.

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