

Attitude Towards Learning Of Science, Intelligence And Academic Achievement In Science Among Students At The Secondary Level

Dr. V.J.Uma

Assistant Professor N.K.T. National College of Education for
Women, Chennai. vjumaa@gmail.com

Abstract

The present study investigates the relationship between attitude towards learning of Science, intelligence and academic achievement in Science among students at the secondary level. Survey method is used to select a sample of 618 students at the secondary level. The research tools used are Academic Achievement in Science Attitude towards Learning of Science Scale (Grewal, 1972) and Standard Progressive Matrices (Raven, 1960) The results of the statistical analyses show a significant correlation of attitude towards learning of Science, intelligence and academic achievement in Science among students at the secondary level. No significant difference was observed among students at the secondary level pertaining to their attitude towards learning of Science, intelligence, and academic achievement in Science among students at the secondary level.

Keywords: Attitude towards learning of Science, Intelligence, Academic achievement in Science and Secondary Levels.

1. Introduction

Humans are the most advanced and intelligent species in the universe and their greatest work is Science. In the history of mankind, advent of Science is the greatest blessing. Science has come to relieve mankind from sufferings, ignorance and to control nature. From earliest times, people have been curious about the world around them. Thousands of years before civilization began, people learned to count and tried to explain

the rising and setting of the sun and the phases of the moon. They studied the habits of the animals they hunted, learned that some plants could be used as drugs, and acquired other basic knowledge about nature. These achievements marked the beginnings of Science. They were among the first attempts to understand and control nature. In general, Mathematics and Medicine were the first Sciences to develop, followed by the Physical Sciences, life Sciences, and Social Sciences.

Scientific progress is faster today than ever before. This progress is reflected not only by the many discoveries made each year but also by the thousands of scientists involved in research and by the vast sums of money spent on scientific work. As the number of scientists has grown, cooperation and communication among them have become increasingly important. Many recent achievements have resulted from scientists working in research teams. Hundreds of scientific journals, professional societies, and computerized information systems make it possible for scientists throughout the world to exchange information quickly and easily. Increasingly powerful and advanced equipment is helping scientists in many different fields expand our knowledge about the world.

2. Need for the Current Research

Simply stated, learning is the act or process of acquiring knowledge and skills. It is both the product of our experiences and the ultimate goal of education. Learning is often considered to be completed when the student produces the correct answer to the question (Karpicke and Roediger, 2008). There are several factors that contribute to student learning. One significant factor impacting learning is the relationship between teacher and students in the classroom. Teachers who understand their students and adapt their lessons to recognize the diversity of cultures, backgrounds, attitude towards learning, intelligence and learning skills of students to achieve greater success in the classroom.

Slee (1964) indicated that students' attitude and interests could play substantial role among pupils studying Science. Several studies (including Simpson, 1978, Wilson, 1983, Soyibo, 1985) reported that students' positive attitudes to Science correlate highly with their Science achievement. Intelligence is an umbrella term describing a property of the mind including related abilities, such as the capacities for abstract thought,

reasoning, planning, problem solving, communication, and learning. While looking into the intelligence of students, teachers should also understand intelligence is multi-faceted, and learners have multiple ways of analyzing the world. The theory of multiple intelligences was first developed by psychologist Howard Gardner to describe the different kinds of "intelligences" exhibited by human beings. Gardner (1983) suggested that each individual manifests varying levels of different intelligences, including linguistic, mathematical, spatial, bodily kinesthetic, musical, interpersonal, intrapersonal, and naturalist. In addition, learning styles offer various ways in which learners prefer to learn content. It is commonly believed that most people favour some particular method of interacting with, taking in, and processing information, including physical and environmental preferences, cognitive styles, and ways of working. As it is much required that Teachers should develop different profiles of intelligences of students to adopt to different teaching strategies to cater to the needs of individual students a need is felt to investigate the attitude towardss Science Learning, intelligence and academic achievement of Students in Science.

3. Review of Related Literature

Studies reviewed pertaining to the present study have been compiled and presented below under appropriate headings.

3.1 Studies Related to Attitude towards Learning of Science and Academic Achievement in Science among Students at the Secondary Level

Akçay and others (2006) aimed to compare the effects of computer-based learning and traditional method on students' attitudes and achievement towardss analytical chemistry. Students from Chemistry Education Department at Dokuz Eylül University were selected randomly and divided into three groups; two experimental (Eg-1 and Eg-2) and a control (Cg). In teaching analytical Chemistry topics, two different computer based methods--new analytical chemistry learning software called HEHASit (Method A) and a Microsoft Excel program (Method B)--were prepared and applied to Eg-1 and Eg-2, respectively. Whereas the last group (Cg) was taught by the traditional method (Method C). In the comparison of the effects of the three methods, an attitude questionnaire was developed and an achievement test related to Analytical

Chemistry, and applied to students in all three groups. Students' attitudes towards computers were also tested by a computer attitude test developed by the investigators. As a result of the study, significant differences between control group and both experimental groups and between experimental groups on computer attitudes and analytical chemistry attitudes were found. Furthermore, analytical chemistry achievement in experimental groups was significantly higher from the control group, thus revealing a significant correlation between attitude towards Chemistry and academic achievement in Chemistry.

Amudha (2007) investigated the attitude towards the study of Science and academic achievement in Science of 301 students at the secondary level. The investigation revealed that the girls in matriculation and central board schools were significantly better in their attitude towards the study of Science and their achievement in Science. But surprisingly the investigator found that the boys in state board schools were better in their attitude towards the study of Science and academic achievement in Science, compared to the girls of state board schools.

Evaluation

Most human behaviours, such as walking, speaking, reading, writing, dressing and playing, are at least in part products of learning (Ulusoy, 2007). In this process, which starts from birth and ends in death, humans learn something new each day. It is very clear that learning becomes very important to bring up the citizens of the nation. The quality of citizens depends on the quality of their education and quality of education besides other factors depends upon among other factors mainly on attitude towards studies of the learners. Quality of education is reflected through academic achievement, which is influenced by factors such as to acquire the knowledge, skills and values of society, the attitudes of those individuals towards learning.

Successful learners are enthusiastic, exhibit confident attitudes towards learning, have positive expectations from it and do not experience anxiety about learning. Because the attitudes towards learning one has inevitably influence the outcomes, the more positive attitudes one has, the better he or she performs in learning (Duarte, 2007; Braten, 2006).

Both negative and positive attitudes have a strong impact on the success of learning. The attitude of an individual depends heavily upon different stimuli. Stern (1983) claimed that the affective component contributes at least as much and often more to language learning than the cognitive skills, and this is supported by recent researches. All studies adduce that affective variables have significant influences on successful learning, (Gardner, 1985; Spolsky, 1989; Skehan, 1989).

Positive attitudes will ensure that they acquire lifelong learning skills. And an individual with positive attitudes towards any subject concentrates on it, is interested in it and takes all the actions necessary to succeed in learning about it (Başaran, 1974; Kılıççı, 1992). Thus, a favourable achievement in learning is to be expected (Kara, 2003). Discovering students' attitude towards studies especially for a subject like Science that requires a good attitude to learn a certain skills will help both teachers and students in the teaching-learning process. But in the Indian context though a number of studies have been conducted, the results are not found to be conclusive in determining the impact of attitude towards learning of Science on the academic performances of students in Science, especially at the secondary level. Thus a need was felt for further assessment of the impact of the variable, attitude towards learning of Science on the academic achievement of Science, especially in the Indian context.

3.2 Studies related to Intelligence and Academic Achievement in Science

Bhujendra Nath Panda (1996) investigated the Saaras, one of the primitive tribes in India and one of the important tribes living in District of Orissa. The history relating to social and cultural background of Saaras has been narrated by many, it is not sufficient enough to know the mental health status and academic achievement of these sections of the society and its changes due to culture-contact. Aspects of tribal children and their results are also contradictory, the present study was planned to examine the effects of acculturation on mental health status and academic achievement of Saaras. Thus it was hypothesized that there would be a significant difference in the mental health status and academic achievement of least and more acculturated Saara tribe adolescent.

Kalyani (2002) studied the relationship between intelligence and cognitive styles of a sample of children studying 8th, 9th and 10th standards in Tripathi town. To study cognitive styles of children (ie) field dependence/ independence and reflectivity/ impulsivity, Group Embedded Figure Test (GEFT) and Matching Familiar Figure Test (MEFT) were used. Results revealed that intelligence and cognitive styles are related.

Evaluation

The perception that intelligence facilitates learning became more evident after the learning theories classes. Participants appreciated the importance of intelligence (although it is not the only variable) in learning, supporting the view of Watters and Watters (2007). We all know that Science learning has become very imperative in the present days with explosion of advancements both in Science and Technology. Although all sorts of imagination and thought may be used in coming up with hypotheses and theories, sooner or later scientific arguments must conform to the principles of logical reasoning—that is, to testing the validity of arguments by applying certain criteria of inference, demonstration, and common sense. Scientists may often disagree about the value of a particular piece of evidence, or about the appropriateness of particular assumptions that are made—and therefore disagree about what conclusions are justified. But they tend to agree about the principles of logical reasoning that connect evidence and assumptions with conclusions.

Thus, intelligence is the ability to carry on abstract thinking, the ability to adopt to new situation, the ability to adjust to environment. An intelligent person possesses all these abilities. One may have more of one of these abilities and less of another and it is also been noted that academic achievement is achieved through intelligence. As a result Science learning requires intelligences for enhanced learning. Since there only very studies have been conducted, especially with reference to the Indian context, investigation into the intelligence of students and its impact on academic performance in Science becomes very fundamental.

4. Statement of the Problem

The review done from the available relevant literature, relating to the present research area, led the investigators to

conceptualize the problem in an attempt to fill in the lacunae found.

Thus the problem is stated as here under:

Attitude towards Learning of Science, Intelligence and Academic Achievement in Science among Students at the Secondary Level

5. Objectives of the Study

- To study the nature of attitude towards learning of Science, intelligence and academic achievement in Science among students at the secondary level; and
- To compare students on the select variables of study using classifications of systems of education and gender.

6. Hypotheses

- I. There will be a significant and positive relationship among attitude towards learning of Science, intelligence and academic achievement in Science among students at the secondary level in different categories of schools, state, matriculation and central board schools.
- II. There will be no significant difference in attitude towards learning of Science, intelligence and academic achievement in Science among boys and girls at the secondary level in different systems of education, namely, state, matriculation and central board schools.
- III. There will be no significant difference in attitude towards Science learning, intelligence and academic achievement in Science among boys at the secondary level in different systems of education, namely, state, matriculation and central board schools.
- IV. There will be no significant difference in attitude towards Science learning, Intelligence and academic achievement in Science among girls at the secondary level in different systems of education, state, matriculation and central board schools.

7. Method of Investigation

The study involved multiple variables necessitating multiple permutations and combinations. The investigator took utmost care to establish a sound research methodology, designing the psychometric properties and executing the same to the sample. The present section has provided a detailed description of the variables studied and controlled, the sample selected, tools constructed and chosen and description of the main study with the briefing of the analyses proposed.

7.1 Population and Sample Characteristics

The target population for the present study will be the students at the secondary level. From the target population a sample of 618 students were chosen from the secondary level. The chosen sample comprised of 320 boys and 298 girls from secondary level, Further the sample comprised of 205 students in state board, 211 in matriculation and 202 from central board schools.

7.2 Tools used for the Study

The research tools used for the present study to analyze attitude towards learning of Science, intelligence and academic achievement in Science among students at the secondary levels are as follows:

The tools selected to be used for assessment of the variables are as follow:

- Academic Achievement in Science
- Attitude towards Learning of Science Scale (Grewal, 1972)
- Standard Progressive Matrices (Raven, 1960)

The tools chosen were found to be suitable, workable, reliable and valid.

8. Analyses of Data

The results of the analyses of data collected are compiled and presented in tables below:

Table-1a: Simple Correlation Matrix between the Select Independent Variables and Academic Achievement in Science among Boys in State Board Schools at the Secondary Level (N=104)

Variables	Attitude towards Learning of Science	Intelligence	Academic Achievement in Science
Attitude towards Learning of Science	1	0.24*	0.39**
Intelligence	x	1	0.24*
Academic Achievement in Science	x	x	1

****Significant at 0.01 level**

***Significant at 0.05 level**

In the above table (Table-1a), it is seen that there is a significant correlation between all select variables, namely, independent variables, attitude towards learning of Science, intelligence and the dependent variable, academic achievement in Science among boys in state board schools.

Table-1b: Simple Correlation Matrix between the Select Independent Variables and Academic Achievement in Science among Girls in State Board Schools at the Secondary Level (N=101)

Variables	Attitude towards Learning of Science	Intelligence	Academic Achievement in Science
Attitude towards Learning of Science	1	0.33**	0.71**
Intelligence	x	1	0.48**
Academic Achievement in Science	x	x	1

****Significant at 0.01 level**

It is interesting to note that in Table-1b, the academic achievement in Science of girls in state board schools at the secondary level correlates significantly with all independent variables, namely, attitude towards Science learning and intelligence.

Table-2a Simple Correlation Matrix between the Select Independent Variables and Academic Achievement in Science among Boys in Matriculation Board Schools at the Secondary Level (N=110)

Variables	Attitude towards Learning of Science	Intelligence	Academic Achievement in Science
Attitude towards Learning of Science	1	0.19*	0.51**
Intelligence	x	1	0.24*
Academic Achievement in Science	x	x	1

****Significant at 0.01 level**

***Significant at 0.05 level**

The table above (Table-2a) has evidenced a picture of the correlation of the independent variables to academic achievement in Science manifesting a clear relationship. It could be observed that the variables attitude towards learning of Science, intelligence and academic performance in Science correlate significantly with each other.

Table-2b: Simple Correlation Matrix between the Select Independent Variables and Academic Achievement in Science among Girls in Matriculation Board Schools at the Secondary Level (N=101)

Variables	Attitude towards Learning of Science	Intelligence	Academic Achievement in Science
Attitude towards Learning of Science	1	0.38**	0.43**
Intelligence	x	1	0.31**

Academic Achievement in Science	x	x	1
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****Significant at 0.01 level**

***Significant at 0.05 level**

The table above (Table-2b) has indicated a significant relation between the independent variables of attitude towards learning of Science, intelligence and academic achievement in Science of girls in matriculation board schools.

Table-3a: Simple Correlation Matrix between the Select Independent Variables and Academic Achievement in Science among Boys in Central Board Schools at the Secondary Level (N=106)

Variables	Attitude towards Learning of Science	Intelligence	Academic Achievement in Science
Attitude towards Learning of Science	1	0.32**	0.31**
Intelligence	x	1	0.33**
Academic Achievement in Science	x	x	1

****Significant at 0.01 level**

***Significant at 0.05 level**

By enlarge the table (Table-3a) shows that all the independent variables, attitude towards learning of Science, intelligence, are significantly correlated positively with the dependent variable, academic achievement in Science of boys in central board schools at the secondary level.

Table-3b: Simple Correlation Matrix between the Select Independent Variables and Academic Achievement in Science among Girls in Central Board Schools at the Secondary Level (N=96)

Variables	Attitude towards Learning of Science	Intelligence	Academic Achievement in Science
Attitude towards Learning of Science	1	0.13	0.21*
Intelligence	X	1	0.38**
Academic Achievement in Science	X	x	1

****significant at 0.01 level**

The table (Table-3b) of product-moment correlation has indicated that all the independent variables, intelligence, have a significant correlation to the academic achievement in Science of girls in central board schools at the secondary level.

Table-4a: Summary of Significance of Mean Difference between Boys and Girls in State Board Schools at the Secondary Level

Variables	Groups	N	Mean	SD	SEM	SED	CR	Level of Significance
Attitude towards Learning of Science	Boys	104	25.63	4.50	0.44	0.77	0.06	N.S.
	Girls	101	25.58	6.35	0.63			
Intelligence	Boys	104	23.55	2.83	0.28	0.46	10.26	0.001
	Girls	101	28.30	3.73	0.38			
Academic Achievement in Science	Boys	104	53.81	10.09	0.99	1.38	10.32	0.001
	Girls	101	68.08	9.72	0.97			

From the table above table (Table-4a) it could be interpreted that boys and girls in state board schools at the secondary level differ significantly with regard to all the select variables, namely, intelligence and academic achievement in Science except attitude towards learning of Science. Pertaining to all variables girls are found to be better than boys in state board schools.

Table-4b: Summary of Significance of Mean Difference between Boys and Girls in Matriculation Board Schools at the Secondary Level

Variables	Groups	N	Mean	SD	SEM	SED	CR	Level of Significance
Attitude towards Learning of Science	Boys	110	44.28	3.32	0.32	8.52	17.14	0.001
	Girls	101	52.80	3.90	0.39			
Intelligence	Boys	110	34.39	4.23	0.40	3.43	6.64	0.001
	Girls	101	37.82	3.15	0.31			
Academic Achievement in Science	Boys	110	83.42	4.44	0.42	1.64	2.25	0.05
	Girls	101	85.06	6.11	0.61			

As in the case of the boys and girls in State Board Schools, on comparing the Boys and girls in Matriculation board schools it is observed that the girls are found to be better than boys pertaining to all variables, attitude towards learning of Science, intelligence and academic achievement in Science.

Table-4c: Summary of Significance of Mean Difference between Boys and Girls in Central Board Schools at the Secondary Level

Variables	Groups	N	Mean	SD	SEM	SED	CR	Level of Significance
Attitude towards Learning of Science	Boys	106	64.07	4.45	0.43	5.78	18.54	0.001
	Girls	96	74.61	3.63	0.37			
Intelligence	Boys	106	43.08	2.09	0.20	0.28	14.34	0.001
	Girls	96	47.13	1.92	0.20			
Academic Achievement in Science	Boys	106	73.62	5.42	0.53	0.83	6.20	0.001
	Girls	96	78.76	6.27	0.64			

In the above table (Table-4c), it is evident that boys and girls in central board schools differ significantly with reference to all the independent variables, attitude towards learning of Science, intelligence, and dependent variable, namely, academic achievement in Science. The girls are found to be significantly better with regard to all select variables when compared to the boys in central board schools at the secondary level.

Table-5: One-way Analysis of Variance for the Three Groups of Boys belonging to State (104), Matriculation (110) and Central Board (106) Schools at the Secondary Level

Variables	Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F value	Level of Significance
Attitude towards Learning of Science	Between Groups	2	77574.88	38787.44	2293.56	0.001
	Within Groups	317	5360.92	16.91		
	Total	319	82935.80	--		
Intelligence	Between Groups	2	20087.64	10043.82	985.92	0.001
	Within Groups	317	3229.35	10.18		
	Total	319	23316.99	--		
Academic Achievement in Science	Between Groups	2	48367.38	24183.69	487.74	0.001
	Within Groups	317	15717.82	49.58		
	Total	319	64085.20			

The table showing the F ratios manifest that the boys in different systems of education, namely, state, matriculation and central board schools do differ significantly with regard to the select variables, attitude towards learning of Science, intelligence, and academic achievement in Science. The significant differences found could be ascertained by calculating the critical ratios for the significant F values.

The following tables, 5a, b and c have clearly given the nature and direction of difference for explanation of the difference.

Table-5a: Summary of Significance of Mean Difference between Boys in State and Matriculation Board Schools at the Secondary Level

Variables	Groups	N	Mean	SD	SEM	SED	CR	Level of Significance
Attitude towards Learning of Science	State Board	104	25.63	4.50	0.44	0.54	34.36	0.001
	Matriculation Board	110	44.28	3.32	0.32			
Intelligence	State Board	104	23.55	2.83	0.28	0.49	22.17	0.001
	Matriculation Board	110	34.39	4.23	0.40			
Academic Achievement in Science	State Board	104	53.81	10.09	0.99	1.06	27.52	0.001
	Matriculation Board	110	83.42	4.44	0.42			

The significant F ratios found in variables, attitude towards learning of Science, intelligence, and academic achievement in Science further yielded critical ratio values. It could be observed from the table of critical ratios that the boys of matriculation board schools are significantly better in attitude towards Science learning and thus, in their academic performances also when compared to the boys in state board schools.

Table-5b: Summary of Significance of Mean Difference between Boys in State and Central Board Schools at the Secondary Level

Variables	Groups	N	Mean	SD	SEM	SED	CR	Level of Significance
Attitude towards Learning of Science	State Board	104	25.63	4.50	0.44	0.62	62.25	0.001
	Central Board	106	64.07	4.45	0.43			
Intelligence	State Board	104	23.55	2.83	0.28	0.34	56.85	0.001
	Central Board	106	43.08	2.09	0.20			
Academic Achievement in Science	State Board	104	53.81	10.09	0.99	1.12	17.69	0.001
	Central Board	106	73.62	5.42	0.52			

The critical ratio values found in the table above (Table-5b) have shown significant differences between boys belonging to state board and central board schools at the secondary level. It is found that the boys of central board schools are significantly better in attitude towards learning of Science, intelligence, and academic achievement in Science also, when compared to their counterparts in state board schools.

Table-5c: Summary of Significance of Mean Difference between Boys Matriculation and Central Board Schools at the Secondary Level

Variables	Groups	N	Mean	SD	SEM	SED	CR	Level of Significance
Attitude towards Learning of Science	Matriculation Board	110	44.28	3.32	0.32	0.54	37.14	0.001
	Central Board	106	64.07	4.45	0.43			

Intelligence	Matriculation Board	110	34.39	4.23	0.40	0.45	19.02	0.001
	Central Board	106	43.08	2.09	0.20			
Academic Achievement in Science	Matriculation Board	110	83.42	4.44	0.42	0.68	14.55	0.001
	Central Board	106	73.62	5.42	0.53			

The table presented above has manifested significant differences among boys belonging to matriculation and central board schools on variables, namely, attitude towards learning of Science, intelligence, and academic achievement in Science. Interestingly, though the boys in central board schools are found to be significantly better with regard to all independent variables when compared to the boys in matriculation board schools looking into academic achievement it is found that boys of matriculation board schools are found to be significantly better than their counterparts in central board schools. It is interpreted that the syllabi of matriculation board schools, unlike the syllabi of central board schools, is not very challenging and does not reflect the individuality of students. Most of the matriculation board schools are result oriented, and thereby the students are given adequate coaching and tailor made notes are supplied to ensure cent percent results and good marks.

Table-6: One-way Analysis of Variance for the Three Groups of Girls belonging to State (101), Matriculation (101) and Central (96) Board Schools at the Secondary Level

Variables	Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F value	Level of Significance
Attitude towards Learning of Science	Between Groups	2	119057.96	59528.98	2584.29	0.001
	Within Groups	295	6795.31	23.04		
	Total	297	125853.27	--		
Intelligence	Between Groups	2	17455.67	8727.84	943.68	0.001

	Within Groups	295	2728.38	9.25		
	Total	297	20184.05	--		
Academic Achievement in Science	Between Groups	2	14872.94	7436.47	129.68	0.001
	Within Groups	295	16916.50	57.34		
	Total	297	31789.44	--		

The table above indicating the F ratios shows significant differences between the three groups on all the select variables, namely, attitude towards learning of Science, intelligence and academic achievement in Science.

Table-6a: Summary of Significance of Mean Difference between Girls in State and Matriculation Board Schools at the Secondary Level

Variables	Groups	N	Mean	SD	SEM	SED	CR	Level of Significance
Attitude towards Learning of Science	State Board	101	25.58	6.35	0.63	0.74	36.74	0.001
	Matriculation Board	101	52.80	3.89	0.39			
Intelligence	State Board	101	23.30	3.73	0.37	0.49	19.63	0.001
	Matriculation Board	101	37.82	3.15	0.31			
Academic Achievement in Science	State Board	101	68.08	9.72	0.97	1.14	14.86	0.001
	Matriculation Board	101	85.06	6.11	0.61			

The critical ratio values in the above table, Table-6a, indicate that the girls in matriculation schools have shown differences with their counterparts in state board schools with regard to all select variables. This could be interpreted that the girls in matriculation schools come from an elevated socio-economic status than girls in state board schools. Further, the matriculation schools with much confidence and intelligent students provide better facilities, thereby by fostering a positive attitude towards studies and learning skills among

students and all these leading to better academic performance among girls, when compared to their counterparts in state board schools.

Table-6b: Summary of Significance of Mean Difference between Girls in State and Central Board Schools at the Secondary Level

Variables	Groups	N	Mean	SD	SEM	SED	CR	Level of Significance
Attitude towards Learning of Science	State Board	101	25.58	6.35	0.63	0.74	66.12	0.001
	Central Board	96	74.61	3.63	0.37			
Intelligence	State Board	101	28.30	3.73	0.37	0.43	44.22	0.001
	Central Board	96	47.13	1.92	0.19			
Academic Achievement in Science	State Board	101	68.08	9.72	0.97	1.17	9.11	0.001
	Central Board	96	78.76	6.27	0.64			

The critical ratios presented in the above table (Table-6b), are all found to be significant at 0.001 level. This has lead to the inference that in attitude towards learning of Science, intelligence and academic achievement in Science, the girls of central board schools are notably superior when compared to their counterparts in the state board schools. The central board schools are governed by the Central Government, thereby, providing good infrastructure facilities and employing teachers with high profile, competent to deal with the challenging curriculum. These factors enable the girls in central board schools to perform significantly better than the girls in state board schools at the secondary level.

Table-6c: Summary of Significance of Mean Difference between Girls in Matriculation and Central Board Schools at the Secondary Level

Variables	Groups	N	Mean	SD	SEM	SED	CR	Level of Significance
Attitude towards Learning of Science	Matriculation Board	101	52.80	3.89	0.39	0.54	40.64	0.001
	Central Board	96	74.61	3.63	0.37			
Intelligence	Matriculation Board	101	37.82	3.15	0.31	0.37	24.90	0.001
	Central Board	96	47.13	1.92	0.20			
Academic Achievement in Science	Matriculation Board	101	85.06	6.11	0.61	0.88	7.14	0.001
	Central Board	96	78.76	6.27	0.64			

It is seen from the above table the two sets of girls, from matriculation and central board schools differ significantly in connection with all select variables. In other words, girls belonging to the central board schools have better attitude towards learning of Science, intelligence, also hail from a better socio-economic status compared to girls in matriculation schools. In spite of all these reasons, girls in matriculation board schools are able to perform and achieve academically better in Science than their counterparts in central board schools. These results are similar to that of the performance of boys in matriculation and central board schools.

9. Discussion

Science and technology are major influences in many aspects of our daily lives, at work, at play, and at home. Our dependence on Science and technology demands a high level of scientific literacy for all, be it boys or girls. Science education contributes to the growth and development of all students, as

individuals, as responsible and informed members of society, and as productive contributors to our country's economy and future. Quality Science education for all students requires the removal of barriers to achievement and encourages continuing participation in Science. Accordingly, the curriculum in Science should recognise, respect, and respond to the educational needs, experiences, achievements, and perspectives of all students: both female and male; of all races and ethnic groups; and of differing abilities and disabilities.

In line with the research conducted by Maehr and Steinkamp (1983) Science education often undervalues the contribution of girls, provides unfamiliar contexts for their learning, and fails to develop their confidence in pursuing studies in this area. It is important to note that the group 'girls' is not homogeneous. Culture and gender factors are inextricably linked and neither should be considered in isolation. A curriculum which is gender-inclusive acknowledges and includes the educational needs and experiences of girls equally with those of boys, both in its content and in the language, methods, approaches, and practices of teaching.

In the present investigation it is seen that there is a significant difference between boys and girls in all the three categories of schools, namely, state, matriculation and central board schools pertaining to all independent variables and the dependent variable, academic achievement in Science, except for attitude towards learning of Science in State board schools. The girls are significantly better than the boys in all the three categories of schools and thereby perform better in Science when compared to the boys in their own category of schools. The results are in line with the early researches conducted by Graham (1990), Sally and Carolyn (1994), Thompson (2005)

10. Conclusion

There is a widespread consensus that one of the objectives of education is to enable all students to realize their capabilities and reach their full potentials. Education is the most cogent instrument in the progress of any nation. The scenario of education has many approaches, pure and applied. These approaches by and large have been totally fostering human potential channelized and utilized for growth and development. The quality of education has to be improved and any attempt to improve the quality of education ultimately

depends not only on the quality of instructions imparted in the classrooms but also on the attitude towards learning and intelligence.

Reference

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