

Science Achievement and Attitude towards Science among Higher Secondary School Students of Aizawl City

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Abstract: The main objective of the present study is to explore students' achievement in science and their attitude towards science. The study also tries to find out the relationship between science achievement and attitude towards science among higher secondary science students of Aizawl, Mizoram. Altogether, 300 students, (150 males, and 150 females) were randomly selected for the study. Data on attitude towards science was collected through 'Science Attitude Scale' developed by the researchers and 'Achievement Test in Science (ATS-GR)' developed by S.C. Gakhar and Rajnish was used to measure science achievement. Results indicate that no significant difference was found in the attitude towards science with respect to gender but boys were found to possess significantly higher in science achievement as compared to girls. No significant correlation was found between attitude towards science and science achievement.

Key Words: Attitude towards Science, Science Achievement, Higher Secondary School Students

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I. INTRODUCTION

There has been an increased proliferation of knowledge in the scientific and technological fields that demands a talented and creative scientific community capable of developing advancements in science and technology so as to be able to compete with other nations. Science education therefore has to be constantly updated and restructured even at the school level to better impart scientific skills and inculcate a positive attitude towards science among students so that they may be able to keep up with the continuing changes in science and technology.

In the field of scientific research, students' attitude towards science has been regarded as an important and significant topic and has garnered great interest among researchers. Attitude towards science may be referred to as a general and continuing positive or negative feeling about science. Yara (2009) has described attitude towards science as an interest or feeling towards studying science. It is the students' disposition towards liking or disliking science. Osborne et al.(2003) have provided a list of components of attitude towards science. These components are "perception of the science teacher, anxiety towards science, the value of science, self-esteem at science, motivation towards science, enjoyment of science, attitudes of peers and friends towards science, the nature of classroom environment, achievement in science and fear of failure on course."

Attitudes are acquired rather than being inborn. It must be noted that the learning environment of the students, i.e. personal characteristics, school, classroom, teachers and family background have a strong influence in shaping their attitude towards science. If students are assured about acquiring successful experiences and positive feelings at the beginning of their science education, they will be motivated and will be likely to have positive and fulfilling scientific experiences in the future. Thus, they will acquire positive attitude towards science and this will influence them to perceive the learning of science as a lifelong pursuit. However, if students have negative experiences concerning their science education, they are more likely to develop a negative attitude towards science that they may carry on to the future years. Researchers such as Simpson & Oliver, 1990 have found similar results.

Research findings constantly reveal attitudes as an important component of science education (Joyce & Farenga, 2000; Osborne et al, 2003) that influences students' achievement (Linn, 1992). Various studies have reported a high correlation between positive attitude towards science and science achievement (Wilson, 1983; Oliver & Simpson, 1988; Rana, 2002). High achievement scores were found among students with positive attitude towards science (Hough & Piper, 1982; Wilson, 1983)

Science achievement has become a growing topic of concern in the field of education. There are many variables that can impact successful student achievement, such as the quality of schools and teachers, and

attitude and aptitude amongst others. The ultimate goal of every teacher is to improve the ability level and prepare students for high achievement. He should try to keep his students well motivated and enthusiastic.

Mizoram has a wealth of human and natural resources, which have great potential for scientific and technological contributions. However, their contribution to the overall advancements in science and technology in the country are not substantial as compared to those of other states. This may be due to the late entry of formal education, which was introduced to Mizoram via the Christian missionaries in 1894. One of the most effective ways in which Mizoram can make substantial contributions to science and technology is to strengthen science education in the state.

Attitude towards science as well as achievement in science is considered extremely important at the higher secondary stage because it tends to serve as a deciding factor for the selection of students' professional carriers. At present, as presented by the statistical cell, Director of School Education (2017-18), there are only 40 higher secondary schools in Mizoram offering science as a stream of education. Out of these higher secondary schools, 23 of them are within Aizawl city, which is the capital city. The rest are distributed throughout the districts of Champhai, Kolasib, Lunglei, Saiha and Serchhip. The higher secondary schools in Lawngtlai and Mamit do not offer science as a stream of education.

Rationale of the study

Research findings indicate that attitude towards science and science achievement is positively correlated. Research in this field has been greatly emphasized because of the increasing recognition that the national development of any country largely depends on a highly educated, well-trained and adaptable workforce who participates in the process of scientific and technological advancement. The enrolment of students pursuing science at the higher secondary stage in Aizawl is much lower as compared to those in the arts stream. The low enrolment rates in the science stream have become a matter of great concern for the teaching community. Therefore the investigators felt it necessary to study the science achievement as well as attitude towards science among the higher secondary school students in Aizawl. The present research work further attempts to study the correlation between attitude towards science and science achievement among higher secondary school students in Aizawl.

Objectives

1. To find out the attitude towards science among higher secondary science students in Aizawl.
2. To find out the science achievement among higher secondary science students in Aizawl.
3. To find out the difference in the attitude towards science among higher secondary science students in Aizawl with reference to gender.
4. To find out the difference in the science achievement among higher secondary science students in Aizawl with reference to gender.
5. To find out the relationship between attitude towards science and science achievement among higher secondary school science students in Aizawl.
6. To make suggestions for the improvement of science education in Mizoram.

Hypotheses

1. There is no significant difference in the attitude towards science among higher secondary school science students in Aizawl with reference to gender.
2. There is no significant difference in the science achievement among higher secondary school science students in Aizawl with reference to gender.
3. There is no significant relationship between attitude towards science and science achievement among higher secondary school science students in Aizawl.

Methodology

The causal comparative status survey design was employed for the present study. This is keeping in view the main objective which is to find out the attitude towards science as well as science achievement among higher secondary science students with reference to their gender.

Tools used

The following tools were used for the present study:

1. Science attitude scale developed by the investigators.
2. Achievement Test in Science (ATS-GR) developed by S.C. Gakhar and Rajnish; National Psychological Corporation Agra;

Population

The population for the present study consists of all the higher secondary school students offering science stream in Aizawl.

Sample

The sample comprises of 300 higher secondary school students randomly selected from the higher secondary schools offering science stream in Aizawl City. Out of the total sample, 150 are males and 150 are females.

Analysis of data

The data collected using science attitude scale as well as achievement test in science were tabulated and analysed, keeping in mind the objectives and hypotheses of the study.

Attitude towards science among higher secondary school science students

The scores of all higher secondary school science students on science attitude scale were scored and tabulated. Based on their responses, the students were classified into three groups as per the norms of the scale. The scores above the 75th percentile constitute positive attitude, those below the 25th percentile constitute negative attitude and those between the 25th and 75th percentile constitute moderate attitude. The following Table - 1 shows the position of higher secondary school science students of Aizawl with respect to their attitude towards science.

Table – 1: Attitude towards science among higher secondary school science students

Science Attitude	Total (N=300)	
	No of Students	Percentage
Positive Attitude	78	26%
Moderate Attitude	148	49.33%
Negative Attitude	74	24.67%

Table - 1 indicates that out of 300 higher secondary school science students of Aizawl, 78 (26%) students have positive attitude towards science, 148 (49.33%) students have moderate attitude towards science, and 74 (24.67%) students have negative attitude towards science. It was found that majority of the students have moderate attitude towards science. Students with positive attitude towards science were slightly more in number than students with negative attitude towards science.

Science achievement among higher secondary school science students

The Achievement Test in Science (ATS-GR) developed by S.C. Gakhar and Rajnish was administered to the sample higher secondary school science students and the scores obtained were scored and tabulated. The scores above the 75th percentile constitute high achievement, those below the 25th percentile constitute low achievement, and those between the 25th and 75th percentile constitute average achievement. The following Table - 2 shows the position of higher secondary school science students in Aizawl with respect to their science achievement.

Table – 2: Science achievement among higher secondary school science students:

Science Achievement	Total (N=300)	
	No of Students	Percentage
High Achievement	75	25%
Average Achievement	164	54.67%
Low Achievement	61	20.33%

It is clear from the above Table - 2 that out of the total sample of 300 higher secondary school science students of Aizawl, 75 (25%) of them have high achievement in science, 164 (54.67%) have average achievement in science and 61 (20.33%) possess low achievement in science. It may be concluded that majority of the students have average achievement (54.67%) in science. The number of students with high achievement (25%) in science were slightly more in numbers than those with low achievement (20.33%) in science.

Gender difference in attitude towards science among higher secondary school science students

To compare the attitude towards science between the male and female higher secondary school students the mean and standard deviation of both the males and females was calculated. The t-value was then established in order to ascertain the difference between the two groups. The following Table - 3 shows the comparison in the attitude towards science among higher secondary school science students of Aizawl with reference to gender.

Table – 3: Attitude towards science among higher secondary school science students of Aizawl with reference to gender

Gender	N	Mean	SD	MD	SE _{MD}	t-value	Sig. level
Male	150	74.23	10.122	.547	1.132	.483	NS
Female	150	74.78	9.466				

NS means not significant

It can be seen from Table - 3 that the obtained ‘t’ value for the significance of difference between the mean attitude scores of male and female higher secondary school students towards science is .483, whereas the required ‘t’ value, with df = 298 to declare the difference as significant is 1.97 at 0.05 level. Since the calculated ‘t’ value was below the criterion ‘t’ value, it can be concluded that there was no significant difference between these two groups regarding their attitude towards science. Therefore, the hypothesis (No.1) that states there is no significant difference in the attitude towards science among higher secondary school science students in Aizawl with reference to gender was accepted. Upon comparing their mean scores, it was found that the female students have higher attitude towards science than their male counterparts. But, this could be a chance factor.

Gender difference in science achievement of higher secondary school science students of Aizawl

The mean and standard deviation of the achievement scores of male and female higher secondary school science students was also calculated. The significance of difference between the means was tested, by applying ‘t’ test. Table - 4 displays the comparison of the science achievement of higher secondary science students of Aizawl with respect to gender.

Table – 4: Science achievement in science among higher secondary science students of Aizawl with reference to gender

State	N	Mean	SD	MD	SE _{MD}	t-value	Sig. level
Male	150	18.58	4.997	1.153	.486	2.375	*
Female	150	17.43	3.224				

* means significant at .05 level

Table – 4 discloses that the ‘t’ value for the significance of difference between the mean scores of male and female students of Aizawl towards science achievement is 2.375. Since the calculated ‘t’ value was greater than the criterion ‘t’ value, it shows that there was a significant difference in the science achievement of higher secondary school students of Aizawl with reference to gender. Therefore, the null hypothesis (No.2) which states there is no significant difference in the science achievement of higher secondary school students of Aizawl with reference to gender was rejected since significant difference was found at 0.05 level. A comparison of the mean scores of males (18.58) and females (17.43) reveal that males have higher mean scores, therefore, their science achievement was found to be higher than that of females.

The probable reason for the above findings could be male students are usually given more opportunities in science related activities and they have more freedom to explore their interest, which enables the development of their potentialities to the fullest.

Relationship between attitude towards science and science achievement among higher secondary school students of Mizoram

The Pearson Product Moment Correlation Method was used to determine the correlation between attitude towards science and science achievement among all higher secondary school students of Aizawl. Table No. 5 presents the correlation between attitude towards science and science achievement among higher secondary science students of Aizawl.

Table No. 5: Correlation between attitude towards science and science achievement among higher secondary school students of Aizawl (N=300)

Categories	Attitude	Achievement
Attitude	1	.010
Achievement	.010	1

NS = Not Significant

As shown in Table No. 5, the correlation between attitude towards science and science achievement among higher secondary school students in Aizawl was not significant (r =.010). Therefore, the null hypothesis (No. 3) that there is no significant relationship between attitude towards science and science achievement among

higher secondary school students of Aizawl was accepted. Contrary to the present finding, Simpson and Oliver (1990), found that students' attitude to science correlate highly with their science achievement.

II. SUGGESTIONS

1. Teachers should possess positive attitude towards science because their actions are deeply influenced by their perception of science. Teachers should undergo pre-service and in-service trainings so as to enhance their perception of science in a favourable way. This will further help develop a positive attitude towards science among their students.
2. Improvement of science achievement should remain a priority in the teaching community so as to groom the youth to become well-informed and effective citizens equipped with critical thinking and analysis skills, contributing to the social and economic prosperity of our respective states, and in turn, our country.
3. In order to develop positive science attitude and attract more students towards science subject, the co-curricular activities should include activities like science exhibitions, science quiz, science projects, science debates, etc.
4. The school should have well equipped science clubs at the higher secondary stage.
5. Scholarships and other incentives awarded to meritorious science students should be increased
6. Schools should have well equipped laboratories, good libraries, high quality science teaching aids, etc. so as to enhance larger participation of students in science related activities.
7. Parents should not undermine the scientific abilities of girls. Equal treatment should be given to both boys and girls.

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