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RESEARCH ARTICLE

SCIENTIFIC ATTITUDE OF SECONDARY SCHOOL STUDENTS OF SIVASAGAR DISTRICT IN RELATION TO THEIR ACHIEVEMENT IN SCIENCE

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ABSTRACT

Scientific attitude refers to open mindedness, objectivity, aversion to superstitions, rationality, curiosity, etc. It is a way of thinking of a person. A person with scientific attitude is truthful in observation, rational in thinking, objective in observation and action, and free from superstitious beliefs. Scientific attitude is one among the major determinants of students' achievement in science which has become a major quality parameter of a student living in the present scientific society (Abell & Ledarman, 2007). A number of researchers have revealed that a significant relationship exists between scientific attitude and academic achievement. The justification for selecting the proposed study is that there is no such study done in Assam on scientific attitude and its relationship either with achievement in science or with academic achievement as a whole. Apart from these, Sivasagar district of Assam is a tea garden dominated area and tea-tribes students studying in secondary schools of Sivasagar district are mostly first generation learners. Moreover, a number of false beliefs exist among the people of Assam as well as among the tea tribes as evident from the news in different media. Thus, in the present study, an attempt has been made to study the scientific attitude of the secondary school students of Sivasagar District in relation to their achievement in science. A comparison between tea-tribes students and non-tea-tribes students is made in relation to their scientific attitude, achievement in science and academic achievement. The study revealed that 14% variance in scientific attitude is explained by achievement in science and academic achievement in combination. The study also revealed that higher the achievement in science higher the scientific attitude of secondary school students. The tea-tribes students are less scientific in their thinking than non-tea tribes students.

KEY WORDS: Scientific Attitude, Achievement in Science.

INTRODUCTION

Science is transforming the life of the people of the globe in a faster way. It, on one hand, helps the people to live a better life and on the other hand, inculcates in them a new way of thinking and a new approach of solving their problems. A major aim of teaching science at different levels of learning is development of scientific attitude or scientific temper among the students which was also the focal theme of International Science Day, 2014.A person with scientific attitude is truthful in his/her observation, rational in his/her thinking, objective in his/her observation and action, his/her mind set is free from superstitious beliefs, etc. Thus, scientific attitude of a person reflects a particular way of thinking of that person. It is an adoption of a particular approach by a person in doing a work or solving a problem or arriving at conclusion or making decisions or observing a situation, etc. Scientific attitude is the attitude of being objective in observation and thinking. It is the desire to do observations and experimentations. A person with scientific attitude does not remain stick to his/her own views and ideas. He/she keeps on revising them in accordance with the new findings. Scientific attitude of a person never allows him/her to belief blindly any meaningless conclusions based on superstitious belief without complete evidences. It is the tendency to test traditional belief in the light of convincing proof. Scientific attitude is the attitude of being logical in thinking and reasoning.

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A person with scientific attitude feels excited to see a new thing and hear a new idea and he/she tries to know this with proof. He/she is free from any sort of social, economic and political influences while judging a situation. Scientific attitude is the way of thinking of a person that makes him/her to believe on things/facts which are proved in the light of certain evidences and accepts the facts based on those evidences. A person with scientific attitude rejects all biased statements and always dependent on sufficient evidences and their truthfulness. Scientific attitude is a tendency to seek truth, think logically and there upon act rationally (Rani &Rao,2007).

Scientific attitude is one of the major determinants of students' achievement in science which has become a major quality parameter of a student living in the present scientific society (Abell & Ledarman, 2007). A number of researchers have revealed that a significant relationship exists between scientific attitude and academic achievement (Reena, 2013; Myrten, 2013; Demirbas, 2009; Mukhopdhyaya, 1991; Kaushik, 1988; Shinde, 1982). Mukhopadhyaya (1991) also revealed high relationship between academic motivation and scientific attitude from which scientific aptitude of a person can be predicted. Sam (1992) reported that the mean scores of the scientific attitude test of the pupils of urban and rural areas differed significantly. The rural students were reported to have low level of scientific attitude as compared to the urban students. Rao (1990) found that there was no influence of gender on scientific attitude, but there is a significant difference between government and private school students in relation to their scientific attitude.

There is a significant difference of scientific attitude of students taught through activity oriented instructional strategy in the schools run by government and private management in urban areas (Pillai, 2012). Thus scientific attitude is a major determinant of achievement in science in particular and academic achievement in general.

There is no study carried out in Assam on scientific attitude and its relationship either with achievement in science or with academic achievement. Besides, Sivasagar district is a tea garden dominated area and tea-tribes students studying in secondary schools of Sivasagar district are mostly first generation learners. Moreover, a number of false beliefs exist among the people of Assam as well as among the tea tribes. Thus in the present study an attempt has been made by the researchers to study scientific attitude in relation to academic achievement and achievement in science of secondary school students of Sivasagar District as well as to compare scientific attitude, achievement in science and academic achievement of tea tribes students with non-tea tribes students.

Objective of the Study

The objectives of the study are given below:

- To determine the extent to which Achievement in Science can determine Scientific Attitude of students
- To determine the extent to which Academic Achievement can determine Scientific Attitude of students
- To determine the extent to which Achievement in Science and Academic Achievement combined can determine Scientific Attitude of students
- To find out the Relationship between Scientific Attitude and Achievement in Science of Secondary School Students of Sivasagar Districts.
- To find out the Relationship between Scientific Attitude and Academic Achievement of Secondary School students of Sivasagar District.
- To compare the Scientific Attitude, Achievement in Science, and Academic Achievement of Tea-tribes and Non-Tea Tribes Secondary School Students of Sivasagar District.

Hypotheses of the Study

The following hypotheses were formulated for the study:

- There is no significant relationship between Scientific Attitude and Achievement in Science of Secondary School students of Sivasagar district.
- There is no significant relationship between Scientific Attitude and Academic Achievement of Secondary School students of Sivasagar District.
- There is no significant difference between Tea Tribes andNon-Tea Tribes students studying in secondary schools of Sivasagar district as far as there Scientific Attitude, Achievement in Science, and Academic Achievement are concerned.

Operational Definition of Terms Used in the Study

Scientific Attitude: In this study, Scientific Attitude refers to one's open mindedness, objectivity, aversion to superstitions, rationality, curiosity, etc. It is a way of thinking of a person. A person with scientific attitude is truthful in observation, rational in thinking, objective in observation and action, and free from superstitious beliefs. The score obtained in the Scientific Attitude Scale is considered to be the scientific attitude of the students. Higher the score in the Scientific Attitude Scale higher the scientific attitude of the students.

Achievement in Science: The score obtained in the science test of the Class-IX annual Examination conducted by Sivasagar District Academic Council is considered to be the achievement in science.

Academic Achievement: The total score obtained in all the subjects of Class-IX Annual Examination conducted by Sivsagar District Academic Council is considered to be the academic achievement of students.

Tea Tribes: There are more than one thousand tea gardens in Assam where workers originally coming from Orissa, Madhya Pradesh, Bihar, Andhra Pradesh and West Bengal have engaged themselves and subsequently settled in Assam permanently. They are known as Tea- and Ex-Tea Garden Tribes, who are recognized as Other Backward Classes by the Government (Department of Tea Tribes, Government of Assam). In the present study, the Tea and Ex-Tea Garden Tribes engaged in different activities of tea gardens are considered to be the Tea Tribes.

Non-Tea Tribes: All other students those who are not come under tea tribes are considered to be non-tea tribes in the present study.

Delimitation of The Study: Delimitation in terms of geographical area, nature of educational institution, respondents(students) are given below:

Geographical Area: The present study comprises of secondary school of Sivasagar district of Assam.

Nature of Educational Institutions: The study is conducted to secondary schools of Sivasagar districts under SEBA (Board of Secondary Education, Assam) only.

Respondents: The study is restricted to only Class X students of Sivasagar district. Data are collected from only one academic session (2013-14).

Methodology

Method used: Normative survey method is used to study the present problem.

Population and Sample: The population of the present study comprises of all the Class-X secondary school students of Sivasagar District. Sample of the present study comprises of 404 Class-X students selected purposively from the secondary schools which are typically situated in the tea garden areas of Sivasagar District.

Tool Used: A Likert Type Scientific Attitude Scale was constructed by the researchers comprising of 78 statements. Out of which 37 statements show favourable scientific attitude and 41statements show unfavourable scientific attitude. The Split-half co-efficient of reliability of the scale is .85.

The co-efficient of validity of the scale is .51. It was calculated by comparing the scientific attitude score with the score obtained in the Scientific Attitude Scale constructed and standardized by J.K. Sood and R.P. Sanadhya. The total marks obtained in the Class-IX annual examination conducted by Sivasagar District Academic Council by the sampled students were used as academic achievement. Marks were collected from the official records of the concerned secondary schools of Sivasagar District.

Analysis and Interpretation of Data

Prediction of the Scientific Attitude of Students from Achievement in Science and Academic Achievement

Regression analysis is used to study the extent to which achievement in science and academic achievement explain variance in scientific attitude. Table-1 shows the value of multiple correlation and percentage of variance in scientific attitude explained individually by Achievement in science and academic achievement.

Table-1. Summary of Multiple Correlation Coefficient and Percentage of Variance in Scientific Attitude explained individually by Achievement in Science and Academic Achievement

Independent Variable	N	R	% of Explained Variance
Achievement in Science	404	.368	13.6%
Academic achievement	404	.252	6.3%

Considering the independent variables individually, 13.6% of variance in scientific attitude is explained by achievement in science and only 6.3% of variance is explained by academic achievement.

Table-2. Beta Coefficient and t-value for Independent Variables in Regression Equation

Independent Variables	Beta coefficients	t	Significance
Achievement in Science	.327	5.992	.000
Academic Achievement	.079	1.455	.146

From Table-2, it is evident that one unit increase in achievement in science is associated with .327unit increase in scientific attitude. However, one unit increase in academic achievement is associated with .079 unit increase in scientific attitude.

Table 3. Summary of Multiple Correlation Coefficients and Percentage of Variance in Scientific Attitude explained by Achievement in Science and Academic Achievement in Combination

Independent Variables	N	R	% of Explained Variance
Achievement in Science + Academic Achievement	404	.375	14%

Considering the independent variables in combination, 14% variance in scientific attitude is explained by achievement in science and academic achievement in combination (as shown in Table-3).

Table 4. Relationships between Scientific Attitude and Achievement in Science of Students Studying in Secondary Schools of Sivasagar District

Variables	N	df	r	Significance
Scientific Attitude	404	402	.28	Significant at .01 level

Relationship Between Scientific Attitude of the Students Studying in Secondary Schools of Sivasagar District and their Achievement in Science

Product moment coefficient of correlation was calculated to examine the relationship between scientific attitude and achievement in science of students studying in secondary schools.

From Table-4 it is clear that the value of the product moment coefficient of correlation (r) is 0.28 which is significant at 1% level of significance. Hence, the null hypothesis that is "There is no significant relationship between Scientific Attitude and Achievement in Science of students studying in secondary schools of Sivasagar district" could be rejected at 1% level of significance. Thus, it can be concluded that there is a significant relationship between scientific attitude and achievement in science of students studying in secondary schools of Sivasagar District. Since, the value of r=0.28, therefore, there is a low positive relationship exist between scientific attitude and achievement of students studying in secondary schools of Sivasagar District. Moreover, the calculated value of the co-efficient of correlation is positive, which also means that if achievement in science of students increases, the scientific attitude of students also increases or vice versa.

Relationship Between Scientific Attitude of the Students Studying in Secondary Schools of Sivasagar District and Their Academic Achievement

Product moment coefficient of correlation was calculated to examine the relationship between scientific attitude and academic achievement of students studying in secondary schools.

Table 5. Relationship between Scientific Attitude and Academic Achievement of Students Studying in Secondary Schools of Sivasagar District

Variables	N	df	r	Significance
Scientific Attitude Academic Achievement	404	402	.02	Not Significant at .01 level

From Table-5 it is clear that the value of the product moment coefficient of correlation (r) is 0.02 which is not significant at 1% level of significance. Hence, the null hypothesis that is "There is no significant relationship between Scientific Attitude and Academic Achievement of students studying in secondary schools of Sivasagar district" could be accepted at 1% level of significance. Thus, it can be concluded that there is no significant relationship between scientific attitude and academic achievement of students studying in secondary schools of Sivasagar District.

Comparison of Scientific Attitude of tea Tribes and Non-Tea Tribes Students Studying in Secondary schools of Sivsagar District

The 't-test' was used to compare the scientific attitude of **Tea** Tribes and Non-Tea Tribes students studying in secondary schools of Sivsagar District. Table-6: shows the comparison of scientific attitude of Tea Tribes and Non-Tea Tribes students studying in secondary schools of Sivasagar District. The following null hypothesis was formulated for testing if there is any significant difference in scientific attitude of Tea Tribes and Non-Tea Tribes students studying in secondary schools,

Table 6. Comparison of Scientific Attitude of Tea Tribes and Non-Tea Tribes Students Studying in Secondary Schools of Sivsagar District

Categories	N	Mean	SD	t	df	Significance
Tea Tribes	202	254.77	23.46	5.28	402	Significant at .01 Level
Non-Tea Tribes	202	274.47	27.96			

Table 7. Comparison of Achievement in Science of Tea Tribes and Non-Tea Tribes Students Studying in Secondary Schools of Sivsagar District

Categories	N	Mean	SD	t	df	Significance
Tea Tribes	202	38.39	7.47	3.57	402	Significant at .01 Level
Non-Tea Tribes	202	42.53	10.66			

Table 8. Comparison of Academic Achievement of Tea Tribes and Non-Tea Tribes Students Studying in Secondary Schools of Sivasagar District

Categories	N	Mean	SD	t	df	Significance
Tea Tribes	202	242.6	49.31	3.52	402	Significant at .01 Level
Non-Tea Tribes	202	262.47	66.51			

"There is no significant difference between Tea Tribes and Non-Tea Tribes students studying in secondary schools of Sivasagar District as far as their scientific attitude is concerned". The 't' value is found as 5.28, which is significant at .01 level. Hence, the null hypothesis could be rejected at .01level.

Thus, there is a significant difference between Tea Tribes and Non-Tea Tribes students studying in secondary schools of Sivasagar District as far as their scientific attitude is concerned. It is also evident from Table-6 that the mean scientific attitude score of tea tribes students (254.77) are lower than the non-tea tribes students (274.47).

Comparison of Achievement In Science of Tea Tribes And Non-Tea Tribes Students Studying in Secondary Schools of Sivasagar District

The 't-test' was used to compare the Achievement in Science of Tea Tribes and Non-Tea Tribes students studying in secondary schools of Sivas agar District. Table-7shows the comparison of Achievement in Science of Tea Tribes and Non-Tea Tribes students studying in secondary schools of Sivas agar District.

The following null hypothesis was formulated for testing if there is any significant difference in Achievement in Science of Tea Tribes and Non-Tea Tribes students studying in secondary schools, "There is no significant difference between Tea Tribes and Non-Tea Tribes students studying in secondary schools of Sivas agar District as far as their Achievement in Science is concerned". The 't' value is found as 3.57, which is significant at .01 level.

Hence, the null hypothesis could be rejected at .01 level. Thus, there is a significant difference between Tea Tribes and Non-Tea Tribes students studying in secondary schools of Sivas agar District as far as their Achievement in Science is concerned. It is also evident from Table-7 that the mean achievement in science of tea-tribes students (38.39) are lower than the non-tea tribes students (42.53).

Comparison of Academic Achievement of tea Tribes and Non-Tea Tribes Students Studying in Secondary Schools of Sivasagar District:

The 't-test' was used to compare the Academic Achievement of Tea Tribes and Non-Tea Tribes students studying in secondary schools of Sivasagar District. Table-8shows the comparison of Academic Achievement of Tea Tribes and Non-Tea Tribes students studying in secondary schools of Sivasagar District. The following null hypothesis was formulated for testing if there is any significant difference in Academic Achievement of Tea Tribes and Non-Tea Tribes students studying in secondary schools, "There is no significant difference between Tea Tribes and Non-Tea Tribes students studying in secondary schools of Sivasagar District as far as their Academic Achieve mentis concerned". The 't' value is found as 3.52, which is significant at .01 level. Hence, the null hypothesis could be rejected at .01 level. Thus, there is a significant difference between Tea Tribes and Non-Tea Tribes students studying in secondary schools of Sivasagar District as far as their **Academic Achievement** is concerned. It is also evident from Table-8 that the mean academic achievement of tea-tribes students (242.6) is lower than the non-tea tribe students (262.47).

Conclusion

The above study revealed that 14% variance in scientific attitude is explained by achievement in science and academic achievement in combination. The study also revealed that higher the achievement in science higher the scientific attitude of secondary school students. The tea tribe students are inferior in terms of their achievement in science and academic achievement in comparison to non-tea tribes students. Moreover, tea-tribes students are less scientific in their thinking than non-tea tribes students.

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