

A Study of Scientific Attitude as Predictors of Achievement in Science of Class X Students: Analysing Socio-Demographic Variables in Gender and Locality

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Abstract

Science is fundamentally a body of knowledge built upon empirical evidence, rigorous experimentation, and logical reasoning. It encompasses a vast array of disciplines, from physics and chemistry to biology and psychology, each offering insights into different aspects of the natural world. This study investigates the role of scientific attitude as a predictor of achievement in science among Class X students. Utilizing the Scientific Attitude Scale, we examined variations in Scientific Attitudes among different demographics, including boys and girls, and students from rural and urban schools. The research aims to understand how these attitudes influence students' academic performance in science. By analysing data from diverse educational settings, this study seeks to identify key factors that contribute to higher achievement in science and provide insights into enhancing scientific education. The findings are expected to inform educators and policymakers on the importance of fostering positive scientific attitudes to improve overall student performance in science subjects.

Keywords: Scientific Attitude, Scientific Attitude Scale, Boys, Girls, Rural and Urban Schools.

INTRODUCTION

In this modern era, science indeed stands as the cornerstone of progress across all facets of life. To harness the benefits of scientific advancements, it's imperative for our students to prioritize their studies and engage deeply with scientific principles and methodologies. Scientific Attitude encompasses a mindset characterized by curiosity, skepticism, objectivity, and a commitment to empirical evidence. It involves approaching problems with an open mind, asking questions, and seeking evidence-based explanations. Skepticism encourages critical evaluation of information and claims, leading to a deeper understanding of complex phenomena. In general belief, individuals who possess a positive Scientific Attitude are more likely to excel in scientific endeavours compared to those with a lower scientific attitude. Ghosh (2020) supported this notion by highlighting a positive correlation among scientific attitude, scientific interest, and academic achievement.

SCIENTIFIC ATTITUDE:

Scientific attitude refers to a set of attributes, dispositions, and behaviours that characterize a mindset conducive to scientific inquiry and exploration. "Scientific Attitude" refers to the observable behaviours

and cognitive processes that manifest in individuals' intellectual curiosity, commitment to truth-seeking, reliance on empirical evidence, and willingness to engage in open communication in the context of scientific inquiry.

According to Sekar, P. and Mani, S. (2013), Scientific Attitude is commonly linked with mental processes that influence how individuals' approach and interact with the world around them. These cognitive habits extend beyond scientific inquiry and are integral to daily life for everyone. By fostering attributes such as curiosity, critical thinking, and open-mindedness, individuals develop a framework for understanding, evaluating, and responding to various phenomena and challenges they encounter in their everyday experiences. Thus, Scientific Attitude serves as a valuable foundation for navigating complexities, making informed decisions, and continuously learning and growing in all aspects of life.

Review of Related Literature

Naseer Ali (2013) conducted a comprehensive study on the scientific attitude of secondary school students in Maharashtra, India. The research aimed to explore potential differences in scientific attitudes among students based on various demographic factors. The findings of the study revealed that there were no significant disparities between male and female students concerning their scientific attitude. This suggests that gender did not play a substantial role in shaping the scientific attitudes of secondary school students in the region.

Sekar and Mani (2013) conducted a survey among first year higher secondary school students and discovered a notable gender difference favouring girls in terms of scientific attitude. Across various school boards, girls exhibited significantly more positive attitudes towards learning science compared to boys. Moreover, in central board and matriculation level schools, girls not only demonstrated better performance but also achieved greater success in science compared to boys.

Jeyanthi (2016) conducted a study focusing on scientific attitude and achievement in science among upper primary school students. The research involved a sample of 200 upper primary school students in Dindigul district, selected using a simple random sampling technique. Baskara Rao's scientific attitude scale (SAS) was utilized as the primary assessment tool. The key finding of the study revealed that there were no significant differences observed in gender.

Manashee Gogoi and Binoy Munda (2016) uncovered a significant correlation between science attitude and academic achievement, highlighting the crucial link between the two factors.

OBJECTIVES OF THE STUDY:

The following objectives are framed for the present study.

1. To find out the level of Scientific Attitude of class X students.
2. To find out whether there is any significant difference in the Scientific Attitude of class X students with reference to Socio- demographic variables namely gender and locality.

HYPOTHESES:

The following null hypotheses were formulated for the purpose of testing –

IA: “There would be no significant difference in the Scientific Attitude of class X students with reference to Gender.”

IB: “There would be no significant difference in the Scientific Attitude of class X students with reference to Locality.”

SCOPE OF THE STUDY

The present investigation attempts to find out Scientific Attitude and Attitude towards Science of X class students as predictors on Achievement of Science. The present study gives immense importance to the level of Scientific Attitude of X class students comparing based on gender and locality.

METHOD

The investigator adopted 'Survey Method' for the present study.

SAMPLE

The sample was collected by using Simple Random Sampling Technique. The schools under government and private Management of urban and rural areas were sort out. From each locality 6 Government high schools and 6 private high schools were selected. Totally 24 schools were selected in that 12 from urban area and 12 from rural area. Thus, after selecting the high schools, the investigator personally visited the selected high schools. From each locality, that is from urban locality 375 students from government schools, 375 students from private schools and from rural locality 375 students from government schools, 375 students from private schools were taken into consideration for data collection. The total sample of 1500 high school students of class X were equally distributed between both genders, between both localities, and among the two managements of government and private the schools.

TOOLS FOR THE STUDY:

Scientific Attitude Scale (Self Made Tool)

STATISTICAL TECHNIQUES USED IN THE STUDY

The collected data was analysed by using appropriate statistical techniques such as

- Mean
- Standard deviation
- 't'-test
- Two - way ANOVA
- 'F'-test
- Pearson's coefficient of correlation
- Multiple regression test

ANALYSIS OF CLASS X STUDENTS' LEVEL OF SCIENTIFIC ATTITUDE

Scientific Attitude was analysed according to the following objectives,

- To find out the level of Scientific Attitude of class X students.
- To find out whether there is any significant difference in the Scientific Attitude of class X students with reference to Socio- demographic variables namely gender and locality.

Table 1: Level of Scientific Attitude Vs Socio - demographic variables of class X students

S. No.	Socio demographic variables		Levels of Scientific Attitude					
			Low (Below 129.852)		Moderate (Between 129.82 – 143.388)		High (Above 143.388)	
			No. of students	% of students	No. of students	% of students	No. of students	% of students
1.	Gender	Boys	267	35.6	258	34.4	225	30.0
		Girls	262	34.9	237	31.6	251	33.5
2.	Locality	Rural	276	36.8	280	37.3	194	25.9
		Urban	253	33.7	215	28.7	282	37.6

In the present study self-made tool is used to analyse the level of Scientific Attitude of class X students. Scientific Attitudes of Class X students are analysed with reference to Socio-demographic variables: - Gender and Locality.

Table-1 reveals that among 750 students of class X, in boys the frequency of low level of Scientific Attitude is 267(35.6%), Whereas in girls the frequency of low level of Scientific Attitude is 262(34.9%). In Moderate level of Scientific Attitude, for boys it is 258(34.4%), whereas moderate level of Scientific Attitude in girls, is 237(31.6%). The high level of Scientific Attitude is seen among 225(30.0%) boys, whereas the high level of Scientific Attitude is seen among 251(33.5%) girls studying in class X.

Among 750 of class X students, in rural area the frequency of low level of Scientific Attitude is found among 276(36.8%), whereas class X students in urban area the frequency of low level of Scientific Attitude was found among 253(33.7%). In rural area the moderate level of Scientific Attitude is found among 280(37.3%), whereas in urban area moderate level is found among 215(28.7%). The frequency of high level of Scientific Attitude of rural is 194(25.9%), whereas the high level of Scientific Attitude of urban class X students is 282(37.6%).

Scientific Attitude Vs Socio-demographic variables:

Table - 2: Mean, SD and ‘t’ values for the scores of Scientific Attitudes of Class X students with reference to Socio-demographic variables

S. No	Socio-Demographic variables	Categories	N	Mean	SD	‘t’ Values
1.	Gender	Boys	750	136.39	13.350	0.656@ P = 0.512
		Girls	750	136.85	13.726	
2.	Locality	Rural	750	135.17	12.527	4.173** P = 0.000
		Urban	750	138.07	14.339	

Gender:

Hypothesis - I_A

“There would be no significant difference in the Scientific Attitude of class X students with reference to Gender”.

From the table – 2 it is observed that there is no significant difference found between boys and girls. The mean difference is 0.459 the ‘t’ value (0.656) for class X students’ Scientific Attitude is not significant at 0.05 level (P=0.512). Therefore, it is stated that there is no significant gender difference between boys and

girls in their Scientific Attitude. Hence the formulated Sub Hypothesis - I_A 'There would be no significant difference in the Scientific Attitude of class X students with reference to Gender' is accepted.

Locality:

Hypothesis – I_B

“There would be no significant difference in the Scientific Attitude of class X students with reference to Locality”.

From the table – 2 it is observed that there is significant difference found between the students studying in urban and rural locality. The mean difference is 2.901. the ‘t’ value for class X students’ Scientific Attitude is significant at 4.173 (P=0.000). Therefore, it is stated that there is significant difference among rural and urban locality of class X students in their Scientific Attitude. Hence the formulated Sub Hypothesis- I_B 'There would be no significant difference in the Scientific Attitude of class X students with reference to Locality' is rejected.

MAJAR FINDINGS OF THE STUDY

a) Level of Scientific Attitude Vs Socio - demographic variables of class X students

- The scores pertaining to Scientific Attitude, the frequency of High level of Scientific Attitude was found among girls 251(33.5%), when compared to boys 225(30.0%),
- The frequency of High level of Scientific Attitude was found among students studying in urban area schools 282 (37.6%), when compared to students studying in rural area schools 194 (25.9%).

b) Scientific Attitude Vs Socio-demographic variables:

- **Gender:** There was no significant difference between boys and girls in their Scientific Attitude.
- **Locality:** There was significant difference between rural and urban locality of class X, Urban students exhibited higher Scientific Attitude than rural students.

EDUCATIONAL IMPLICATIONS

- The findings of the present study indicate that approximately 70% of the participants demonstrated moderate to low levels of Scientific Attitude. To enhance Scientific Attitude among students, educators can employ various strategies to influence specific characteristics associated with it. Therefore, teachers should prioritize initiatives aimed at fostering Scientific Attitude. These may include organizing visits to science exhibitions, fairs, excursions, and industries, as well as engaging students in activities such as brainstorming sessions, debates on science and technology topics, discussions about prominent scientists, and essay writing on recent inventions. These proactive measures can significantly contribute to nurturing a stronger Scientific Attitude among students.
- From the present study it was observed that nearly 75% of the population in rural areas fall under moderate and low level of Scientific Attitude category. This might be because of the student’s socio-economic background, the interest of the student towards science, scientific approaches, Attitudes towards Science learning and doing, psychological, intellectual, and behavioural aspects of students. Schools in rural areas must be well equipped and well established to impart the best scientific knowledge to rural students. Headmasters, teachers, and parents should concentrate more on their children’s education especially on science subjects to enhance their Scientific Attitude.

RECOMMENDATIONS

To develop Scientific Attitude and Attitude towards Science in students at class X level, there are a plethora of small but effective changes that can be implemented to improve secondary school education. The first fruitful step to be taken for the improvement of Scientific Attitude among class X students is to frame the questions in exams in such a manner that students will secure good marks only when they read the entire textbook. The Government and educational planners must take necessary steps for the modifications in the curricula, without compromising on the quality of education and competency level expected to be achieved by all children in each standard.

CONCLUSION

The present study aimed to investigate the predictive influence of Scientific Attitude and Attitude towards Science on Achievement in Science among class X students. Given the limited research conducted in Nellore district of Andhra Pradesh concerning these predictors in relation to class X students, this research seeks to shed light on the current landscape of secondary school education in the region. In the present study, notable variations were observed in the Scientific Attitude of class X students across different socio-demographic variables, including gender and Locality. However, Gender did not emerge as a significant differentiator in Scientific Attitude among students.

Reference:

1. **Naseerali, M. K. (2013).** scientific attitude of secondary school students in Maharashtra, Conflux Journal of Education, vol: 1, Issue: 2.
2. **Sekar, P., and Mani, S. (2013).** Science Attitude of Higher Secondary Biology Students. *Education*, 3(9).
3. **Jeyanthi, R. (2016).** Scientific attitude and Achievement in Science of Upper Primary School students. *International Journal of Humanities, Arts, Medicine and Sciences*, 4(7), 129-132.
4. **Manashee Gogoi, Binoy Munda (2016).** Scientific attitude of secondary school students of Sivasagar district in relation to their achievement in science. *International Journal of Innovation Sciences and Research* 5(02): 637-641.