International Journal of Enhanced Research in Educational Development (IJERED)
ISSN: 2320-8708, Vol. 11 Issue 5, Sept.-Oct, 2023, Impact Factor: 7.326

'Scientific Attitude' Among Secondary School Students - An Exploratory Analysis

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ABSTRACT

Scientific Attitudes are predispositions (tendency, inclination, mental set, or habit of mind) to think and act in a certain way. It is a "mindset" in a particular direction, or it can be a way of life. Secondary science education has a significant impact on student's attitudes toward science, which is an essential effect of science instruction. One of the main objectives of secondary school science instruction is to help students develop scientific mentality. The teaching of science imparts the scientific method and develops a scientific attitude, which is very valuable and, at the same time, is transferable to other situations in life. Thus, the current researcher attempts to learns about the scientific attitude of secondary schools. An exploratory survey method was adopted. The among 110 secondary students from Dindigul district selected at random. The findings of the study revealed that there exist significant differences in the scientific attitude mean scores of secondary school students with respect to gender, location and mode of teaching.

Key Words: Science Teaching, Scientific Attitude, Secondary School Students

INTRODUCTION

Our daily lives are entwined with scientific knowledge. Without science, it is impossible to live successfully and survive. So, to achieve monetary satisfaction, everyone needs to have a sufficient understanding of science. The development of science is essential to a country's progress. It offers quick economic growth and great living standards. To make life more meaningful and progress in society, inventions and discoveries are a must. Science teaches us to think correctly. Behavior that is directed at or away from a certain object, scenario, collection of objects, or situation, is controlled by a scientific attitude. If there is a Scientific Attitude, you always think and act wisely for the development of science. Scientific attitude is a multidimensional concept. The student's scientific attitude towards science may affect their performance. Many different researchers expose the fact that scientific attitude of teachers towards science education not only affect their own performances, but also influence students' success, performance and attitude towards science courses (Altınok, 2004; Morell & Lederman, 1998; Palmer, 2001; She & Fisher, 2002; Sönmez, 2007; Washton, 1971).

REVIEW OF RELATED LITERATURE

Adi Fadli et. al, (2022) tested the Exploring Students Scientific Attitudes Based on Gender Perspective. This study was a cross-sectional survey design in which the data were collected from 200 university students (50 men and 150 women) through cluster random sampling. The questionnaire and interview data of students' scientific attitudes based on gender were examined using a difference t-test. The results indicate that students' scientific attitudes did not significantly differ in terms of gender perspective.

Nisha et al. (2022) evaluated school students' levels of scientific attitude in a brief survey. To gauge the pupils' attitudes toward science, a questionnaire was employed. The study employed a survey approach. 227 students took part in the study. The findings showed that there is no significant difference in the level of scientific attitude between boys and girls or between different age groups.

Vasimalai Raja (2016) examined secondary school students' attitudes toward science. For the study, the researcher has chosen the survey methodology. In the Virudhunagar district, a sample of 300 students from the eighth, ninth, and tenth grades is chosen at random. The results of the study demonstrated that there is no appreciable difference in the mean scores of scientific views by gender or by kind of school.

Definition of Key Terms

Science Teaching: "Science teaching involves active learning strategies to engage students in the process of science and teaching methods that have been systematically tested and shown to reach diverse students." (Policy Forum in Science magazine, 2004).

Scientific Attitude: "A relatively enduring organization of beliefs, feeling, and behavioral tendencies towards socially significant objects, groups, events of symbols" (Hogg, & Vaughan 2005).

Secondary School Students: The students enrolled in the IX and X standards of schools are considered secondary school students. It includes the IX and X standards. The present study focuses on IX Standard Students.

Objectives

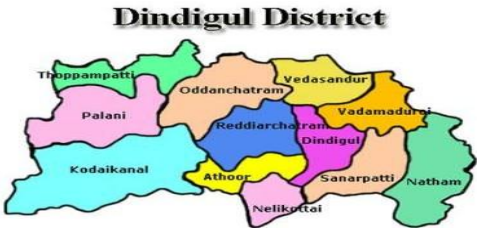
- To assess the scientific attitude of secondary school's students in Dindigul District
- To ascertain the effects of the following elements on secondary school students' scientific attitudes toward, a) Gender b) Locality c) Mode of Teaching

METHODOLOGY

In this study, an exploratory survey approach was used. Students in secondary schools were given the Scientific Attitude Scale by the researchers for the chosen sample.

Sample

The 110 secondary school students in Dindigul District's standard IX were chosen as the study's sample. 44 boys and 66 girls made up the 110 samples. A stratified sampling strategy was used to choose the samples.



Tools

The study's instrument is the scientific Attitude Test (SAT), developed & standardized by the investigator. The test's reliability is found to be 0.66 using Spearman-Brown formula (Split-half method), and the Correlation coefficient of validity is found to be 0.65 using Karal Pearson's product moment method.

DATA ANALYSIS AND INTERPRETATION

Null Hypothesis

H0: There is no significant difference in the level of scientific attitude between male and female students.

Table:1 Level of scientific attitude among Gender

Test	N	Mean	S. D	Mean Difference	t-value
Male	44	250.32	50.20	38.48	4.739 (Significant at 0.05 level)
Female	66	288.80	29.93		

The mean scores for scientific attitudes among male and female students were 250.32 and 288.80, respectively, with standard deviations of 50.20 and 29.93. The research reveals that there is a large variation in the mean scores overall. The estimated "t" value (4.739) is higher than the table value of 1.96, at a 0.05 level of significance. Because of this, the null hypothesis, "There is no significant difference in the level of scientific attitude between male and female students." is not accepted.

It is accepted that there is a significant difference in the level of scientific attitude between male and female students.

B. Null Hypothesis

H0: There is no significant difference in the level of scientific attitude between ruraland urban students

Table:2 Level of scientific attitude among Locality

Test	N	Mean	S. D	Mean Difference	t-value
Rural	78	264.23	44.56	31.55	5.354 (Significant at 0.05 level)
Urban	32	295.78	17.22		

The mean scores for scientific attitudes among rural and urban students were 264.23 and 295.78, respectively, with standard deviations of 44.56 and 17.22. The research reveals that there is a large variation in the mean scores overall. The estimated "t" value (5.354) is higher than the table value of 1.96 at a 0.05 level of significance. Consequently, the null hypothesis, "There is no significant difference in the level of scientific attitude between rural and urban students." is not accepted.

It is accepted that there is a significant difference in the level of scientific attitude between rural and urban students.

C. Null Hypothesis

H0: There is no significant difference in the level of scientific attitude between traditional teaching and Online teaching.

Table: 3 Level of scientific attitude among mode of teaching

Test	N	Mean	S. D	Mean Difference	t-value
Traditional Teaching	48	261.92	40.66	20.39	2.637 (Significant at 0.05 level)
Online Teaching	62	282.31	39.62		

Traditional teaching and Online teaching based on students' mean scores of scientific attitude were 261.92 and 282.31, respectively and standard deviation(S.D) were 40.66 and 39.62, respectively. The research reveals that there is a large variation in the mean scores overall. The estimated "t" value (2.637) is higher than the table value of 1.96 At a 0.05 level of significance. Consequently, the null hypothesis, "There is no significant difference in the level of scientific attitude between traditional teaching and female students Online teaching," is rejected.

It is accepted that there is a significant difference in the level of scientific attitude between traditional teaching and Online teaching.

Major Findings of the Study

The major findings of the study were,

- It is evident from the mean difference value (38.48) that the female secondary school students have a higher scientific attitude score (288.80) than the male score (250.32).
- It is evident from the mean difference value (31.55) that the urban secondary school students have a higher scientific attitude score (295.78) than the rural score (264.23).
- It is evident from the mean difference value (20.39) that Online teaching based on secondary school students has a higher scientific attitude score (282.31) than the traditional teaching score (261.92).

Educational Implications of the Study

- Scientific attitude is the skill to respond constantly, realistically, and objectively in creation behaviors to an innovative or difficult situation.
- Every aspect of life requires some knowledge of science. Human comforts have risen thanks to science. A

man with scientific aptitude can readily take advantage of these advantages and improve his quality of life.

- Scientific attitudes are learned or acquired from our personal experiences, informationprovide by others, and market-controlled sources, especially exposure to mass media.

CONCLUSION

The main goal of science teaching and learning should be to develop a scientific mindset in our pupils. Overall, the child's performance is altered. Effective science education can transform a child's conduct for the better by keeping this scientific mindset in mind. The only institution where kids may receive this kind of training is school. Similar to the scientific attitude, which has numerous traits and may be applied in a variety of contexts, scientific attitude is a composite behavioral quality. These approaches to thinking and daily life are crucial for everyone, not just scientists.

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