



A Study of Scientific Attitudes of Students of Secondary Level in Context of Certain Variables

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Abstract:

The attitudes are changed in various situations. The person having scientific attitude feels easy to adjust in scattered society in comparison to other people. He can become helpful to maintain peace to other people, so he as well as the nation can progress smoothly. We face many problems like pollution, population explosion, lack of energy, unemployment; poverty etc. Education is the weapon which can never fail in solving such problems. Scientific attitude can be cultivated by science education. Scientific attitude is necessary for progress of the nation.

Scientific attitude helps an individual to develop vision for better life, to make life meaningful and teaches him to do all work systematically. Scientific attitude is like a foundation for all the fields of life so this must be attended. Evaluation is a process which can change the teaching techniques. Evaluation presents the true position of students and also propriety of teaching process. If we want to think for developing scientific attitudes in students, we also should know the level of scientific attitudes in them. So the researcher had selected this subject for research.

Keywords: Attitude, Science, Scientific Attitude, Secondary level

1. Introduction

Now a day, science has become an internal part of human life. The world without science can't be imagined. Science has changed the world from modern civilization to scientific civilization by its wonderful achievements. One of the objectives of education is to develop scientific attitudes in students. The curriculum and educational system should be arranged in a way that the views of Indian citizen be scientific. On the other hand central or state government has not tried their best to develop the scientific attitudes in students at secondary level. It resulted in decrease of number of students in science colleges. This is enough state of affair to make us anxious.

Students learn science subject till standard – 10. Secondary Education Board also tries to develop interest, attitudes and aptitudes in science subject. Science fairs, science exhibitions, science clubs, science projects, seminars etc are arranged at Taluka, District and state level. In spite of such efforts the students in science stream are decreased. So developing scientific attitude has become inevitable now.

2. Objectives of the research

The variable under measurement was the scientific attitude, so the researcher had decided to construct the Scientific Attitude Scale to measure the scientific attitudes of students in this research. He had planned to study the scientific attitudes of students studying in standard 8 to 10 in Gujarati medium Secondary schools. The objectives of this research were decided as below.

1. To construct and standardize the Scientific Attitude Scale to measure scientific attitudes of students of secondary level.
2. To decide validity and reliability of scientific Attitude Scale.
3. To establish norms of the Scientific Attitude Scale.
4. To know the level of scientific attitudes of secondary school students in context to standard, area of schools and sex of students.
5. To know the level of scientific attitudes of secondary school students in context to standard of students.
6. To know the level of scientific attitudes of secondary school students in context to area of students.
7. To know the level of scientific attitudes of secondary school students in context to sex of students.
8. To study the scientific attitudes of secondary school students in relation to interaction with their standard, area of schools and sex.

3. Hypotheses of the research

The hypotheses in any research are formed keeping objectives in mind. The hypotheses for this study are mentioned below.

- H₀₁** There will be no significant difference among the average score of scientific attitudes of students studying in standard. 8, 9 and 10.
- H₀₂** There will be no significant difference between the average score of scientific attitudes of students studying in standard. 8 and 9
- H₀₃** There will be no significant difference between the average score of scientific attitudes of students studying in standard. 8 and 10
- H₀₄** There will be no significant difference between the average score of scientific attitudes of students studying in standard. 9 and 10
- H₀₅** There will be no significant difference between the average score of scientific attitudes of students studying in urban area and rural area.
- H₀₆** There will be no significant difference between the average score of scientific attitudes of boys and girls of secondary schools.
- H₀₇** There will be no significant effect of interaction between students' standard and area of schools on their average score of scientific attitudes at secondary level.
- H₀₈** There will be no significant effect of interaction between students' standard and sex on their average score of scientific attitudes at secondary level.
- H₀₉** There will be no significant effect of interaction between students' area of schools and sex on their average score of scientific attitudes at secondary level.
- H₀₁₀** There will be no effect of interaction among students' standard, area of schools and sex on their average score of scientific attitudes at secondary level.

4. Operation definitions of terms

4.1 Secondary level

According to definition stated in Gujarat State Secondary Education resolution 1972 code No. (2), the institution giving education for standard 8 to 10 is called secondary level (school)

4.2 Attitude

Some definitions are stated here to understand the meaning of an attitude.

“An attitude means inclination of favour or oppose toward anything or situation.”

- J.P. Guilford (1965)

“An attitude is defined as generalized disposition towards group of people and it is emotionally tones.”

- Thurston (1960)

“Attitudes are associated with likes and dislikes consequently have on emotional confront.”

- Morris (1946)

“Attitudes is a dispositional readiness to respond to certain situations persons and objects in a consistent manners which has learned and has become one’s typical mode of response”

- Freeman (1965)

4.3 Scientific Attitude

“Scientific approach for things, machines, experiments of science.”

- Reader Digest (1984)

“Scientific attitude means psychological thinking of any person toward science.”

- Noll (1935)

“Most often characterized by a list of components attitudes such as objectivity, open mindedness, respecticism and a willingness to suspend judgment if there is insufficient evidence.”

- Education commission (1977)

“Scientific attitudes can be defined as open – mindedness a desire for accurate knowledge, confidence in procedures for seeking knowledge and expectation that solution of the problem will come through the use of verified knowledge.”

- Rethinking science education (1960)

5. The variables under the research

The variables included in this study and their levels are mentioned as below.

➤ **Dependent variable**

- Scientific attitudes

➤ **Independent Variables:**

- Standards of the students
- Area of schools
- Sex of the students

6. Importance of the research

Today’s student is a citizen of tomorrow. Future society depends on all round development of students. Umashankar Joshi had rightly said, “Man should become human.” The importance of this research is stated below.

1. The research was aimed at constructing a standardized Scientific Attitude Scale. So such Scientific Attitude scale will be available to measure scientific attitudes of students studying in standard 8, 9 and 10.
2. The Scientific Attitude scale will be useful not only to know the scientific attitudes of students but also to draw attention to deficiencies in developing scientific attitudes in students. It will guide to arrange educational programmes to develop such attitudes.
3. Attitudes are shaped with physical and mental development of students. Positive or negative attitudes are formed by good and bad experiences in family, school, society etc.
This study will provide guidance to develop positive scientific attitudes in students so they will take interest in science stream after passing standard.10. The number of students will be increased in science colleges.
4. After knowing the level of scientific attitudes of secondary school students by this study, more programmes will be planned to develop scientific attitudes.
5. So many programmes are planned for development of scientific attitudes. The Scientific Attitude scale will be useful to test effectiveness of all these programmes and approaches and methods of science education.
6. It will be known to which extent the variables like standard, area and sex of students contribute to develop scientific attitudes.

7. Data Collection

An accurate method should be used to collect information on any subject or research. Quantitative or qualitative data should be collected according to subject of research. In this study, to achieve decided objectives and to make the results effective, the researcher had collected the data using the Survey Method.

The researcher had to collect score using the Scientific Attitude Scale from the students of standard 8, 9 and 10 studying in secondary schools in urban and rural areas of Gujarat state. He had visited the selected schools and got the permission to collect data on the scientific attitude scale. Then he went to schools and gave the scientific attitude scale to students on the fixed day and collected the data. The Principals had allotted time with glad after hearing the importance of this study. Both the Principal and teachers had co operated in selecting one class from each standard, to manage the class for test etc. The following care was taken while giving the Scientific Attitude Scale to students and collecting them.

- (1) The class was managed – Necessary instructions related to the Scientific Attitude Scale were given and then the Scientific Attitude Scale was distributed.
- (2) Students were made to note the information on the first page of the Scientific Attitude Scale then they were told to read the instructions carefully.
- (3) Enough time was allotted to response all the items in the Scientific Attitude Scale as the Scientific Attitude Scale is not a kind of test within any time period. Students had passed about 25 minutes for their response.

In the form of response, the students had to mark in the Scientific Attitude Scale so they had responded naturally without any anxiety. Some students in schools in rural area were found weak in reading and comprehension in standard. 8. They had taken more time than normal students in reading and understanding the statements. After completing, the Scientific Attitude Scales were

collected and checked according to score system. Then score were noted and used for analysis and finding norms.

8. Data Analysis

Statistical calculation of data was done as below.

- (1) To construct and standardize the Scientific Attitude Scale, the discriminative value of statements was found out using t-test suggested by Allen Edward.
- (2) The reliability and validity was found out using calculation suggested by Pearson factorial method.
- (3) To know the level of scientific attitudes of students of standard – 8 to 10, average and percentage were calculated.
- (4) The significance difference between two or more averages is tested using f-value by ANOVA. If F -value is found out significant at 0.01 or 0.05 levels, the superior out of two groups is cleared the mean value. For three or more groups, t-value is used to know the significance of average score between two groups. When the groups are more in numbers and f-value is found significant, the Newman - Keuls method is useful to examine significance between average scores.
- (5) Winer (1962) had explained the use of new man – Keuls method for necessary calculations in detail. The researcher had also used N. K. Test when it was found necessary after ANNOVA.

9. Findings

The following findings are concluded after analysis of data of 1446 characters of sample and interpretations.

** Level of scientific attitudes of students of secondary level*

- Only 6.08% students of secondary level get A grade
- Only 30.84% students of secondary level get B grade
- Only 46.95% students of secondary level get C grade Means most of students are found in normal level of scientific attitudes.
- Only 13.48% students of secondary level get D grade
- Only 2.62% students of secondary level get E grade means a few students are found in the lowest level of scientific attitudes.
- The percentage of students of standard – 8, 9 and 10 having A, Grade are 3.94%, 3.19% and 11.13% of respectively.
- The percentage of students of standard – 8, 9 and 10 having B, Grade are 26.69%, 30.59% and 35.77% of respectively.
- The percentage of students of standard – 8, 9 and 10 having C, Grade are 94.13%, 38.81% and 46.42% of respectively.
- The percentage of students of standard – 8, 9 and 10 having D, Grade are 11.9%, 24.65% and 5.98% of respectively.
- The percentage of students of standard – 8, 9 and 10 having E, Grade are 4.13%, 2.81% and 1.85% of respectively.

- The percentage of students having A-grade from urban area are 8.85% and from rural area are 3.71%.
- The percentage of students having B-grade from urban area are 35.43% and from rural area are 26.92%.
- The percentage of students having C-grade from urban area are 40.24% and from rural area are 52.56%.
- The percentage of students having D-grade from urban area are 13.06% and from rural area are 13.97%.
- The percentage of students having E-grade from urban area are 2.40% and from rural area are 3.0%.
- The percentage of boys and girls having A-grade are 6.04% and 6.16% respectively.
- The percentage of boys and girls having B-grade are 25.13% and 41.55% respectively.
- The percentage of boys and girls having C-grade are 48.88% and 43.11% respectively.
- The percentage of boys and girls having D-grade are 17.07% and 6.95% respectively.
- The percentage of boys and girls having E-grade are 2.86% and 2.18% respectively.

*** *The scientific attitude of students of secondary level in reference to independent variables***

The research was aimed at studying the scientific attitudes of students of standard – 8, 9 and 10 in reference their standard, area of school and sex. The researcher had decided to apply analysis to variance. For this purpose, obtained score of 720 students classified according to 3x2x2 factorial design.

- F -ratio for students of standard – 8, 9 and 10 was found 17.59 which was significant at 0.01 level so significant difference was found among the average score of scientific attitudes of students of standard – 8, 9 and 10.
- Significant difference was found between average score of scientific attitudes of urban students and rural students at 0.01 level. The scientific attitudes of students from urban area were found superior to those from rural area.
- Significant difference was found between the scientific of boys are girls of secondary schools at 6.01 level. The girls had better scientific attitudes than boys had.
- The significant effect of interaction of standard and area was found on average score of scientific attitudes of students at secondary level.
- The significant effect of interaction of sex and area was found on average score of scientific attitudes of students at secondary level.
- The significant effect of interaction of standard, area and sex was found on average score of scientific attitudes of students at secondary level.

10. Conclusion

To prepare a research design is an important step for any study. Here information of variables, population, and selection of sample, data collection and analysis are mentioned. In the next chapter, procedure of construction and standardization of the scientific Attitudes scale is discussed.

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