Science attitude analysis among secondary school students of Yamunanagar region in relation to their achievement in General Science

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ABSTRACT *We are living in an age of science and technology where science has become part and parcel of human life. Right from cradle to grave, all our activities are controlled by science. A working definition of science reflecting the approaches generally accepted today in science education is "Science is an accumulated and systematized learning in general use, restricted to natural phenomenon." The progress of science is marked not only by an accumulation of fact but by the emergence of scientific method and scientific attitude. Science is an important part of our life. That's why it has made an integral part of the curriculum. The teaching of science is not purposeful if it fails to develop the scientific attitude, scientific knowledge, various skills and methods to solve problems in day to day life. Sometimes there is more achievement in science among students, but they do not possess positive scientific attitude. This raised a curiosity within the researcher to thoroughly study the attitude of students towards science in relation to their achievement in general science. The present article has highlighted the fact that the achievement in science has an impact on the attitude towards science. Intelligence has no place barrier and the students of rural area can prove worthy occupants of it. The teacher should, therefore, provide many opportunities of teaching and learning so that students get more inclined towards it.*

Key Words: *RTE act; SMC; SSA.*

Introduction

The study of science is the need of hours for developing our reasoning capabilities, imagination, concentration, and fiction less attitude. As Science believe in reality and cannot accept anything without an experimental proof, so it attracts the attention of genius mind to think new scientific ideas and to prove them with their sharp intelligence and wisdom. Science has helped to improve quality as well as quantity in many aspects of life. Science can also be defined as the organized body of knowledge which attempts to explain phenomena (natural or manmade). Kothari commission has very rightly remarked in their recommendation as follows:

"Science and Mathematics should be taught on a compulsory basis to all pupils as a part of general education during the first ten years of teaching."

Under the new curriculum, science will be a completely subject up to high school stage. One of the objectives of teaching science is to inculcate scientific attitudes among the pupils. The purpose of this scale would be to know whether or not the students have developed favorable attitudes sciences as a discipline. The underlying assumption being that one of the outcomes of science education is the development of positive attitude towards the subject. In India, there is a look of standardized commercially for use by the teachers and research workers. Hence, it was thought relevant to develop a dependable attitude scale for measuring the attitude of students towards science.

Thruston (1948) defined attitude as the degree of positive and negative effect associated with some psychological object. A psychological object, according to him, may be a person, a religion, an institution, a community, a system, a minority community or a political party. Many attitude scales were prepared in past time decades to study the attitude of people towards such issues as co-education, capital punishment communism, U.N.O. etc. Various scales for measuring attitudes of teachers towards teaching (Ahluwalia, 1976), guidance services (Baker, 1967), towards science and scientists (Sood, 1975), towards microteaching (Passi & Lalitha, 1977) have been given. The scales for measuring the attitude of students and teachers towards academic disciplines have also become popular.

(A) Objectives of the study

1) To study the science attitude of rural high school students.
2) To study the science attitude of rural high school students in relation to their achievement in general science.
3) To study the science attitude of rural high school boys and girls in relation to their achievement in general science.

(B) Hypothesis

1) There is no significant relation between the science attitude of high school students and their achievement in general science.
2) There is no significant relation between science attitude and the achievement in general science among boys and girls students.

(C) Methodology

Survey method has been used for the study.

(D) Sample used

For the present study, 150 students from 3 schools of district Yamunanagar (Haryana) are selected, consisting of 50 students from each school.

(E) Tools used

The science attitude scale by Mrs. Avinash Grewal of Bhopal (published by National Psychological Corporation, Agra) was used for collection of data. For the statistical techniques, the science attitude scale by Mrs. Avinash Grewal was used.

(F) Science Attitude Scale

After the selection of sample, science attitude scale (SAS) was used as a suitable tool. The selection of tools for a particular study depends on various consideration i.e. the objective of the study, time available at the disposal of the investigator, availability of the suitable text, personal competence of the researcher to administer score and interpret the result etc. For the present work, questionnaire for SAS was used which contains 20 items. The questionnaire was researcher administered on high school students. It was seen that students did not face any ambiguity and difficultly.

The SAS has accepted the definition of science attitude as an opinion or position taken w.r.t. a psychological object in the field of science (Richard W. Moore, 1970). The science attitude has, therefore, been operationally defined as generalized attitude towards the universe of science content and being measured in terms of its favorableness or unfavorableness estimated from the scores obtained by the students on an attitude scale towards science comprising of four categories from the universe of contents 'Science Attitude'.

1) Positive intellectual
2) Negative intellectual
3) Positive Emotional
4) Negative emotional attitudes

For the construction of attitude task of SAS, the more commonly used techniques are (a) the method of paired comparisons; (b) the method of equal-appearing intervals; (c) the method of successive intervals; (d) the method of summated ratings also known as Likert method; (d) scalogram analysis and (e) the scale discrimination technique. Likert method and scale discrimination techniques were considered to be more appropriate for use in the construction of SAS. The construction of the scale was done through several procedural steps.

(G) Operational definitions of the terms used

Science attitude: The science attitude has operationally defined as generalized attitude towards the universe of science.

Secondary school students: The students presently studying in Class IX.

Achievement: Marks secured by the students in science in Class VIII.

(H) Statistical Techniques used

After collection of data, the scores were put in a tabular form to make the process of analysis and interpretation of data, the following statistical techniques were used to perform the analysis.

1) Mean
2) Correlation method
3) t-test

Main Results

Each of the ten positive items of the SAS is assigned a weight ranging from 4 (Strongly Agree) to Zero (Strongly Disagree). In the case of ten negative items the scale scoring is reversed ranging from Zero (Strongly Agree) to 4 (Strongly Disagree). The attitude score of a subject is the total sum of scores on all the

twenty items of the scale. For each student, a total score on the scale can be obtained by summating his scores for the individual items. Thus, a maximum of 80 scores can be obtained by a student. However, the administration of the test reveals that the scores ranged from 25 to 70.

Most of the scales make use of raw scores only for the purpose of interpretation. But according to Thorndike and Hagen (1969), the raw scores can be converted into a percentile or standard score. Accordingly, percentile and standard scores were determined for use and interpretation of scale scores. Table I gives the complete norms of the scale in percentile scores (PS), standard scores and stannine. Verbal description and interpretation of the ranks obtained by a student are also given in this table.

Table I: Various norms of SAS and their interpretation.

Attitude Scores	Ranges of PS and standard Scores (in brackets)	% of cases included	Stannine	Verbal Description	Interpretation
65-69 and above	99 and above (+2.29 to +2.85)	1 %	9	Superior	Extremely Favorable
60-64	-96.28 -99 (+2.29 to +2.85)	5 %	8	Above Average	Decidedly Favorable
55-59	-84.08-89.20 (+0.89 to +1.45)	12 %	7	Above Average	Fairly Favorable
50-54	-60.12-72.72 (+0.18 to +0.75)	24 %	6	Average	Somewhat Favorable
45-49	-30.24-42.40 (-0.52 to +0.5)	30 %	5	Average	Just Favorable
40-44	-10.28-25.32 (-1.22 to -0.66)	18 %	4	Average	Somewhat Unfavorable
35-39	-3.18-5.50 (-1.92 to -1.36)	7 %	3	Below Average	Unfavorable
30-34	-1.16-1.96 (-2.63 to -2.06)	2 %	2	Below Average	Decidedly Unfavorable
25-29	-10-0.0 (-3.33 to -2.77)	1 %	1	Low	Extremely Unfavorable

The reliability of the science attitude scale (SAS) was estimated by the split-half (0.86) and test-retest (0.75) methods which was found to be satisfactory. This compares favorably with reliability (0.765) found by Sood (1975) for his scale of attitude towards science and scientists. Reliability of the scale was further checked by two methods of scoring by administrating the scale to a small sample of 50 subjects with instructions to check the statements in accordance with the usual Likert instructions. The coefficient of correlation found between the scores on two scales was 0.94. Ferguon (1941) reported a correlation of 0.82 between the Thruston and Likert method of scoring. The reliability coefficients are given in Table II.

Table II: Reliability coefficients of the SEs of their measurements.

Sr. No.	Method	Reliability obtained	Coefficient Corrected	Reliability	SE of measurement
1	Split-half (odd even)	0.76	0.86	0.87	-2.63
2	Test-reset (3 months)	0.60	0.75	0.77	-3.55
3	Likert-Thruston (Technique of scoring)	0.94	0.96	0.96	+4.48

The analysis of the collected data through proper statistical techniques and interpretation of the results was made thereafter. The data of the study was analyzed, interpreted and discussed separately for boys and girls as well. Table III/IV shows SAS score and general science achievement of (total students)/ (boy and girl separately).

Table III: Score of rural area high school students as obtained from SAS and their general science achievement in VIII class.

From SAS		From General Science	
Score	Frequency	Score	Frequency
30-34	6	35-40	6
35-39	7	41-46	6
40-44	21	47-52	25
45-49	35	53-58	29
50-54	52	59-64	32
55-59	25	65-70	29
60-64	2	71-76	12
65-69	1	77-82	9
70-74	1	83-88	1
		89-94	1
	N = 150		N = 150

Here the mean score from SAS = 49.1. Therefore, according to norms of SAS, they are average, and their attitude is just favorable. By calculating the correlation among the science attitude and general science achievement from Table III among the rural high school students, it was found to be low positive which was 0.145. This means that the correlation between the two variables is negligible i.e. the rural high school students have the negligible correlation between their scientific attitude and general science achievement.

Table IV: Score of rural area high school (Boys) as obtained from SAS and their general science achievement in VIII class.

Boys				Girls			
From SAS		From General Science		From SAS		From General Science	
Score	Frequency	Score	Frequency	Score	Frequency	Score	Frequency
30-34	5	30-41	5	32-36	2	35-39	1
35-39	5	42-46	2	37-41	3	40-44	1
40-44	13	47-51	9	42-46	10	45-49	6
45-49	18	52-56	8	47-51	20	50-54	16
50-54	21	57-61	17	52-56	33	55-59	14
55-59	8	62-66	10	57-61	8	60-64	14
60-64	2	67-71	13			65-69	8
65-69	1	72-76	4			70-74	6
70-74	1	77-81	4			75-79	7
		82-86	1			80-84	3
		87-91	1				
	N = 74		N = 74		N = 76		N = 76

Further, by calculating the correlation among the science attitude and general science achievement among the rural high school boys (Table IV), it was found to be low positive which was 0.276. Thus, it is evident that the boys' students have very low correlation between science attitude general science achievement. On the other hand, the correlation among the science attitude and general science achievement from Table IV for rural high school girls, it was found to be negative which was -0.051.

In the end, the Relationship between science attitude and general science achievement of high school total students/Boys only/Girls only was evaluated. Table value of correlation at 0.05 level was found to be 1.48/2.0/1.99 which is greater than the calculated value 0.14/0.276/-0.051 (Table V), for total students/Boys only/Girls only. Hence null hypothesis is accepted for all cases i.e. there exists no significant difference between the science attitude and achievement in general science among high school all students/Boys only/Girls only.

Table V: Relationship between science attitude and general science achievement of high school all students/Boys only/Girls only:

Students	Variables	N	df	r	Level of significance
Total	Science Attitude General Science Achievement	150	148	0.14	Not significant at 0.05 level
Boys	Science Attitude General Science Achievement	74	72	0.276	Not significant at 0.05 level
Girls	Science Attitude General Science Achievement	76	74	-0.051	Not significant at 0.05 level

Also, the significance of difference between two correlations among boys and girls was found to be 0.58 which was less than 1.96 and hence is not significant at 0.05 level. Based on this evidence, the correlation between science attitude and achievement in general science does not really differ among boys and girls.

Main Findings

The main findings of present work are as under:

1. The rural area students have just favorable attitude towards science.
2. Most of the students achieved average scores in their previous classes as their achievement in general science.
3. Most of the boy and girl students achieved average level of science attitude scale and achievement in general science.
4. There exists no significant relation between science attitude and achievement in general science among rural high school all students/Boys only/Girls only.

Educational Implications

Scientific attitude of students in rural area is very significant in so far as their future career and other perspectives of life are concerned. It is, therefore, very important that the teachers pay maximum attention to raise the interest of the students towards science.

The present study highlighted the fact that achievement in science of the students has impact on their attitude towards science. Intelligence has no place barrier and the students of rural area can prove worthy occupants of it. The teacher should, therefore, provide many opportunities of teaching and learning. The general observation in this regard is that the most important factor that helps in developing scientific attitude is the motivation. It is therefore most important for the teacher as well as the parents that they should infuse the spirit of motivation in student's mind so that they get inclined more towards science.

A teacher should tell the importance of science in human life and there should be more practical work for the students.

Conclusions

Science is an important part of our life. That's why it has made an integral part of curriculum. Teaching of science is not purposeful if it fails to develop the scientific knowledge, scientific attitude, various skills and methods to solve problems in day to day life. Science has helped in developing various values like intellectual value, practical value, cultural value, vocational value and democratic value which make a one complete human being of better value.

Sometimes, there is more achievement in science among students, but they do not possess positive scientific attitude. This justifies the importance of study the attitude of students towards science in relation to their achievement in general science. In the present investigation, no significant relation between science attitude and achievement in general science among rural high school all students/Boys only/Girls only has been observed.

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Great minds discuss ideas. Average minds discuss events. Small minds discuss people.

~ Eleanor Roosevelt