

PROBLEM SOLVING ABILITY AND SCIENTIFIC ATTITUDE OF HIGHER SECONDARY SCHOOL STUDENTS

C. Kalaivani

Research scholar, Research and Development Centre, Bharathiyar University, Coimbatore-641046

Dr. N. Pugalenth

*Associate professor, Department of Biology,
SRKV College of Education, Periyanaickenpalayam, Coimbatore - 641026*

Abstract

The objective of the study is to find the significant relationship between problem solving ability and Attitude towards science of higher secondary school students with reference to the background variables. Survey method was employed. Two tools are used in this study namely Problem Solving Ability Test prepared and standardized by Dr. L.N. Dubey, Professor in the Department of Psychology, University of Agra and The science attitude scale, constructed and standardized by Mrs. Avinash Grewal of Bhopal (published by National Psychological Corporation, Agra) has been used in the present study. The significant difference between the means of each pair of group is computed using Standard Deviation, 't' test, ANOVA and Pearson's Co-efficient Correlation. The findings are established and tabulated from the analyzed data. The finding shows that there is no significant difference between the problem solving ability and attitude towards science of higher secondary school students. Finally, Interpretations, Recommendations are given by the investigator based on the findings.

Keywords: *problem solving ability, Attitude towards science, higher secondary School Students.*

Introduction

The quality of nation depends upon the quality of education. Education in true sense is catalyst to help the educated persons to solve problems faced by them in real life besides learning the skill of reading, writing and arithmetic. Successful problem solving ability results in the acquisition of new knowledge just as does the successful learning of concepts and principles. Robert M.Gagne(1976) states "problem solving may be viewed as a process by which the learner discovers a combination of previously learned rules which can be applied to achieve a solution for a novel situation." The objective of present study was to understand the problem solving behavior of children in relation to mark obtained on problem solving ability test and attitude towards science.

Science is the Investigation and interpretation of events in the natural and physical environment of man. Science is that human Endeavour that seeks to describe with even increasing accuracy the events and circumstances that occur or exist within our natural

environment (John Wood Burn and Ellsworth S. Osborn). Science is a dynamic and vital forces in the daily life of every man and woman. It touches every phase of human activity.

Science there by becomes knowledge acquired in a particular way, it becomes a human activity, and an attitude and exercise of the mind that puts us it were in a state of familiarity with nature (Gilbert Archey).

Teaching of science at school stage helps in development of scientific literacy. It also helps in the formation of scientific attitude. This is essential to dispel social evils and helps in development of open mindedness, decision taking ability. Training in scientific method thus improves the quality of thinking.

Review of the Literature

Janpload (2007) studied the effects of using metacognitive strategies in organizing mathematics activities on mathematical problem solving ability and self-regulation in learning mathematics of eight grade students in Nakhonsrithammarat province, and she found that the students who learn by using metacognitive strategies had higher problem solving ability and self-regulation in learning than the students who learn by the normal strategy.

Wendy Alison (1989) studied the gender disparities in school learning science attitudes and achievement in Botswana. The causal analysis reveals that among boys, the gender typing of school science as male, has a small positive influence upon science attitude and performance; for girls, however it has a small negative influence.

Gauld (1980) developed an analysis, which concerns with the nature of scientific attitude, development of scientific attitude as a students study habits attitude towards the study of science and their academic achievement.

Jayashree (1998) studied the socialization ability, scientific attitude and attitude towards science in junior college students found that

Need and Importance

Problem solving is the key to success and has been regarded as the most significant aspect of human behaviour. One of the major aims of education is to develop the ability to attain better performance. No two individuals are alike. There are individual differences in the problem solving ability. Some individuals can handle a situation, but others cannot. A large part of an individual's life is spent in a struggle to find effective solution to his problems. A student having good problem solving ability will be properly adjusted in the class as well as at home. A problem cannot be solved without thinking. The need of problem solving behaviour is to create the power of thinking which helps to find out the solution of the problem. The main objective of problem solving is to go through the physical, psychological, social and environmental factors which hinder the progress of an

individual to attain certain goals. The study of science brings behavioural change in the learner and enriches his characters and personality. Science gives opportunity for creative thinking, problem solving ability and constructive imagination. The learner develops the habits of searching for the truth. These qualities affect the pattern of behavior of the learner. The Significant aspect of science is what whatever the students learn has immediate application in the attitude towards and problem solving ability of higher secondary school students. The development of experimental knowledge of attitude towards science and interest in science of the High school students needs opportunities to make connection between what they achieve in science and personal responsibility towards scientific attitude gets gradually increased.

According to Festinger (1957) the scientific attitude is not change but earlier scientific attitude or involvement only become stinger, so the purpose of this study is to assess and analyses and attitude towards science and problem solving ability of Higher secondary school students. The investigator has decided to take up the research study on attitude towards science and problem solving ability of higher secondary school students in karur district.

Statement of the Problem

Present study is entitled as “Problem solving ability and Scientific Attitude of higher secondary school students.”

Definition of the Key Terms

Problem solving ability

The process of working through details of a problem to reach a solution. Problem solving may include mathematical or systematic operations and can be a gauge of an individual's critical thinking.

Attitude

a) The Attitude is “the degree of positive or negative effect associated with some psychological objects”, namely institution, ideal, symbol, phrase, slogan, job or idea towards which people can differ with respect to positive or negative effect (Thrustone, 1946).

b) The attitude is a dispositional readiness to respond to certain situations, person, objects in a consistent manner which has been learnt and has become one’s typical mode of response (Freeman, 1950).

c) Attitudes are learned; consequently they may be differentiated from physiological motives (since attitude are learned, they can be altered through experience or education).

Scientific Attitude

By the term Scientific Attitude the investigator means a complex of values and norms which is held to be binding on the man of science and is legitimized in terms of institutional values.

Higher secondary School Students: Higher secondary school students are the students who are studying in classes XI and XII standards.

Karur District: Karur District is a district in Tamil Nadu State of India.

Objectives of the Study

To find out the relationship between problem solving ability and scientific attitude among the secondary school students with respect to their demographic variables such as Gender, Locality, Family Occupation and Educational Qualification of Parents.

Hypothesis of the Study

1. There is no significant difference between higher secondary school students towards problem solving ability with respect to their Gender.
2. There is no significant difference between higher secondary school students towards problem solving ability with respect to their Locality.
3. There is no significant difference between higher secondary school students towards problem solving ability with respect to their Family occupation.
4. There is no significant difference between higher secondary school students towards problem solving ability with respect to their Parents qualification.
5. There is no significant difference between higher secondary school students towards scientific attitude with respect to their Gender.
6. There is no significant difference between higher secondary school students towards scientific attitude with respect to their Locality.
7. There is no significant difference between higher secondary school students towards scientific attitude with respect to their Family occupation.
8. There is no significant difference between higher secondary school students towards scientific attitude with respect to their Parents qualification.
9. There is no significant relationship between problem solving ability and Scientific Attitude of higher secondary school students.

Methodology

Sampling- In the present study, a sample of 80 students studying in class XI Standard students was randomly picked up from govt, aided and matric higher secondary schools in karur district.

Tools Employed

A. Problem Solving Ability Test: In the present study, the tool employed for the collection of data was Problem Solving Ability Test prepared and standardized by Dr. L.N. Dubey, Professor in the Department of Psychology, University of Agra. This test is in English and contains 20 unsolved questions. Every question has four given responses out of which only one answer is correct. If the pupil ticks the correct answer then he/she is given „one□ mark and if he/she ticks a wrong answer „zero□ is given. At the end all the marks are added. The maximum marks are 20. The high the score earned on this test, the high is the problem solving ability.

B. Science attitude Scale (SAS): The science attitude scale, constructed and standardized by Mrs. Avinash Grewal of Bhopal (published by National Psychological Corporation, Agra) has been used in the present study. This is a Likert type of scale, consisting of 20 statements for each of which the subject is required, to express his opinion on a 5 point scale, Strongly Agree (S.A), Agree (A), Undecided (U), Disagree (D) and Strongly Disagree (SD). Odd numbered statements are negative statements and even numbered statements are positive statements. These statements are concerned with the role of science in industry, vocational career of pupils, human development and welfare.

Data Analysis

Mean, SD and ‘t’ test were computed to know the significant difference between the means of the different sub-groups in terms of Gender , Locality , Family Occupation and Parents Educational Qualification. Correlation study was done to find out the significant relationship between problem solving ability and Scientific Attitude of higher secondary school students.

Analysis and Interpretation

Total Sample = 80			
Distribution of Sample by Variables			
Variable	Sex	Male	38
		Female	42
	Locality	Rural	48
		Urban	32
	Family occupation	Labor	53
		Others	27
	Parent’s qualification	Illiterate	26
		Literate	54

Table 1: Difference in Problem Solving Ability of Higher Secondary School Students based on Demographic Variables

Variables	Sub variables	N	Mean	SD	't'	Result
Gender	Male	38	12.57	2.47	2.55	S
	Female	42	14.23	3.45		
Locality	Urban	48	13.04	2.46	0.06	NS
	Rural	32	13.53	3.74		
Family Occupation	Labor	53	13.96	3.10	1.00	NS
	Others	27	12.07	3.39		
Parents Qualification	Illiterate	26	11.96	2.73	3.01	S
	Literate	54	13.98	2.98		

The table value 2.00 for df 78 at 0.05 level. From the above table-1, it is found that there is no significant difference in problem solving ability of higher Secondary school students based on Locality and Family Occupation. It has been also found that there is significant difference between Scientific Attitude of secondary school students based on Gender and Parent's qualification. The mean attitude score of students whose parents are illiterate are higher than those whose parents are literate. Educational and cultural gaps may hinder easy and effective communication of parents and children. Educated parents are less inclined to be involved as children get older due to their profession etc.

Table 2 Difference in Scientific Attitude of Higher Secondary School Students based on Demographic Variables

Variables	Sub variables	N	Mean	SD	't'	Result
Gender	Male	38	63.96	14.11	0.04	NS
	Female	42	64.09	13.77		
Locality	Urban	48	64.89	13.50	0.72	NS
	Rural	32	62.59	14.18		
Family Occupation	Labor	53	64.54	13.25	0.75	NS
	Others	27	61.88	15.83		
Parents Qualification	Illiterate	26	65.11	14.31	0.38	NS
	Literate	54	63.83	13.17		

The table value 2.00 for df 78 at 0.05 level. From the above table-2, it is found that there is no significant difference in scientific attitude of higher Secondary School students based on Gender, Locality, Family Occupation and Parent's qualification.

Table 3: Relationship between Problem Solving Ability and Scientific Attitude of Higher Secondary School Students

Variable	N	Mean Level	'r' Value	Level of Significance at 0.05 level
Problem solving ability	80	13.46	0.151	0.217
Scientific Attitude	80	63.97		

The table value 0.217 for 80 at 0.05level. From the above table-3, it is found that the calculated 'r' value is less than the table value, so there is no significant relationship between in problem solving ability and Scientific Attitude of Higher secondary school students. Problem solving ability of higher secondary school students does facilitate improving Scientific Attitude. Student's environmental friendly practices may be stronger among those who have better scientific attitude.

Findings

1. There is significant difference between higher secondary school students towards problem solving ability with respect to their Gender.
2. There is no significant difference between higher secondary school students towards problem solving ability with respect to their Locality.
3. There is no significant difference between higher secondary school students towards problem solving ability with respect to their Family occupation.
4. There is significant difference between higher secondary school students towards problem solving ability with respect to their Parents qualification.
5. There is no significant difference between higher secondary school students towards scientific attitude with respect to their Gender.
6. There is no significant difference between higher secondary school students towards scientific attitude with respect to their Locality.
7. There is no significant difference between higher secondary school students towards Scientific attitude with respect to their Family occupation.
8. There is no significant difference between higher secondary school students towards Scientific attitude with respect to their Parents qualification.
9. There is no significant relationship between problem solving ability and Scientific Attitude of higher secondary school students.

Discussion

The result of the study indicates that There is no significant difference between higher secondary school students towards Scientific attitude with respect to their Demographic variables. There is no significant difference between problem solving ability of higher secondary school students based on Locality and Occupation of Parents. It means that these demographic variables does not affect the problem solving ability of students to a greater extend. Certain variable like Gender and Parental Educational Qualification have a significant difference over problem solving ability of students. Parents' involvement in the children's learning enhances children's academic achievement, intellectual skills, motivation to study; attitude towards learning etc. problem solving ability is a must for enhancing scientific attitude among the students. This fact has been emphasized by the finding that Scientific Attitude is higher among the students who have offered science as a subject in their studies. Higher level of scientific attitude may sensitize students to imbibe environmental friendly practices in their day- to- day life. It means that students having high desire for understanding new things and ideas and willingness to revise opinions and conclusion were better in environmental friendly practices.

Scope of the Study

The findings of study will throw light on the problem solving ability and attitude towards science in the student's higher secondary level. It will help to know the strength and weaknesses of the students in the problem solving ability attitude towards sin the student's higher secondary level. The findings of the study will help the administrators to formulate strategies of implementing educational programmes of the students at higher secondary level.

Limitation

This study is confined to 80 higher secondary students of government, aided, matriculation schools to Karur district only. This study is limited to certain aspects of the problem solving ability in relation with scientific attitude only.

Educational Implications

- Educationist, educational administrators and teachers must acquaint their pupil about pros and cons of problem solving ability and scientific attitude.
- Formal system of education should also incorporate in its curriculum some elements of problem solving ability and scientific attitude programmes.
- Educational institutions may organize different programmes for awareness from time to time.

- According to a report 90% of the information gained by the student is the result of their contact with the outside world.
- Modern communication technologies like T.V., Radio and Internet should be utilized as a means to communicate the concept of problem solving ability and scientific attitude.

References

1. Ajwani, J.K. (1979). Problem solving behavior in relation to personality, intelligence and age, Ph.D. Psy., RSU.
2. Chattopadhyay, M.K. (1998). A quasi-experimental study on the educational backwardness of SC secondary school students in some districts of West Bengal, in Sixth Survey of Educational Research (1993-2000) Vol. I NCERT, p. 239.
3. Janpload, T. (2007). Effects of using metacognitive strategies in organizing mathematics activities on mathematical problem solving ability and self-regulation in learning mathematics of eight grade students in Nakhonsrithammarat. Thesis, Chulalongkorn University.
4. Kiran, U. (1983). Anxiety, task complexity and sex as related to verbally expressed preferences and problem solving performance, Ph.D. Psy., Agra U. in Fourth Survey of Research in Education (1983-88) Vol. I by M.B. Buch NCERT, p. 384.
5. Bennet, J. (2003). Teaching and learning science. New York: Continuum.
6. Bhaskara Rao, (2000). "A comparative study of scientific attitude, scientific aptitude and achievement in Biology at secondary level, Fifth Survey of Research in Education". Buch, M.B.(ed):New Delhi: NCERT.
7. Bennet, J. (2008). Annual National Survey of Year 9 Students' Attitudes to Science, University of York: Department of Educational Studies.
8. Jayasree, K. (1998): "Socialization ability, scientific attitude and attitude towards science in Junior College Students" - A study.
9. Gauld, C.F. and Hukins, A.A. (1980): "Scientific attitudes - A review", Studies in Science Education, 7:129-161.