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A Comparative Study Of Scientific Attitude And Problem Solving Ability Among Adolescent Students

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Abstract

The main aim of the present investigation is to compare the Scientific Attitude and Problem Solving Ability among Adolescent boys and girls. For realizing this aim, a representative sample of 200 adolescents (100 boys and 100 girls) of 11th grade students was taken from the government schools of Jawali Tehsil of District Kangra of Himachal Pradesh. The Scientific Attitude of sample students was measured by Scientific Attitude Scale by Dr Avinash Grewal and the Problem Solving Ability was tested by L.N. Dubey's Problem Solving Ability Test. The data was analyzed by using Mean, S.D. and t-test keeping in view the objectives of the study. The results revealed that there exists significant difference between Scientific Attitude and Problem Solving Ability of Adolescent Students. Boys have higher Scientific Attitude and Problem Solving Ability than girls adolescents.

Index Terms

Scientific Attitude, Problem Solving Ability, Adolescent Students

Introduction

Today we all face issues on a global scale that are fundamentally technical climate change, energy resources, food productions, genetic modification and so on and as such demand basic scientific literacy throughout our population so that wise decisions can be reached about how to address them. Science is certainly a very fascinating subject to learn as it arouses children's curiosity about the nature and whatever happens in our everyday life. For instance, it helps the children to understand better about their own sense organs, living and non-living things, energy and so on. The purpose of science education is not simply to produce the next generation of scientists but produce a generation with scientific literacy and scientific attitude.

Human beings can solve any problem by applying intelligence, because Intelligence leads us to solve our day to day issues by using scientific attitude. Scientific attitude is defined as ability (i) of critical thinking based on experiments, observations and conclusions and (ii) to critically judge the correctness or inappropriateness of the statements made about different forms of living organisms, objects, incidences and methods. Modern society is being influenced by the scientific environment and its application and science has become an integral part of our daily life. We cannot think our life without science. A citizen of modern India sees the countless manifestations of science all around him. There is no aspect of man's life today which has not been influenced by science in one way or the other. Gupta (2003) concluded a study on a topic entitled "Scientific Attitude and Science Achievement" and found that science achievement has a significant role to play in predicting scientific attitude. Scientific Attitude is one of the key objectives of science teaching and it is also one of the major outcomes of it. To understand the role of scientific attitude in the life of a successful man, it incorporated in all types of instructions and in all works of education as a compulsory part, directly or indirectly. Many ways and means are used and applied to develop scientific attitude at various levels of education. Sharma (2007) identified a study on the topic entitled "Problem Solving Ability and Scientific Attitude as determinants of academic achievement of higher secondary students" that the boys and girls having high and average scientific attitude was not significant. Yadav and Bharti (2007) found a study on a topic entitled "A study of relationship between Environmental Awareness and Scientific Attitude among Higher Secondary students" that there is no significant difference between the environmental awareness scores of Higher Secondary students having parents in government service.

Shaya & Paul Raj (2008) concluded a study on a topic entitled "Attitude of upper primary students towards science teaching" that the factors domicile, gender, locality of school and size of the family do not influence their scientific attitude and achievement in science. Munby (1983) define scientific attitude as the thinking pattern generally characteristic of scientists such as objectivity, curiosity, questioning and justifying conclusions with evidences. Vaidya (1999) explained that "Scientific Attitudes are open mindedness, curiosity, judgement based upon scientific facts alone, willingness to taste and verify conclusions, faith in cause and effect relationship, rejection of the principle of authority and more faith in the books written by specialist in their respective fields etc". Sood and Richa (2015) found that there exists significant difference between scientific attitude and problem solving ability of adolescent boys and girls. Reena (2013) revealed that there is a significant and positive relationship between scores on scientific attitude, aggregate academic achievement and aggregate academic achievement in science of high school boys and girls.

Problem solving is the Framework or pattern within which creative thinking and reasoning take place. It is the ability to think and reason on given levels of complexity. People who have learned effective problem solving techniques are able to solve problems at higher levels of complexity than more intelligent people who have no such training. The state of tension is created in mind when an individual faces a problem. He practices his efforts and uses all his abilities, intelligence, thinking, imagination, observations to solve the problem. Problem solving is an important component in students' life because students would be able to achieve all the three values namely functional, logical and aesthetic. According to Skinner (1968), "Problem solving is a process of overcoming difficulties that appear to interfere with the attainment of a goal. It is the process of making adjustment in spite of interferences. Gagne (1985) defined Problem Solving as the "Synthesis of other rules and concepts into higher order rules which can be applied to a constrained situation." Mary (2011) defined that there exists a positive relationship between Problem Solving Ability and Scholastic Achievement of secondary school students. Lizzie (2017) explained that there exist a positive relationship between problem solving ability in mathematics and academic achievement.

Rationale of the study

Human beings can solve any problem by applying intelligence, science and reasoning. Success, Efficiency and happiness in life depend to a large extent on the ability to solve problem. A child is not born with the ability but has to develop it in the course of his experience under the guidance of his parents, teachers and elders by using Intelligence, Reasoning and Capacity to build. Scientific Attitude and Problem Solving are those which generate higher order thinking capacity in students to solve their day to day problems in general. For finding the solutions of problem coming from the daily life, a person should be able to understand the relationship between cause and effect. He should have to give up outdated traditions, customs commonly known as superstitions. He should accept all thoughts on the level of facts and reality. Such a scientific approach should be developed in human beings. Scientific attitude leads to the development of many abilities and one such ability is problem solving ability. Scientific attitude and problem solving ability play a significant role in preparing the adolescent to set realistic goals and think of solutions needed to reach these goals. So there is a need to study the scientific attitude and problem solving ability among adolescent students.

Objectives of the study

1. To study the difference between Scientific Attitude among Adolescent Boys and Girls.
2. To find out the difference between Problem Solving Ability among Adolescent Boys and Girls.

Hypotheses of the study

1. There exists no significant difference between Scientific Attitude of Adolescent Boys and Girls.
2. There exists no significant difference between Problem Solving Ability of Adolescent Boys and Girls.

Sampling Procedure

In the present study, descriptive research method of investigation was employed on a randomly selected sample of 200 adolescents (100 boys and 100 girls) of 11th grade students of Government schools of Jawali Tehsil of district Kangra of Himachal Pradesh.

Tools Used

1. Scientific Attitude Scale by Dr Avinash Grewal
2. Problem Solving Ability Test by L.N. Dubey

Statistical Technique Used

To find out the significant difference between Scientific Attitude of Adolescent Boys and Girls Means, S.D. and t-ratio was employed. The analysis and interpretation of data are given in the following tables.

Analysis and Interpretation of Data

Table 1: Significance of the difference between means of Scientific Attitude of adolescent boys and girls

Sr. No	Group	N	Mean	S.D.	SEm	t-value
1	Boys	100	48.33	8.33	0.83	3.32*
2	Girls	100	44.61	7.49	0.75	

Table 1 revealed that the mean scores of Scientific Attitude of Adolescent boys and girls are 48.33 and 44.61 respectively and their respective S.D. are 8.33 and 7.49. The t ratio comes 3.32 with df 198 which is significant at 0.01 level of significance. This revealed that there exists significant difference between Scientific Attitude of Adolescent boys and girls. Again as the mean scores of adolescent boys is significantly higher than that of adolescent girls for the variable Scientific Attitude. It may be further stated that boys have higher Scientific Attitude than adolescent girls. It may be because boys take much interest in Science and scientific things.

Figure 1: Bar graph showing difference between Means of Scientific Attitude of Adolescent boys and girls

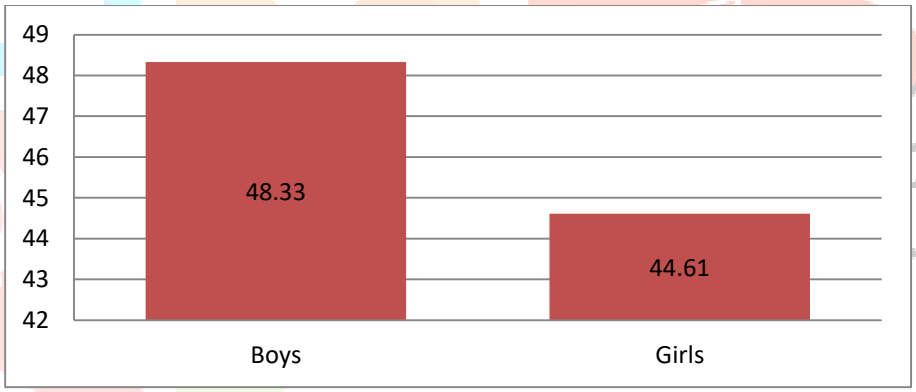


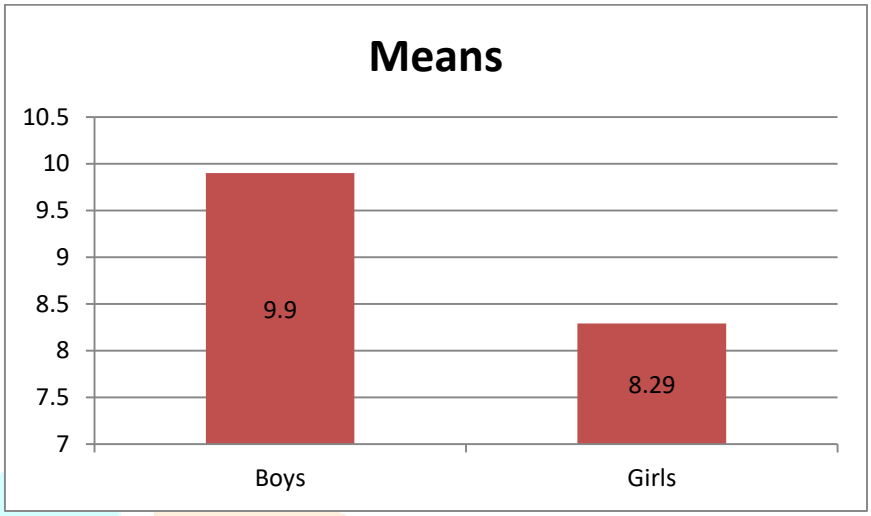
Table 2: Significance of the difference between means of Problem Solving Ability of Adolescent boys and girls

Sr. No	Group	N	Mean	S.D.	SEm	t-value
1	Boys	100	9.90	3.33	0.32	3.40*
2	Girls	100	8.29	3.18	0.31	

Table 2 exhibits that the mean scores of Problem Solving Ability of Adolescent boys and girls are 9.90 and 8.29 with their respective SD are 3.33 and 3.18. The t value comes 3.40 with df 198 which is significant at 0.01 level of significance. Therefore hypothesis No 2 stating that There exists no significant difference between Problem Solving Ability of Adolescent Boys and Girls stands rejected. It means that there are difference between mean scores of problem solving ability of adolescent boys and girls. As the mean scores of adolescent boys are significantly higher than that the adolescent girls in respect to Problem Solving Ability

too so it may be further concluded that boys have higher ability of problem solving then their female counterparts.

Figure 2: Bar graph showing difference between means of Problem Solving Ability of Adolescent boys and girls



Results and Discussions

1. From the result of Hypothesis No 1, it is stated that boys have higher Scientific Attitude than the adolescent girls. Because on the basis of mean scores of boys and girls in respect to scientific attitude, it can say that the boys are better in understanding of Science and they have higher scientific attitude. This result is similar to the study of Srivastava (1980), Budhdev (1989), Sood and Richa (2015) and Reena (2013).
2. The result of hypothesis number 2, **"**There exists no significant difference between Problem Solving Ability of Adolescent boys and girls" stands rejected. There exists difference between means scores of Problem Solving Ability of boys and girls. The mean scores of adolescent boys are significantly higher than the adolescent girls. The results are in tune with studies by Mary Jose, Nisha and Thomas (2011) and Granadevan & Selvaraj (2013) and Lizzie (2017).

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