

SCIENTIFIC APTITUDE OF HIGHER SECONDARY STUDENTS OF DISTRICT FAZILKA

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Abstract

The present study is carried out in the Fazilka district of Punjab, India, which aimed to find out the level of scientific aptitude of the higher secondary level students. A descriptive survey method was adopted for the study. A total sample of 100 Higher Secondary School students of the Fazilka district were selected by random sampling. To know about scientific aptitude, Scientific Aptitude Test Battery (SATB) developed by Agarwal and Aurora (1986) was used. The results of the present study reveal that there is insignificant difference between male and female higher secondary school students in respect of their Scientific Aptitude and also there is insignificant difference between government and private higher secondary school students in respect of their Scientific Aptitude.

KEY WORDS: Scientific Aptitude, Higher Secondary School

INTRODUCTION

We live in world of science. Every citizen knows the wonder of science. Science gives us countless manifestations. Science now totally changed the life of mankind. Education should help the children to express and bring out their talents to limelight. The main aim of education is to help the child to grow to his fullest extent possible using all his potentialities. In this modern society, education is thought to bring about desirable changes in the behavior of its members. Science has occupied almost all spheres of human life. The wonderful achievements of science have glorified the modern world, transformed the modern civilization into a scientific civilization and illuminated the human creative potential.

That development of any country is always based upon the standards of education of the citizens. Education is a continuous lifetime process. The main aim of the education is to make overall development of the citizens. Each person carries general and special qualities. Such qualities are lying since their birth. Proper environment is always required to develop such inner qualities. After knowing interest, hobbies, capabilities and qualities of the students, proper education system should be required to apply. As per the opinion of R. L. Thorndike, "One of the first practical matters and discuss with which psychological were concerned was guiding young people into the types of work in they would be happy, successful and selecting for an employer those men who would be efficient and satisfied in the job that he was trying to fulfill."

The term science means the same at any level. In one sense, it is a body of information and principles that help us understand the world around us from atoms to stars, from microscopic water life to man. In another sense, science may be regarded as methods of discovery, the methods by which new information is uncovered, new principles arrived at old principles modified or discarded. It is characteristic of science that it starts with a perplexing problem, proceeds with the trying of different methods of solution, and results in a new discovery. In the study of science, we learn ways of exploring in order to learn about the world. For children, the study of science consists of their exploring the world around them in order to learn about it and so answer their questions about it, the better to enjoy and appreciate their surroundings. It seems a natural thing to wonder what makes a rainbow, how magnets can pick up iron nails, how far away the stars are, how a compass can point north, and how an aero plane can stay in the air. It appears natural, too, to try out things to see how they work, to experiment, to manipulate to be curious, to ask questions, to seek answers. To learn to think scientifically is to learn those concepts and principles, which will enable one to make wise choices in deciding how to live with one's environment. This is indeed science for the citizen.

SCIENTIFIC APTITUDE

The term scientific aptitude encompasses a wide variety of factors including physical development, social maturity, emotional maturity, moral character, attitudes, interests and skills. Scientific aptitude comprises of curiosity, observation, identification, description, experimental study and theoretical description of phenomena. The characteristics that individuals with aptitude for science possess include creative abilities, critical thinking ability, ability to see relationships, ability to reason, and open-mindedness.

One who has scientific aptitude not only grasps the knowledge correctly but also applies it in understanding dynamic situations. The ability to apply the knowledge of science in solving problems is another trait of an individual having scientific aptitude. One who is scientific minded and has aptitude for science is curious to solve problems, curious to know things and raise significant questions with reference to observed phenomenon. Developing scientific aptitude amongst young people should be the major aim of science teaching and education. The knowledge of science and deeper understanding of science can completely change the mind-set and attitude of child. Effective teaching in science in order to develop scientific aptitude in children can bring about the desirable changes in the child. School is the only institution where children can be trained to develop this aptitude. Science teaching is not just a simple presentation of facts, in certain; it helps in development of new ways of thinking. This development reveals in itself increased skills, improvement in characters and desirable aptitudes.

Scientific aptitude embodies an individual's innate potential, inclination, and capability to comprehend, engage with, and excel in scientific pursuits. It is a multidimensional construct that encompasses cognitive abilities, personal attributes, and acquired skills essential for understanding and applying scientific knowledge effectively.

The present study aims to understand scientific aptitude of Higher Secondary Students. There are many studies conducted on scientific aptitude. One study conducted by Adesoji and Ogini (2012) performed a study on Student's aptitude indices as predictors of learning outcomes in chemistry. The study made recommendations for teachers and parents to make sure that only students having high positive scientific aptitude are encouraged to enroll in science classes. Moreover, government along with relevant agencies should make appropriate provision in terms of facilities necessary for effective teaching and learning science in schools to enhance the development of needed aptitude by students. Kaur (2013) did a research on "Scientific aptitude and intelligence as correlates of performance of students in Pre Medical Entrance Test" among 180 medical students who have recently passed the PMET. The result of the study revealed that the scientific aptitude of boys and girls was average and there exist no significant difference between the two groups in their scientific aptitude. Barwal (2014) conducted a study on "Scientific aptitude of college students of Himachal Pradesh." Collection of data was done from a sample of 150 college 22 students from two districts of Himachal Pradesh. The result showed that there was significant difference between students of science and arts as well as students of science and commerce in their scientific aptitude. The findings also revealed that rural and urban students did not differ significantly on their scientific aptitude. Stanly (2016) studied "Influence of scientific aptitude on achievement in science of 9 standard boys and girls." The study revealed that the students' scientific aptitude was low. The level of achievement in science was also found to be low. It was also found that girls were better in their scientific aptitude than boys and girls had higher achievement in science than that of boys. Banerjee (2016) had undertaken a study entitled "Project on achievement in life science: relationship with aptitude in life science and scientific attitude- An investigation" among the secondary students in North 24 Parganas of West Bengal. The result showed that there is strong correlation between students' achievement in life science and aptitude in life science. There was a strong association of scientific attitude with achievement in life science. The study concluded that the result of strong aptitude and attitude implies that there is a possibility of a learner to acquire skills and competency in learning life science. As such many studies were conducted on secondary school level thereby few reviewed were conducted on higher secondary level. Therefore, it is very much necessary to look into the various determinants which affect Scientific Aptitude in higher secondary level

SIGNIFICANCE OF THE STUDY

Science plays a major role in inculcating hope for continuous and progressive welfare. The strength of a modern economy depends on the strengths of its industry and industrial development. It depends upon technology and on the application of new scientific knowledge. At the same time, the nation's progress, welfare and prosperity also depend on a rapid, planned and sustained growth in the quality and extent of education and research in science and technology (Kothari Commission (1964-1966)). Science in curriculum provides certain values which are not provided by any other subject. It affords knowledge of certain facts and laws and an insight into methods and data peculiar to the domain of science. Further any subject in the curriculum should satisfy the intellectual, utilitarian, vocational, cultural, moral and aesthetic values. Besides these, teaching of science imparts training in the 'scientific method' and develops Scientific Aptitude, which are very valuable

and at the same time referable to other situations of life. The Scientific Aptitude plays a major role in science education, and in the lives of pupils pursuing science education. Science has become a compulsory subject in school curriculum, and is trying to inculcate Scientific Aptitude besides preparing the pupils for leading quality life.

STATEMENT OF THE PROBLEM

Scientific Aptitude of Higher Secondary School Students of District Fazilka.

OPERATIONAL DEFINITIONS OF THE KEY TERMS

Scientific Aptitude: Scientific aptitude refers to ability in science comprising of curiosity, observation, identification, description, experimental study and theoretical description of phenomena. Thus for the present study, Scientific Aptitude refers to the scores obtained by the students after performing the test given to them.

Higher Secondary School: Higher secondary school refers to the educational institution imparting formal education which offers Science stream for class XI and XII.

RESEARCH QUESTIONS

The following research questions are framed for the present study.

1. Is there any significant difference between the scientific aptitudes of higher secondary school students of Fazilka district with respect to gender?
3. Is there any significant difference between the scientific aptitudes of higher secondary school students of Fazilka district with respect to type of school management?

OBJECTIVES OF THE STUDY

1. To study the difference, if any, between male and female higher secondary School students in respect of their Scientific Aptitude.
2. To study the difference, if any, between Government and Private higher secondary school students in respect of their Scientific Aptitude.

HYPOTHESES OF THE STUDY

1. There is no significant difference between male and female higher secondary school students in respect of their Scientific Aptitude.
2. There is no significant difference between Government and Private higher secondary school students in respect of their Scientific Aptitude.

METHODOLOGY OF THE STUDY

A sample of 100 Higher Secondary School Students from District Fazilka was selected randomly. The sample was further equally divided into 50 Government and 50 Private higher secondary school students.

TOOL OF THE STUDY

The present study was aimed to study Scientific Aptitude of students in relation to some variables, so the Scientific Aptitude Test Battery (SATB) developed by Agarwal and Aurora (1986) was used.

RESULTS AND DISCUSSION

Table 1

Significant difference between male and female higher secondary school students in respect of their Scientific Aptitude

Group	N	Mean	S.D	t-ratio	Level of Significance
Male	50	128.5	24.6	0.58	Not Significant
Female	50	125.8	21.3		

The result of table no 1 shows that t-ratio between scientific aptitude of male and female higher secondary school students is 0.58. The t-value to be significant at 0.05 and at 0.01 level is 1.96 and 2.58 respectively since calculated t-ratio is less than both these values therefore it is not significant. Hence the hypothesis “There is no significant difference between male and female higher secondary school students in respect of their Scientific Aptitude” is accepted.

The reason behind this could be due to equal opportunities given to both the gender to receive the same learning in science and participate in activities related to science and science learning. Spelke (2005) also found that boys and girls showed equal scientific aptitude. According to her, finding that male and female show equal aptitude for science does not imply that humans’ genetic endowment is irrelevant to these achievements, instead

it shows that scientific reasoning ability develops from a set of biologically based cognitive capacities that males and females share.

Table 2

Significant difference between Government and Private higher secondary school students in respect of their Scientific Aptitude

Group	N	Mean	S.D	t-ratio	Level of Significance
Government	50	128.8	23.4	0.30	Not Significant
Private	50	130.3	26.2		

Table 2 shows that t-ratio between scientific aptitude of government and private higher secondary school students is 0.30. The t-value to be significant at 0.05 and at 0.01 level is 1.96 and 2.58 respectively since calculated t-ratio is less than both these values therefore it is not significant. Hence the hypothesis “There is no significant difference between government and private higher secondary school students in respect of their Scientific Aptitude” is accepted.

CONCLUSIONS

On the basis of careful analysis and interpretation of the objectives and hypotheses of the study it can be concluded that:

1. Insignificant difference was found between male and female higher secondary school students in respect of their Scientific Aptitude.
2. Insignificant difference between government and private higher secondary school students in respect of their Scientific Aptitude.

EDUCATIONAL IMPLICATIONS

1. As we know science is the product of creative thinking. The development of creative genius of our youth should be of prime importance in our education system. Therefore, nurturing this capability to its utmost potential becomes a significant responsibility.
2. Scientific information, reasoning and logical ability and cause finding ability shows slightly upward trend with the increase in the scientific aptitude of the students. Thus if we faster through teaching and learning process, general information regarding science, daily life scientific observations, scientific vocabulary, scientific concepts, reasoning and logical thinking and cause finding ability of students regarding daily observation then the scientific aptitude could show upward increment.
3. If teaching-learning activities include, apart from its regular curricular activities, various co-curricular activities such as organization of science fair, science exhibitions, scientific debates, scientific quiz and science club, use of problem solving and project methods and brain storming inquiry training model and concept attainment model, emphasis on numerical based problems, activity based self learning, use of ICT etc. then it will be possible to faster scientific aptitude and scientific attitude among students.

REFERENCES

- Adesoji, F. A., & Ogini, A. M. (2012). Students' aptitude indices as predictors of learning outcomes in chemistry. *British Journal of Arts and Social Sciences*, 8(11), 174-182.
- Agarwal, J.C. (2008). *Psychology of Learning and Development*, New Delhi: Vikas Marg Publications.
- Agrawal, K.K., & Aurora, S. (1986). *Manual for Scientific Aptitude Test Battery*, National Psychological Corporation, Agra, India.
- Banerjee, R. (2016). Project on achievement in life science: It's relationship with aptitude in life science & scientific attitude -An investigation. *International Journal of Humanities and Social Science Invention*, 5(11), 13-18. [http://www.ijhssi.org/papers/v5\(11\)/version-2/C05011021318.pdf](http://www.ijhssi.org/papers/v5(11)/version-2/C05011021318.pdf)
- Barwal, K. S. (2014). Scientific aptitude among college students of Himachal Pradesh. *Conflux Journal of Education*, 2(3), 45-48.
- Bhaskara, R.D. (1990). A comparative study of scientific attitude, scientific aptitude and achievement in Biology at Higher secondary level. Ph.D. in Education, Osmania University.

- Garrett, H.E.(1979). Statistics in Psychology and Education, Mumbai: Vakils Pfeffor and Simon.
- Kaur, N. (2013). Scientific aptitude and intelligence as correlates of performance of students in pre medical entrance test. International Journal of Research in Education Methodology, 2(3), 172-176.
- Mangal, S.K. (2007). Advanced Educational Psychology, New Delhi: Prentice Hall of India Pvt. Ltd.
- Manichander, T. & Brindhamani, M.(2014). Academic achievement and scientific aptitude in science among the students of standard-x. American research thoughts,1(1),304-310.
- Mukhopadhyay,R.(2012-13). Whether Aptitude In Physics, Scientific Attitude, And Deep Approach To Study Explain Achievement In Physics Significantly An Investigation. International Journal of Humanities and Social Science Invention. 2(1),57-63.
- Nataraj,P.N. & Manjula G.(2012). A Study On Scientific Aptitude Of High School Students In Relation To Their Achievement In Science. Indian Streams Research Journal, 2(9).
- Patel, D.R. (2010).A study of scientific aptitude of students of secondary schools. Sansodhan E-Journal,8(2),1-5.
- Rao, (1996). Scientific Attitude, Scientific Aptitude and Achievement. New Delhi: Discovery Publishing House.
- Sen, M.K. & Mukhopadhyay, R.(2008). Construction of an Aptitude Test in Physics, Sikshachintan: A Journal of Education, 2, 89-93, ISSN-0973-5461, R.K.M. Sikshanmandira, Belurmath, WB, India.
- Spelke, E. S. (2005). Sex difference in intrinsic aptitude for mathematics and science: A critical review. American Psychologist, 60(9), 950-958.
- Stanly, S. L. (2016). Influence of scientific aptitude on achievement in science of IX standard boys and girls. Paripex- Indian Journal of research, 5(9), 359- 360.
- Vastava,V.R.(1992). A study of creativity among higher secondary students in relation to scientific aptitude and attitude toward science.Dissertation Ph.D. in Education, Agra University.