ATTITUDE OF SECONDARY SCHOOL STUDENTS TOWARDS MATHEMATICS IN RELATION TO THEIR GENDER AND LOCALITY

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Abstract

Education is a process of human enlightment and empowerment for the achievement of a better quality of life. In India the quality improvement of Mathematics education is the greater need of today. The quality of education can be measured through achievement and psychomotor domains. To achieve this goal positive attitude towards mathematics among students should be highly motivated to develop their skill like mathematics aptitude, imagination, originality, creativity, logical thinking and systematized reasoning etc. Mathematics is poorly taught and badly learnt, It is little more than burdening the mind with dead information, and it could degenerate even into a new superstition. The present study was conducted with an objective to study the attitude of secondary school students towards Mathematics in relation to their gender and locality. The findings of the present study will help educational authorities to devise instructional strategies across the curriculum to enhance the mathematics attitude of school students.

Keywords : *Attitude, Mathematics, Gender and Locality.*

Introduction

In the present age of science and technology, mathematics dominates almost every field of one's daily activities. It is an indistinguishable part of human life and has now become every man's everyday concern. It disciplines the mind, systematizes one's thought and reasoning. It is an important subject in school curriculum and is closely related to one's daily life as compared to other school subjects except mother tongue. In real sense, mathematics is a science of space and quantity that helps in solving the problems of life needing numeration and calculation. It provides opportunities for the intellectual gymnastic of the man's inherent powers. It helps the students in acquiring essential knowledge, skills, interests and attitudes and it is necessary for the realization of the practical or utilitarian value, disciplinary value and cultural value. The way that Mathematics is represented in the classroom and perceived by students, even when teachers believe they are presenting it in authentic and content dependent way stands to alienate many students from mathematics (Barton, 2000; Furinghetti and Pakhonen2002).

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The competence gain in the study of mathematics is widely used in all spheres of human life. Mathematics plays a key role in shaping how individuals deal with the various spheres of private, social and civil life (Anthony & Walshaw, 2009). This justifies the compulsion of study of the subject by all students who go through basic and secondary education in most of the countries. It is therefore a core subject at these levels of education. It is regrettable, therefore, that in the contemporary times many students struggles with mathematics and perform abysmally low in their final examinations in most jurisdictions. It has also been realized that many students have developed negative attitude towards the study of mathematics as a result of mass failure of students in the subject. It is an irrefutable fact that the successfulness of learning the subject is contingent on myriad of factors. School, classroom, student and teacher factors all impinge on the learning of mathematics.

The knowledge of mathematics is an essential tool in our society (Broody, 1987). As a tool it can be used in our daily life to overcome the difficulties faced (Bishop, 1996). Due to this, mathematics has been considered as one of the most important core subject in a school curriculum.

Before thinking about the teaching and learning of mathematics one must know, what is mathematics? In one of the dictionaries it has been given that 'Mathematics is the science of number and space" While others have defined it as "The science of measurement, quantity and magnitude." It is clearly indicated that mathematics is an accepted science which ideals with the quantitative aspect of knowledge of our life. It is helpful in drawing necessary conclusions and interpreting various ideas with useful meaning. How does mathematics do all things? Infect, mathematics has its own language, tools and mode of operations. That is why mathematics is taken as a chest filled up with so many valuable tools concerning with operations like measuring, weighing, etc. It helps in proper understanding of the nature's work and complicated problems of life by converting them into its language of signs and symbols. In real sense, mathematics is a real science of space and quantity which is helpful in solving a number of problems needing numeration and calculations. In fact, it is an exact science and it involves high cognitive abilities and powers.

Attitude

An attitude is a readiness to respond in such a way that behavior is given a certain direction. It is a particular feeling about something. It therefore involves a tendency to behave in a certain way in situations which involves something whether person, idea or object. Attitude is a central part of human identity. Everyday people love, hate, like, dislike, favour, oppose, agree, disagree, argue, persuade etc. All these are evaluative responses to an object. Hence attitudes can be defined as "a summary evaluation of an object of thought" (Bohner & Wänke, 2002).

It is partially emotional and is acquired not inherent, in an individual. Attitudes are never innate. They are formed and learnt by the individual as he grows up in the group. Attitudes develop and change with time (Rubinstein, 1986). According to Multi component model of Attitude (Eagly & Chaiken, 1993), attitudes are influenced by three components. They are cognitive (beliefs, thoughts, attributes), affective (feelings, emotions) and behavioural information (past events, experiences) (Maio, Maio, & Haddock, 2010). Negative attitude may have negative impact on teaching. Favorable positive attitude makes the teaching- learning process easier and performance of an individual way of thinking, acting and behaving. It has very serious implications for the learner, the teacher, the immediate social group.

Attitude towards Mathematics

Some authorities regard attitude towards Mathematics as just a like or dislike for Mathematics, while others extend the meaning to embrace beliefs, ability, and usefulness of Mathematics. For Zan and Martino (2007), attitude towards Mathematics is just a positive or negative emotional disposition towards Mathematics. Neale (1969), however, defines attitude towards Mathematics as an aggregated measure of "a liking or disliking of Mathematics, a tendency to engage in or avoid Mathematical activities, a belief that one is good or bad at Mathematics, and a belief that Mathematics is useful or useless" Similarly, Hart (1989) considers attitude towards Mathematics from multidimensional perspectives and defined an individual's attitude towards

Mathematics as a more complex phenomenon characterized by the emotions that he associates with Mathematics, his beliefs about Mathematics and how he behaves towards Mathematics. Attitude towards Mathematics has cognitive, affective and behavioral components; and like any other kind of attitude, it can be formed through any of the three processes described earlier. A student can develop positive attitude towards Mathematics because he or she learns to associate positive experiences or events with it. Also, positive reinforcement creates room for the formation of positive attitude for Mathematics.

Values of Mathematics

After knowing what Mathematics is, it is necessary to answer like why should everybody learn Mathematics? The answer to all such questions lies in the knowledge of the utility or values of teaching Mathematics. Following are the values of teaching Mathematics:—

Unitarian or practical value :

As far as the practical value of Mathematics is concerned, no other subject of the school curriculum can surpass it. Not a single aspect of life is free from its use. Every one of us uses some mathematics directly or indirectly in every form of our life. People can go without their mother tongue but not without calculations. Infect it can be concluded that mathematics is needed us whether big or small, rich or poor, younger or

older, man or woman in every sphere of one's life.

Social Value :

Mathematics is a subject of great social importance. It helps in organizing and maintaining our social structure. Society is the result of the union of individuals. It needs various laws but also in their compliance, Law, harmony, dynamicity prevailed in our society depend upon mathematics. The means of transport, communication and so many scientific inventions and discoveries that have knitted the world into a family have their existence due to mathematics.

Moral value :

Study of mathematics helps in character formation and moral development. The qualities like truthfulness, honesty, purity of thoughts and cleanliness, justice, punctuality, duty, patience, self control, self respect, self confidence, respect for other's opinion, distinguishing good and bad, brevity and simplicity in the expression of thoughts, belief in the systematic organization and arrangement etc can be developed through the teaching of mathematics. It also helps in developing positive attitudes as there is no place of prejudiced feelings, biased attitude, doubts and half truths in the solution of various problems of our life.

Artistic or aesthetic value :

For the lover of mathematics, there is all beauty, art, music and fineness in this subject. One finds a huge treasure of pleasure after getting success in the solution of a mathematics problem. It was the reason why Pythagoras sacrificed hundred oxen to the Goddess for celebrating his discovery of the theorem that goes by his name. In the same way, Archimedes had also forgotten his nakedness after discovering his principle. When the student is successful in solving the problem and tallies the answer given in the text book, every student feels maximum satisfaction and derives the greatest pleasure.

Intellectual value :

The study of mathematics helps us in developing our intellectual powers like power of imagination, originality, creativity, logical thinking and systematized reasoning. Every problem in mathematics is an open challenge to the faculties of the mind and a systematic and organized exercise for one's mental health. Hubsch has rightly remarked that "Mathematics is like a wheat stone and by its study one learns to think distinctly, consecutively and carefully." The power of acquiring knowledge and skill to use the acquired knowledge properly at the hour of need are only aimed through the teaching of mathematics.

Disciplinary value :

Mathematics not only helps in developing and controlling the faculties of an individual, it also equips him with proper intellect, reasoning and seriousness needed to

lead a responsible life. That is why; a mind trained through the study of mathematics is more

capable of leading a well disciplined life. Mathematics student is habitual to think properly without any unnecessary biases and prejudices. He can discriminate what is good and what is bad, therefore he does not take decisions with his emotions but tries to apply the logic and intellect. He does not believe in hear saying but tries to investigate the thing before reacting to it.

Cultural value :

By culture of a nation or society we mean the mode of living of its inhabitants. The culture is reflected through how they live, behave, eat, drink and maintain their social relationships. The scientific discoveries, which owe their roots in mathematics, are to a great extent, responsible for bringing changes in the mode of living and thereby the culture has been continuously influenced by the progress and improvement of mathematics. Hogben has rightly said, "Mathematics is the mirror of civilization."The greatness of Indian culture is once reflected through the glory of Indian mathematics of olden days.

International value :

Mathematics has international value in the sense that it is helpful in creating international understanding and the feeling of brotherhood. Indian history reveals that there was a time when our ancestors were unable to count even more than one. Therefore, as far as the potential of knowledge and intellectual development is concerned ,we all human beings- the inhabitants of all countries, the followers of all the religions and members of all the races are the same and therefore, it is unwise to think superior or inferior to any of the other race, religion, culture or nation.

Significance of the study

All the technology around us was developed by mathematically skilled engineers and scientists utilizing techniques and ideas developed by mathematicians. If there had not been mathematically skilled workforce in the past, we might not have the computers, internet and mobile phones we take for granted today. It is regrettable, therefore, that in the contemporary times many students struggle with mathematics and perform abysmally low in their final examinations in most jurisdictions. It has also been realized that many students have developed negative attitude towards the study of mathematics as a result of mass failure of students in the subject. It is an irrefutable fact that the success of learning the subject is contingent on myriad of factors. School, classroom, student and teacher factors all impinge on the learning of mathematics. Students mostly prepare themselves for passing examination. The teachers and parents are also concerned with relatively low achievement of students in mathematics and a number of studies have locked into the causes of such poor performance. Attitude is really the disposition of an individual to learn and to develop some proficiency in some particular

area. Actually it helps to acquire knowledge in a particular area and on the basis of the interest of the future performance of a child that can be predicted.

A child under the pressure of the teachers and parents selecting a professional course will be failure in that area without attitude in that field. Generally, it is noted that students of the same class differ in their performance in mathematics though by same teacher with same objectives, techniques and same environment. On the basis of the studies, it has been explained that it is due to lack of ability, interest, liking, desire, and inclination towards mathematics which in totality is referred to as mathematics aptitude. Even the individual having the same level of intelligence may not show the same result in mathematics. That is why the researchers came across with the cases that some students are fairly good in mathematics and some are not. Also the general notion is that the students who perform well in mathematics, fare good in other subjects simultaneously aptitude and intelligence in relative to some demographic variables viz. gender, locality and type of schools. Secondary stage is the foundation of higher education. Every aspect of life, mathematics has been playing its significant role. Secondary students are our future teachers, engineers, doctors etc. The progress of nation depends upon their achievements; hence, it is essential to know their attitude towards mathematics as mathematics is the foundation of all sciences.

Objectives of the study

1. To study the attitude of secondary school students towards mathematics.
2. To study the difference in the attitude of male and female secondary school students towards mathematics
3. To study the difference in the attitude of rural and urban secondary school students towards mathematics

Hypotheses of the study

1. Secondary school students have positive attitude towards mathematics.
2. There is no significant difference in the attitude of male and female secondary school students towards mathematics.
3. There is no significant difference in the attitude of rural and urban male secondary school studenta towards mathematics.

Methodology

In the present study, Descriptive Survey Method was used.

Sample

For the present study, a sample of 100 secondary school students (10 from each school) from Pathankot district of Punjab state, 50 male students (25 from rural area and 25 from urban area each) and 50 female students (25 from rural area and 25 from urban

area each) were selected on random cum purposive basis.

Tool used

For the present study the investigator used 'Attitude Towards Mathematics Scale' (2003) developed by Dr. S. C. Gakhar and Rajni.

Statistical techniques used

Data was interpreted with the help of Mean, SD, t-test and percentage.

Analysis and interpretation

Hypothesis-1

"Secondary school students have positive attitude towards mathematics."

Table -1 : Showing the levels of attitude and percentage of different groups.

Class interval	Frequency	Percentage
200-210	2	66% Extremely high attitude of Mathematics students
190-200	18	
180-190	26	
170-180	20	
160-170	21	21% moderate attitude of mathematics students
150-160	6	
140-150	3	
130-140	2	13% Extremely low attitude of mathematics students
120-130	2	

The table shows that 66% secondary school students have extremely high attitude towards mathematics, while 21% have moderate and 13% have low attitude. Hence, from the analysis of the data, it can be concluded that the majority of the students have extremely high attitude towards mathematics. Hence, the hypothesis 1, "Secondary school students have high attitude towards mathematics" stands accepted.

Hypothesis II.

"There is no significant difference in the attitude of male and female secondary school students towards mathematics"

Table 2 : Showing the Mean, Standard Deviation, & 't' value of male and female secondary students.

Gender	N	Mean	SD	't' value	Inference
Male	50	177.86	13.36	0.06	Insignificant
Female	50	175.46	17.03		at 0.05 level

Table no 2 shows that Mean scores of attitude of male and female secondary students towards mathematics are 177.86 and 175.46 with SD 13.36 and 17.03 respectively. The 't' value is 0,6 which is insignificant at 0.05 level. It means that male and female secondary students did not differ significantly in their attitude. Hence, Hypothesis II. "There is no significant difference in the attitude of male and female secondary school students towards mathematics" stands accepted.

Hypothesis III.

"There is no significant difference in the attitude of rural an urban male and secondary school students towards mathematics."

Table 3 : showing Mean, SD and't' value of rural an urban male and secondary school students.

Area	N	Mean	SD	't' value	Inference
Rural	50	177.24	15.66	0.03	Insignificant
Urban	50	176.08	16.16		at 0.05 level

Table 3 shows that Mean scores of attitude of rural and urban secondary school students towards mathematics are 177.24 and 176.08 with SD 15.66 and 16.16 score. The 't' value is 0.03, which is insignificant at 0.05 level. It means that rural and urban secondary students did not differ significantly in their attitude towards mathematics. Hence, Hypothesis
III. "There is no significant difference in the attitude of rural an urban male and secondary school students towards mathematics" stands accepted.

Main Findings

Following are some worthwhile main findings which have been emerged from the present study on the basis of the analysis and interpretation.

1. 60% secondary school students had extremely high attitude towards mathematics.

2. 21% secondary school students had moderate attitude towards mathematics.

3. 13% secondary school students had extremely low attitude towards mathematics.
4. There is no significant difference in the attitude of male and female secondary school students.
5. There is no significant difference in the attitude of rural and urban secondary school students towards mathematics.

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