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ATTITUDE TOWARDS MATHEMATICS AND ITS RELATIONSHIP WITH PERCEIVED CAREER CHOICES OF CLASS 9TH CLASS STUDENTS

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Abstract:

In a contemporary educational scenario, often times, the career choices are influenced by the attitude towards mathematics. In a context where Science-Technology-Engineering-Medicine (STEM) along with information and communication technology as well as business management emerged as the most wanted carriers, mathematics also has emerged as the most important school subject to be taught and is considered as the subject that help in clearing the entrance exams of the aforementioned higher education courses. Therefore this article inquires into the attitude of 9th class students towards mathematics and its relationship with the perceived career choices.

KEY WORDS:

Mathematics ,Science-Technology-Engineering-Medicine (STEM) ,modern education .

INTRODUCTION

The importance of mathematics in modern education has been recognized across the world. According to Roger Bacon “mathematics is a gate way and key of all the sciences”. Hence in all the sciences and information technology the knowledge of mathematics is very much essential and useful. Mathematics helps to develop soft skills, like self confidence, logical and critical thinking, self- reliance, sense of appreciation, scientific attitude, problem solving etc. Therefore, the research on mathematics had made it evident that society, community and parents are much keener than before to impart better mathematical abilities among their children. It is also very pertinent for every mathematics teacher to develop positive attitude towards learning mathematics among students. The positive attitude is helpful in improving up the thinking level of the students and plays a significant role in the development of different mental abilities.

According to Baroody (1987), the knowledge of mathematics is an essential tool of any society. Mathematics is a tool that can be used in our daily life to overcome difficulties faced (Bishop, 1996). Due to this mathematics has been considered as one of the most important core subjects in a school curriculum and more mathematics lesson are likely to be taught in schools and colleges throughout the world than any other subject (A. Orton, D. Orton & Frobisher, 2004). However, research around mathematics education reveals that the students do not perform to the expected level, and the students under achievement in mathematics is not just a concern over the year (Pisa, 2003), hence it has been a matter of academic inquiry, research, curriculum designing, pedagogical shifts and enhancing the achievement across the nations.

Several studies and researches have been done in many countries to find the factors that influence the students’ performance in mathematics. Among these factors, students’ attitude towards mathematics is one important factor, among many, that has been consistently studied. It is often found that the studies on relationship between students’ attitude and the students’ academic performance show a positive

relationship (Mohd., Mahmood, & Ismail, 2011; Bramelet & Herron, 2009; Nicolaidou & Philippou, 2003; Papanas tasiou, 2000; Ma & Kisher, 1997). Hence students' attitude towards mathematics is a major factor that might influence the performance of the students in mathematics and overall performance in school and college education. Therefore, across the globe, several studies has been conducted in different countries in order to find out the students' attitude towards mathematics (Tahar, Ismail, Zamani & Adnan, 2010; Bramlett & Herron, 2009; Kogce, Yidiz Aydm, & Altinday, 2009; Tapia & Marsh, 2004; Fennema & Sherman, 1996) and relate the attitude towards mathematics with their performance in mathematics as well as over all academic achievement.

SIGNIFICANT OF THE STUDY

It is observed that students having positive attitude towards mathematics would get more benefits of it, when compared to those who lacked the positive attitude towards mathematics. The positive attitude towards mathematics helps in acquisition of desirable skills, so it is the duty of the mathematics teacher to nourish positive attitude towards of students learning mathematics.

A teacher who has taught even one day in a classroom realizes that a positive attitude towards learning is essential to be successful (Sliva, 2004,p 73). The successful experiences lead to better achievement.

The quality of mathematics can be maintained only when it ensured that students are achieving marks in mathematics due to their understanding of concepts and not due to rote of learning of formula or steps. As mathematics is a subject of sequence in which to understand the concept of higher level, all the concept of lower level are equally significant one cannot escape from any concept of lower level. Henceforth, it becomes immensely important to shape desirable attitude toward mathematics. This study is an attempt to inform the teachers' teacher educators and policy makers to be vigilant about the attitude of school students towards mathematics and how the attitude towards mathematics may influence the choices that students make about their future careers.

STATEMENT OF THE PROBLEM

The present research is undertaken to study: Attitude towards Mathematics and Its Relationship with Perceived Career Choices among 9th Class Students.

OBJECTIVES OF THE STUDY

1. To study students attitude towards mathematics.
2. To compare the attitude towards mathematics of boys and girls.
3. To study various career choice of students.
4. To study the influence of school on attitude towards mathematics.
5. To study the influence of gender, school and their interaction on attitude towards mathematics.
6. To study the relationship between attitude towards mathematics and career choices.

HYPOTHESES

1. There is no significant difference between attitude towards mathematics of boys and girls.
2. There is no significant influence of school on attitude towards mathematics.
3. There is no significant influence of gender, school and their interaction on attitude towards mathematics.

RESEARCH QUESTION

Does interest towards mathematics has any influence on career choices of 9th standard students?

DEFINITION OF KEY TERMS

Attitude : Alport (1935-1967) presents his definition of an attitude as follows: "An attitude is a mental and neural state of readiness, organised through experience, a directive or dynamic influence upon the individual's response to all objects and situations with which it is related". An attitude is an organized and consistent manner of thinking, feelings and reacting with regard to people, social issues , groups, or , more generally, any event in one's environment. It is essential components are thoughts and beliefs, feelings (or emotions), and tendencies to react

Mathematics: Mathematics is an important discipline for school children at primary level. It paves way of improving reasoning and logical thinking. It is bases for intuitively knowledge and insightful ideas. Through mathematics one can develop rational, critical and reflective thought. It is root for scientific inquiry (Wilson, 2008 & mazzocco 2005).

Perceived career choices: Perception is nothing but to become aware or conscious of (something); come to realize or understand. Or become aware of (something) by the use of one of the senses, especially that of sight. Interpret or regard (someone or something) in a particular way. A career is an individual's journey through learning, work and other aspects of life. A student has a various option to choose from, a career through own interested field or a career guidance and suggestions and make a choice of the carrier. Perceived career choice is nothing but the choice that students make and would want to pursue in future.

SAMPLE

In purposive sampling, the researchers collected sample with a purpose in mind. Researchers had certain predefined group in mind. The researchers selected the school based on the type of board; one was CBSE and other was State Board (M.P. Board). Purposive sampling can be very useful for situations where we need to reach the targeted sample quickly. Purposive sampling allows the researcher to select those participants who will provide the richest information.

The sample of the present study

SCHOOL	CBSE	STATE BOARD
GIRLS	1	16
BOYS	5	18
TOTAL	56	34

Variables

Independent variable: Attitude towards mathematics

Dependent variable: Career choice

TOOLS AND TECHNIQUES

Keeping in view the nature of the problem researchers used the tools to gather the data that would answer the research questions and the hypothesis stated in the study. The tools of the study were:

- a) "Attitude towards mathematics inventory." Inventory contains 40 items, based on 5point scale. The scale for inventory was A- Strongly Disagree, B- Disagree, C- Neutral, D- Agree, and E- Strongly Agree. Students' best describes their feeling.
- b) Career choice survey questionnaire was constructed by the researchers. The students were free to fill options according to them. These questions were made to find out the students perception about their career. In this questionnaire there were 25 questions to find out students opinion for their perception regarding career.

DATA COLLECTION PROCEEDURE

1. Two CBSE schools and two State Board schools of Madhya Pradesh were selected
2. Attitude towards mathematics inventory test was administered on the students.
3. Career choice questionnaire were filled by the students.
4. Lead discussions need and importance of mathematics in pursuing different career options were done with the students.

Before conducting the test students were taken into confidence. They were assured that the data collected is only for the study purpose and none of their data would be disclosed to anyone.

OBJECTIVE WISE ANALYSIS

Analysis of data is done according to objectives / hypotheses. Firstly, test was administered on

students to gather the data pertaining to attitude towards mathematics. Than data for perceived career choice was gathered with the help of questionnaire which was constructed by the researchers. Studying the relationship between attitude towards mathematics and perceived career choice is very much pertinent for this study. To see the significant difference between males and females attitude towards mathematics, t- test was used by researcher. The student’s attitude towards mathematics was measured by percentage. Student’s attitude was broadly categorised into three categories: positive attitude, neutral attitude and negative attitude. ANOVA was used to see the significant influence of type of school on attitude towards mathematics. The relationship between attitude towards mathematics and perceived career choice was analysed through the percentage. Henceforth, this study used quantitative method to arrive at the conclusions that are unknown that would answer the hypotheses and the research question of the proposed study.

STUDENTS ATTITUDE TOWARDS MATHEMATICS

Table-1: ATTITUDE TOWARDS MATHEMATICS SCALE

Score	Type of Attitude
100 – 130	Positive attitude
70 – 99	Neutral attitude
40 – 69	Negative attitude

Table-2: Number of students with various percentages of Attitude towards Mathematics

Attitude towards mathematics	No. of students	Percentage %
Positive attitude	28	31.11
Neutral attitude	52	57.77
Negative attitude	10	11.11
Total	90	100

Interpretation

Table-2 indicates that most of the students have the neutral attitude towards mathematics. Students are neither interested nor disinterested in mathematics. From above table show that, out of 90 students, 31.11% students have positive attitude towards mathematics, 57.77% students have neutral attitude towards mathematics and 11.11% students have negative attitude towards mathematics.

To compare the attitude towards mathematics of boys and girls.

H0: There is no significant difference between attitude towards mathematics of boys and girls.

Table-3: N, Mean, SD, Standard Error of Mean and t-value for the Attitude towards Mathematics

	Gender of Students	N	Mean	Std. Deviation	Std. Error Mean	df	t-Value
Attitude towards Maths	Male	53	88.09	15.17	2.08	89	0.93
	Female	37	91.51	19.56	3.217		

Interpretation

Table -3 indicates that the t-value for Attitude towards Mathematics for df 89 is 0.93, which is not significant at 0.05 levels. Therefore, the null hypothesis, namely, “there is no significant difference between attitude towards mathematics of boys and girls”, is not rejected. But, the mean of the female students is higher than the male students. The SD, also, shows that the female students are on higher side than the male students. But the difference is not significant. Mean indicates that attitude of female students towards

mathematics varies and slightly higher than the males.

TO STUDY VARIOUS CAREER CHOICE OF STUDENTS

Table-4: Different career chosen by the students

Careers	No. of students	Percentage %
Engineering sciences	33	12
Medical sciences	12	13
Civil services	04	04
Teaching	05	06
Defence	14	16
Business sales/ management	09	10
Others	13	14
Total	90	100

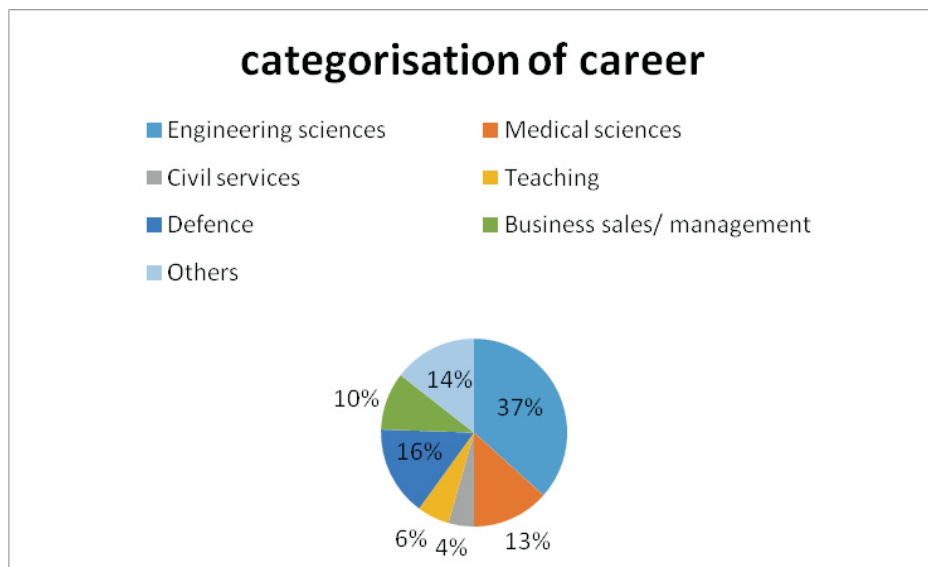


Fig. 1 Categorisation of career

Interpretation

Table-4 indicates various career options chosen by the students. Students had choice career according to their preferences. The table -4 indicates that, out of ninety students, 37% students have choose engineering as their career, 13% choose medical profession as their career, 4% selected civil services , 6% want to become a teacher, 16% want to join defence and 14% want to be a part of business sales and management. Most of the students have chosen to become an engineer as their career.

TO STUDY THE INFLUENCE OF GENDER, SCHOOL AND THEIR INTERACTION ON ATTITUDE TOWARDS MATHEMATICS

H0: There is no significant influence of gender, school and their interaction on attitude towards mathematics.

Table-5: Summary of 2 X 2 Factorial Designs ANOVA of Unequal Cell Size for Attitude towards Mathematics

Sources of Variance	df	Sum of Squares	Mean sum of Squares	F-Values
Gender	1	549.366	549.366	.17
School	1	364.625	364.625	.26
Gender X School	1	728.052	728.052	.11
Error	86	24510.773	285.009	
Total	89	746941.000		

To study the influence of gender on attitude towards mathematics

Table-5 indicates that the F-Value for gender on attitude towards mathematics with df equal to 1/89 is 0.17, which is not significant at 0.05 levels. Therefore, the null hypothesis, namely, “there is no significant influence of gender on attitude towards mathematics”, is not rejected.

Table-6: N. Mean and SD for Attitude towards Mathematics

Gender	Type of School					
	CBSE			State Board		
	N	Mean	SD	N	Mean	SD
Male	35	91.54	15.08	18	81.39	13.33
Female	21	90.76	23.49	16	92.50	13.47
Total	56	91.25	18.47	34	86.62	14.34

To study the influence of school on attitude towards mathematics

Table-6 indicates that the f-value for school on attitude towards mathematics with df equal to 1/89 is 0.11, which is not significant at 0.05 levels. Therefore, the null hypothesis, namely, “there is no significant influence of school on attitude towards mathematics”, is not rejected.

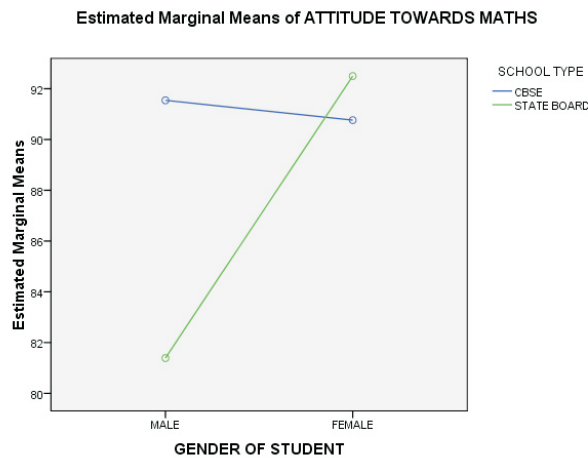


Fig: 3 Attitude of male students and female students of CBSE and SATE BOARD schools

To study interaction of gender and school on attitude towards mathematics

Table-6 indicates that the f-value for interaction of gender and school on attitude towards mathematics with df equal to 1/89 is 0.26, which is not significant at 0.05 level. Therefore, the null hypothesis, namely, “there is no significant interaction of gender and school on attitude towards mathematics”, is not rejected.

Interpretation

Interaction of gender and school on attitude towards mathematics is not significant; therefore there is no influence of gender and school on attitude towards mathematics. The fig: 3, shows that female students of State Board have more positive attitude towards mathematics than the male students. There is little difference in attitude towards mathematics of female students and male students of CBSE board.

TO STUDY THE RELATIONSHIP BETWEEN ATTITUDE TOWARDS MATHEMATICS AND CAREER CHOICES.

Table-7 Various careers, kind of attitude and career choices

	Engineering sciences	Medical science	Civil service	Teaching	Defence service	Business sales/ mgnt	Other
Positive attitude	12	04	00	00	04	05	03
Neutral attitude	17	07	03	05	07	04	09
Negative Attitude	04	01	01	00	03	00	01
Total	33	12	04	05	14	09	13

Interpretation

Table-7 indicates number of students with various career options and their attitude towards mathematics which is categorised as positive, neutral or negative attitude towards mathematics. It also indicates that most of the students with positive attitude towards mathematics have selected engineering as a career. To become engineer, there is necessary requirement of mathematics background. Therefore this table show there is a positive relationship of attitude towards mathematics with perceived career choice.

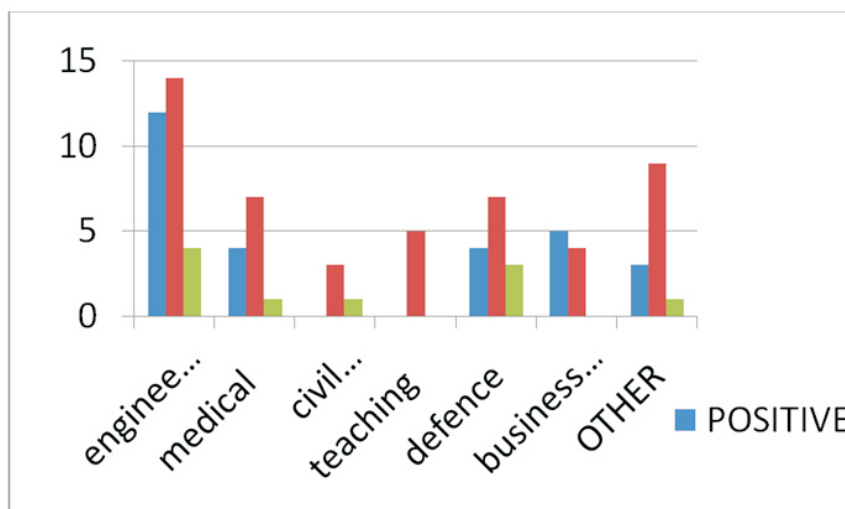


Fig: 2 Attitude towards mathematics and career choice

FINDINGS

The major findings are as follows:

1. The majority of the students have neutral attitude towards mathematics.
2. There is no significant difference between attitude towards mathematics of boys and girls.
3. There is no significant influence of school on attitude towards mathematics.
4. There is no significant interaction of gender and school on attitude towards mathematics.
5. There is positive relationship between attitude towards mathematics and perceived career choice.

EDUCATION IMPLICATION

Mathematics is a core subject which has linkage with other subjects. A child can enhance his/ her creativity and aspiration by developing positive attitude towards mathematics to achieve high goal.

Higher maths ability is often believed to go hand-in-hand with greater levels of general intelligence. At the same time, many students have a negative attitude towards maths. Maths anxiety is defined in the research literature as feelings of concern, tension or nervousness that are experienced in combination with maths. Research in education, cognitive psychology and neuroscience shows that anxiety can lead to a drop in maths performance.. Myths in relation to gender and maths are not the only ones that have the potential to negatively impact students' learning in maths. There is a common misconception that maths is only important for people with career interests in fields like engineering, business and science when, in fact, it is a subject that provides thinking skills that are of great value in everyday life. Teachers have the opportunity to dispel negative stereotypes and myths about maths, and to help create a positive classroom environment that encourages students to have a go without fear. In order to do this, students should feel that maths is just like any other subject and hard work will bring about improvement. Teachers will have the opportunity to encourage their students to believe that things like gender stereotypes and negative peer culture should not limit their mathematical choices. Students should also be made aware of the many applications of maths in many careers and life pathways. Armed with this outlook, they will be able to fulfil their maths potential and make choices based on factors other than anxiety. Therefore, positive attitude towards mathematics can dispel the fear of math among students and reinforce interest to take this subject in a more joyful learning.

CONCLUSION

The primary goal of this study was to contribute to our understanding or knowledge of the attitude towards mathematics and its influence on future career choices. Once students are inspired about a career, they may try to focus on their attitude towards mathematics and develop more positive attitude towards mathematics and perform better to gain more achievement in mathematics. Therefore, it is important to know the students career choices and inform them that mathematics is very much essential in various careers and motivate them to develop positive attitude towards mathematics and achieve the maximum.

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