



A Study On Challenging Option Of Selecting Mathematics At Higher-level Programme

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Abstract: Mathematics, the study of shape, arrangement, quantity, and related concepts, is crucial for understanding quantitative and analytical aspects of various natural and mathematical phenomena. While it finds applications in accounting, surveying, engineering, economics, and more, many students perceive it as a difficult subject. This perception has led to a decline in student enrollment in undergraduate math courses. This study explores personal preferences, perceived difficulties, home and college environments, physical facilities, career aspirations, and teaching-learning processes to gain insights into why some students may opt out of studying mathematics. Understanding these reasons can inform educational strategies to make Mathematics more inclusive.

Keywords: Mathematics , perceptions, attitudes, influence.

I. INTRODUCTION

Mathematics plays a pivotal role in the advancement of our civilization and is indispensable for modern society's existence and progress. It is an integral part of school curricula and a major subject at the higher levels of education. Mathematics encompasses the logical study of shape, arrangement, quantity, and various related concepts, offering insights into the quantitative aspects of natural and mathematical phenomena. It finds applications in a wide array of fields, including accounting, engineering, physical sciences, biology, economics, and business phenomena. It finds applications in a wide array of fields, including accounting, engineering, physical sciences, biology, economics, and business.

1.1 OBJECTIVES

The study aims to achieve the following

- To examine the perceptions and attitudes of Secondary school students towards Mathematics and identify the factors influencing their level of interest and engagement in the subject.
- To compare the perceptions and attitudes of Secondary-level students, Higher Secondary-level non-Mathematics students.
- To identify the factors influencing the declining interest in Mathematics among undergraduate students.
- By achieving these objectives, this research aims to provide a clearer understanding of the challenges and barriers that students face in pursuing Mathematics at the undergraduate level.

1.1 LITERATURE SURVEY

Many students and undergraduates seem to think of mathematicians as old, white, middle-class men who are obsessed with their subject, lack social skills and have no personal life outside maths. The student's views of mathematics itself included narrow and inaccurate images that are often limited to numbers and basic arithmetic. The paragraph we just quoted is the summary of the study 'Maths Images & Identities: Education, Entertainment, Social Justice' carried out by three British sociologists Heather

1.2 METHODOLOGY

This research aims to uncover the root causes behind the declining interest in Mathematics among undergraduate students. To achieve this goal, we utilized a survey research approach and employed Microsoft Excel have been used to analyse and interpret the data. The survey consisted of a structured questionnaire comprising 12 questions, tailored for both school students and undergraduate non-mathematics students.

The questionnaire was distributed to three distinct groups: Secondary-level students. Higher secondary-level students who do not pursue Mathematics. Undergraduate students who did not study Mathematics at the higher secondary level.

The survey questionnaire was thoughtfully crafted to elicit responses and insights regarding Mathematics. Furthermore, questions were customized for college students representing diverse academic disciplines. The survey successfully gathered a total of 361 responses from secondary-level students, 87 responses from college students, and inputs from educators and academic experts.

This comprehensive survey explores various facets, including the rationales behind the diminishing allure of Mathematics, the impact of the classroom environment, individual interests, career aspirations, and the perceived future prospects of the subject. Through rigorous data collection and analysis, this study aims to illuminate the multifaceted factors contributing to the declining interest in Mathematics at the undergraduate level.

2. PERSPECTIVES OF STUDENTS IN STUDENT LEVEL LEARNING MATHEMATICS

Difficulty:

Many people find mathematics challenging, and the fear of struggling with complex concepts can be a significant deterrent.

Lack of Interest:

Not everyone has a natural affinity for mathematics. Some individuals may find other subjects more engaging and may not see the relevance or interest in mathematical topics.

Lack of Confidence:

Some students lack confidence in their math abilities, even if they have the potential to succeed. This lack of confidence can prevent them from pursuing higher-level math courses.

Negative Past Experiences:

Previous negative experiences with mathematics, such as low grades or a lack of understanding, can create a negative perception and lead to avoidance.

Subjective Teaching Experiences:

The teaching style and approach of a particular math teacher can influence a student's perception of the subject. A negative experience with a teacher may impact the decision to pursue Mathematics.

Perceived Lack of Practicality:

Some people may question the practical applications of certain mathematical concepts and may not see how they relate to real-life situations.

ANALYSIS AND INTERPRETATION

SN	Q N	Content	WMS
1	Q11	Believing that real-life applications of mathematics enhance understanding and engagement with the subject	4.01
2	Q4	There is always a fear that my final answer is right or not.	3.95
3	Q2	Satisfaction out of solving a Math problem	3.85
4	Q6	Not comfortable in asking questions during Mathematics class.	3.83
5	Q9	Motivation received from my teachers is not enough	3.73
6	Q7	The syllabus is vast	3.72
7	Q8	Lack of interest in pursuing Mathematics	3.69
8	Q3	Afraid of Mathematics and have a hard time learning it.	3.66
9	Q10	I worked hard but I didn't get good results.	3.65
10	Q1	Solving challenging mathematical problems	3.54
11	Q5	Worrying about getting a poor grade in Mathematics.	3.47

Table 2.1 Perceptions of Secondary School Students

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Q1	1										
Q2	0.429	1									
Q3	0.383	0.314	1								
Q4	0.352	0.536	0.247	1							
Q5	0.413	0.355	0.532	0.382	1						
Q6	0.385	0.381	0.302	0.377	0.492	1					
Q7	0.343	0.483	0.494	0.358	0.418	0.307	1				
Q8	0.373	0.389	0.463	0.394	0.519	0.373	0.388	1			
Q9	0.32	0.241	0.405	0.234	0.462	0.371	0.252	0.306	1		
Q10	0.335	0.402	0.365	0.352	0.562	0.436	0.362	0.583	0.36	1	
Q11	0.326	0.433	0.39	0.398	0.438	0.415	0.364	0.33	0.318	0.222	1

Table 2.2 Correlation matrix to determine the relation among the perceptsives of secondary level students**MAJOR FINDINGS**

Table 2.1 & 2.2 explains the perceptive of the 9th and 10th standard students.

Correlation between Q4 and Q6 have a positive correlation of 0.5357, suggests that the fear of making mistakes aligns with discomfort in asking questions during mathematics class.

Correlation between Q1 and Q2 exhibit a positive correlation of 0.4289, suggests that students who find the challenge of mathematics appealing are likely to derive satisfaction from solving mathematical problems.

Correlation between Q9, representing the perception of inadequate teacher support, correlates positively with Q3 (0.4047) and Q6 (0.3709), highlighting the potential impact of teacher support on overcoming fear and discomfort in mathematics.

Correlation between Q11, representing the role of real-life applications, shows positive correlations with Q2 (0.4327) and Q5 (0.4385), suggesting that students who find satisfaction in solving math problems will appreciate the relevance of real-life applications.

Correlation between Q10, representing satisfaction out of solving a Math problem, shows a notable positive correlation with Q5 (0.5622) and Q6 (0.4356), suggest a potential link between academic performance and feelings of worry and discomfort during math class.

S N	Q N	Content	WMS
1	Q4	There is always a fear that my final answer is right or not.	3.84
2	Q3	Afraid of Mathematics and have a hard time learning it.	3.69
3	Q5	Worrying about getting a poor grade in Mathematics.	3.29
4	Q10	I worked hard but I didn't get good results.	3.16
5	Q9	Motivation received from my teachers is not enough	3.09
6	Q8	Lack of interest in pursuing Mathematics	2.91
7	Q1	Solving challenging mathematical problems	2.91
8	Q6	Not comfortable in asking questions during Mathematics class.	2.89
9	Q11	Believing that real-life applications of mathematics enhance understanding and engagement with the subject.	2.82
10	Q2	Satisfaction out of solving a Math problem	2.80
11	Q7	The syllabus is vast	2.69

Table 2.3 Correlation matrix to determine the relation among the percepts of Higher Secondary level students

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Q1	1										
Q2	0.157	1									
Q3	-0.072	0.08	1								
Q4	-0.006	0.197	0.52	1							
Q5	0.272	0.204	0.267	0.421	1						
Q6	-0.073	0.298	-0.05	-0.06	0.031	1					
Q7	0.013	0.378	0.26	0.3	0.165	0.089	1				
Q8	0.326	0.293	0.075	0.021	0.248	0.421	0.051	1			
Q9	-0.035	-0.16	0.661	0.444	0.247	-0.075	0.238	-0.103	1		
Q10	-0.113	-0.15	0.213	0.376	0.267	-0.172	-0.12	-0.064	0.227	1	
Q11	0.087	-0.11	-0.06	-0.003	-0.06	0.04	-0.23	0.2444	-0.137	-0.078	1

Table 2.4 Correlation matrix to determine the relation among the percepts of higher secondary level students

MAJOR FINDINGS

- ✓ There is no strong correlation between any pair of variables.
- ✓ The correlations are generally weak to moderate, suggesting that the variables are not strongly linearly related.
- ✓ Some variables, such as Q3 and Q9, show moderate positive correlations, indicating a potential association.
- ✓ Negative correlations between Q3 and Q6, as well as Q7 and Q11, are weak.

From the Perception of both Secondary and Higher Secondary level students we can observe a common factor that motivation received from teachers can make students more confident in solving the math problems.

3. PERSPECTIVES OF STUDENTS IN COLLEGE LEVEL LEARNING MATHEMATICS`

To understand the underlying reasons, a series of questions were posed to graduate students who did not pursue mathematics courses. The responses shed on various factors similar to the secondary and higher secondary school students. The factors are:

The Fear of Humiliation:

Few respondents expressed their fear of humiliation in the mathematics classroom. This fear can be attributed to a variety of factors, including the perceived competitiveness of the learning environment, a lack of confidence in one's abilities, and the potential for judgment from peers.

Pacing and Interest:

The speed at which mathematics concepts are presented proved to be a significant challenge for some respondents. The inability to keep up with the pace of the class can lead to frustration. Additionally, the lack of interest in the subject matter further exacerbates this issue.

Teacher-Student Relation:

The attitude of the teacher towards students emerged as another factor impacting the comfort levels of learners. A positive and supportive teacher-student relationship is crucial for creating a conducive learning environment.

Practice and Repetition:

An important aspect of mastering mathematics is regular practice. The respondents had varying levels of practicing math concepts during their school days.

Dislike for Mathematics:

Understanding when students start to develop a dislike for mathematics is essential in addressing the root causes. The survey indicated that the dislike often begins at the secondary level or higher secondary level.

Impact of Online Learning:

The advent of online learning has introduced new challenges. Respondents acknowledged that the online class scenario influenced their choice to opt-out of mathematics courses. This impact extended to other subjects as well.

Peer Influence:

Peer pressure and the influence of friends can also play a role. If students perceive that their peers are not taking advanced math courses, they might be less inclined to do so themselves.

Career Opportunities and Awareness:

Some respondents expressed a lack of interest in the career opportunities associated with a mathematics degree. This highlights the importance of promoting awareness about the diverse career paths available to mathematics graduates. Educational institutions and career counseling services should actively disseminate information about the practical applications of mathematics in fields such as data science, AI, and technology.

Future Prospects:

The survey concluded with questions about future preferences and the potential impact of application-based courses on students' willingness to pursue mathematics. The majority of respondents expressed openness to choosing mathematics if the courses incorporated practical applications like data science and AI.

HYPOTHESIS :1

There is no significant difference in the decisions of students to choose Mathematics as a result of online learning.

Anova: Single Factor

SUMMARY

Groups	Count	Sum	Average	Varianc e
Q4	87	207	2.37931	0.540497
Q8	87	244	2.804598	2.042769

Table ANOVA 3.1							
Source of Variation	SS	Df	MS	F	P-value	F crit	
Between Groups	7.867816	1	7.867816	6.09137	0.01456	2	3.89609
Within Groups	222.1609	172	1.291633				
Total	230.0287	173					

The above result shows that there is a significant difference in the decisions of students to choose Mathematics as a result of online learning.

HYPOTHESIS 2

There is a significant relationship between the fear of humiliation and the frequency of practicing Math concepts.

Anova: Single
Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Q3	86	204	2.372093023	0.54227086
Q1	86	235	2.73255814	1.1629275

Table 3.2 ANOVA

Source of Variation	SS	Df	MS	F	P-value	F crit
Between Groups	5.58720930	1	5.587209302	6.55314882	0.0113404	3.896741962
Within Groups	144.941860	170	0.852599179			
Total	150.529069	171				

The above result shows that there is no significant relationship between the fear of humiliation and the frequency of practicing Math concepts.

SUGGESTIONS

Educators should consider incorporating interactive and real-world applications of mathematical concepts to make the classes more engaging and relevant to students' interests.

Teachers must be mindful of their interactions with students, offering encouragement and personalized assistance to foster a sense of belonging and academic support.

Teachers can implement various strategies such as regular homework assignments, peer tutoring, and interactive online platforms that allow students to reinforce their understanding through repeated practice.

Educational institutions can consider revising teaching methods and curricula at these stages to make math more enjoyable, potentially shifting students' perceptions of the subject.

4. CONCLUSION

This study, which encompasses perspectives from secondary-level students, higher secondary-level non-Mathematics students, and undergraduates, offers a comprehensive view of the intricate factors influencing students' choices and attitudes toward Mathematics

The findings of this research serve as a valuable resource for shaping strategies aimed at improving Mathematics education and promoting a more inclusive approach to the subject. By addressing the challenges and concerns identified in this study, educational institutions and policymakers can work towards rekindling the enthusiasm for Mathematics among students. This, in turn, will contribute to a brighter future for Mathematics as a field of study.

Students' decisions regarding their college majors are multifaceted and influenced by various factors, including their personal interests, perceptions of subject difficulty, career aspirations, family advice, and passion for specific fields. Mathematics, often perceived as complex or lacking appeal, is frequently bypassed as a major. Recognizing and understanding these factors are pivotal for educators and policymakers alike. It enables them to tailor academic programs, enhance teaching methodologies, and provide career guidance that caters to the diverse needs and interests of students.

In conclusion, this research sheds light on the intricate dynamics surrounding students' choices related to Mathematics education. By addressing these dynamics, the educational landscape can be reshaped to foster a renewed appreciation for Mathematics and empower students to embrace it as a subject that offers valuable opportunities and enriching experiences in their academic and professional journeys.

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