

## FACTORS AFFECTING IN LEARNING MATHEMATICS THROUGH MULTIMEDIA TECHNOLOGY IN SECONDARY SCHOOLS STUDENTS

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### ABSTRACT

Technology is important to students in the twenty-first century. Technology is a crucial teaching tool in mathematics lectures that can alter the learning experience in addition to multimedia. In the classrooms of future, multimedia has been included into the teaching process. Teachers can improve their teaching methods by using multimedia technology, which can assist students broaden their knowledge and concepts, as well as improve their mathematical skills. The methods was adopted quasi-experimental design (pre-test and post-test). The research Contributors in this study (male/female) continued 70 secondary school students from two secondary schools in Salem, Tamil Nadu, India. The Questionnaire on Factors Influencing Learning Mathematics adopted in this research was prepared based on Achievement in Learning Mathematics. There was a significant positive relationship exists between the retention test scores of experimental group students' achievement in mathematics in the dimensions of mathematics anxiety and interest. But, there is no significant relationship exists between the retention test score of experimental group students' achievement in mathematics in the dimensions of parental involvement, homework activities, and teacher involvement is differ. Multimedia has long been an element of the classroom instructional process. Teachers can use to the research multimedia technology to improve their teaching methods, allowing students to broaden their knowledge and concepts while also improving their mathematical skills.

**Keywords:** Multimedia Technology, Mathematical Skills, Knowledge, Achievement.

### Introduction

The mathematical ability has long been recognized as vital for both academic accomplishment and effective day-to-day living (Carey, 2017). Our ability to solve issues and make suitable decisions in everyday life is enhanced by our training in accuracy, consistency, and mental discipline that we get from studying mathematics. Due to the widespread recognition of the importance of math knowledge and continued concern about performance at various educational levels, student performance in elementary school education is a cause. According to Eng (2010) mathematical knowledge has constantly been regarded as vital for a wide range of higher education disciplines. (Nicholas, 2018; Joyce, 2017; Gradwohl, 2018). Their students learn essential mathematical ideas as well as the computational and conceptual skills required to succeed in their field of study. A variety of elements are taken into consideration, including prior knowledge of secondary school student mathematics subjects, perspectives on learning math with technology, perceived math anxiety, math interest, parental involvement, homework activities, teacher involvement, self-engagement, and motivation during the math course (Gradwohl, 2018).

### Literature Review

Acharya (2017) Explored that the challenges of the students in public schools face when learning mathematics are explored in this article. This study's main goal was to investigate the motivations for mathematics learning challenges. These findings are consistent with earlier research that found that the ability to make mathematical connections is crucial for students to learn new material. Students' understanding of the material has improved due to their ability to make connections between the various topics they have studied and subjects both inside and outside of mathematics. Teachers can refer to these findings in learning management by focusing on a variety of factors, particularly mathematical connection ability.

Malandrakis, Bara, & Gkitsas, (2021) conducted that study on investigates the perceived influences on student-teachers (STs) understanding of social-urban sustainability. The findings indicate that teaching methods associated factors, such as the practical nature of the course and classroom discussions, as well as the use of appropriate teaching tools and activities, such as site visits and concept maps, were the main factors influencing

STs' learning, asserting a strong and constructive combination of theory and praxis for the advancement of STs' learning. Furthermore, providing learners with a variety of learning environments was a requirement for effective learning.

Qureshi (2021) explored that structure classrooms for active learning is becoming a part of the whole educational follow in higher education institutions to get students active and engaged in the learning process. In order to achieve this goal, it has been identified that social factors are having an impact on student learning performance and engagement in collaborative learning. The findings also support the use of double mediation in this study. As online learning becomes more prevalent in education, it has been concluded that overall collaborative learning and engagement with the influence of social factors improve activities of students learning; thus, their use should be motivated in teaching and learning in higher educational institutions as it influences students' academic development.

Retnawati (2022) studied on Indonesia of the study aims to discuss factors influencing learning outcomes in mathematics in Indonesia, including direct and indirect influences, such as students' perceptions of teacher competence, learning anxiety, problem-solving skills, learning motivation, and mathematical connection ability. These findings are consistent with earlier research that found that the ability to make mathematical connections is crucial for students to learn new material. Students' understanding of the material has improved due to their ability to make connections between the various topics they have studied and subjects both inside and outside of mathematics. Teachers can refer to these findings in learning management by focusing on a variety of factors, particularly mathematical connection ability.

### **Background Of The Study**

Society views mathematics as the basis of scientific and technological knowledge, which must be acquired for a nation's social and economic development. Indeed, studies show that mathematics has an effect on various levels of every aspect of human life. The study piece offers a concise, organized of the factors affecting students' math achievement. We study academic articles on students' performance in mathematics.

Digital math educational materials differ from traditional published ones in several ways, including the dynamic structural components they contain, which have the potential that traditional textbooks are unable to realize. Importantly, dynamic structural elements, or multimodal representations of mathematics, may be crucial for learning, which is why there have been many digital textbooks developed recently and there has been an increase in interest from the scientific community. The purpose of the study is to look into the factors that may affect mathematics teachers' intentions and actual use of digital textbooks.

Research Questions: i. Does the way the teachers and students interact in the classroom affect students' attitudes toward learning mathematics? ii. Do schools offer positive influences to encourage better mathematics teaching and learning?

### **Objective Of The Study**

To identify secondary school level student's relationship between retention tests and the gain score of experimental group and control group achievement in learning mathematics.

### **Hypotheses Of The Study**

H<sub>1</sub>: There is a significant relationship between retention test scores of experimental group student's achievement in mathematics.

H<sub>2</sub>: There is a significant relationship between the Gain score of experimental group student's achievement in mathematics.

H<sub>3</sub>: There is a significant relationship between the retention test scores of control group student's achievement in mathematics.

H<sub>4</sub>: There is a significant relationship between the Gain score of control group students' achievement in mathematics.

### **Methodology**

The quasi-experimental design (pre-test and post-test) was adopted. The research Contributors in this study (male/female) continued 70 secondary school students from two secondary schools in Salem, Tamil Nadu, India. The investigator created a questionnaire on Factors Affecting in Learning Mathematics (FALM), including five subscales: Mathematical Anxiety, Mathematical Interest, Parental Involvement, Homework Activities, and Teacher Involvement. FALM includes a 3-point Likert scale is score of yes-1 sometimes- 2 and No-3 with 50 items. The reliability value (Cronbach's alpha) of FALM was found as 0.872.

**Results**

H<sub>1</sub>: There is a significant relationship between retention test scores of experimental group student’s achievement in mathematics.

<b>Factor affecting in learning Mathematics</b>	<b>N</b>	<b>Correlation value</b>	<b>p value</b>
Mathematics Anxiety	70	0.236	0.018*
Mathematics Interest	70	0.260	0.024*
Parental Involvement	70	0.145	0.231
Homework Activities	70	0.111	0.362
Teacher Involvement	70	0.138	0.255

**Table-1 Significant correlation between the Retention Test Score of Experimental Group Students’ Achievements in Mathematics**

In the above table-1, the hypothesis is accepted at a 5% level of significance in the dimensions of mathematics anxiety and mathematics interest because the p-value is less than 0.05 level. It can be said that there is a significant positive correlation between the retention test score of experimental group students and their mathematical achievement in terms of Mathematical anxiety and mathematical interest. The hypothesis is not accepted at a 5% level of significance in the dimensions of parental involvement, homework activities, and teacher involvement because p values is greater than 0.05 level of significance. Thus, it can be said that no correlation between the retention test score of experimental group students' math achievement and the dimensions of parental involvement, at-homework activities, and teacher involvement exists.

H<sub>2</sub>: There is a significant relationship between the Gain score of experimental group student’s achievement in mathematics.

<b>Factor affecting in learning Mathematics</b>	<b>N</b>	<b>Correlation value</b>	<b>p value</b>
Mathematics Anxiety	70	-.235	0.012*
Mathematics Interest	70	-.266	0.026*
Parental Involvement	70	.292	0.014*
Homework Activities	70	.084	0.489
Teacher Involvement	70	.039	0.750

**Table-2 Significant correlation between the Gain Score of Experimental Group Student’ Achievement in Mathematics**

In the above table-2, the hypothesis is accepted at a 5% level of significance in the dimensions of mathematics anxiety, mathematics interest, and parental involvement because p values are less than 0.05. As a result, it can be said that there is a significant correlation between the retention test score of experimental group students and their achievement in the mathematics domains of mathematics anxiety, mathematics interest, and parental involvement. The hypothesis is not accepted at a 5% level of significance in the dimensions of homework activities and teacher involvement because p values score of greater than 0.05 level. Therefore, it can be said that no correlation between the retention test score of experimental group students' math achievement in the areas of at homework activities and teacher involvement exists.

H<sub>3</sub>: There is a significant relationship between the retention test scores of control group student’s achievement in mathematics.

<b>Factor affecting in learning Mathematics</b>	<b>N</b>	<b>Correlation value</b>	<b>p value</b>
Mathematics Anxiety	70	-0.032	0.792
Mathematics Interest	70	-0.092	0.448

Parental Involvement	70	0.085	0.486
Homework Activities	70	-0.041	0.737
Teacher Involvement	70	0.097	0.432

**Table-3 Significant correlation between the Retention Test Score of Control Group Student' Achievement in Mathematics**

From the above table-3 When a 5% level of significance test indicates that p values are greater than 0.05, the hypothesis is rejected. Therefore, it can be concluded that there is no correlation between the mathematics achievements of the students in the control group's retention test scores.

H<sub>4</sub>: There is a significant relationship between the Gain score of control group students' achievement in mathematics.

Factor affecting in learning Mathematics	N	Correlation value	p value
Mathematics Anxiety	70	0.068	0.577
Mathematics Interest	70	0.162	0.182
Parental Involvement	70	0.180	0.137
Homework Activities	70	0.039	0.747
Teacher Involvement	70	-0.013	0.913

**Table- 4 Significant correlation between the Gain Score of Control Group Student's Achievements in Mathematics**

From the above table-4 While a 5% level of significance test indicates that p values are greater than 0.05, the hypothesis is rejected. Therefore, it can be said that there is no correlation between the math achievement of the students in the control group and their gain score.

### Findings Of The Study

There is a statistically positive relationship exists between the retention test scores of experimental group students' achievement in mathematics in the dimensions of mathematics anxiety and interest. But, there is no significant relationship exists between the retention test score of experimental group students' achievement in mathematics in the dimensions of parental involvement, homework activities, and teacher involvement differs. There is a significant relationship exists between the retention test score of experimental group students' achievement in mathematics in the dimensions of mathematics anxiety, interest, and parental involvement differs. But, there no significant relationship exists between the retention test score of experimental group students' achievement in mathematics in the dimensions of homework activities and teacher involvement. There is no relationship between the mathematical ability of the students in the control group and their retention test scores. The mathematics ability of the students in the control group has no relation to their gain score.

### Discussion

Mathematics test scores are influenced by enthusiasm for the subject. Another important factor contributing to the pupils' poor performance is the parents' significant involvement in providing quality time for the students to learn at home as an outcome of their difficult economic situation. A teacher's perspective explanation of mathematics is negative. Mathematics students' frustration and anxiety were caused by parents and other people whose performance in mathematics is learned the subject. Children's desire to pursue other subjects is influenced by their parents' ignorance of and lack of interest in the subject. Thus, it is important to remove any obstacles that prevent people from learning mathematics and to make it enjoyable in our society (Acharya, 2017).

Instructional design is a difficult method that necessitates the consideration of all aspects of learning to effect the desired change (Colakoglu & Akdemir, 2008). One of the main issues facing educators and instructional designers is altering the quality of mathematics teaching and learning in a favorable direction. In mathematics instruction, they must search for new and different ways to students' changing demands and requirements. It may be helpful for instructional designers and teachers to identify the best instructional strategies to provide the most effective and efficient education by being mindful of the factors that may affect students' mathematical

achievement. Current research has identified numerous characteristics that can influence pupils' math proficiency (Saritas & Akdemir, 2009).

### Conclusion

The goal of the education was to provide a systematic investigation the variables influencing secondary school students' performance in mathematics and how it would affect their secondary school studies. Based on our research, it has been widely discovered that a variety of factors, including parental influences, teaching methods, classroom environment, and student and teacher attitudes, have an impact on students' mathematical ability. This study shows that to increase student enrolment in mathematics and improve student proficiency in the subject, these issues must be addressed as early in the students' careers as possible.

The main contributing reasons to lower mathematics achievement are ideas. Mathematics test scores are influenced by students' interest in and enthusiasm for the subject. Another important factor contributing to the pupils' poor performance is the parents' significant involvement in providing quality time for the students to learn at home. Parents and other people imparted prevention in students' achievement in mathematics is determined by the student's effort in learning mathematics. Thus, it is important to remove any obstacles that prevent people from learning mathematics and to make it enjoyable in our society. Underestimating students' needs and interests in relation to their knowledge and math abilities. The required instructional approaches were followed by the teacher. The utilization of the instructional resources in the classroom quality. For the educational system to improve, educators, students, and parents must work together. Being deficient in math was brought on by a lack of teaching resources and quality instructional materials. Learners in school must handle new policies to improve the teaching and learning process.

### References

- Acharya, B. R. (2017). Factors affecting difficulties in learning mathematics by mathematics learners. *International Journal of Elementary Education*, 6(2), 8-15.
- Belhu, H. S. (2017). Factors affecting learning Mathematics in the Case Assosa University Collage of Natural Science. *International Journal of Education, Culture and Society*, 2(1), 6-12.
- Carey, E., Hill, F., Devine, A., & Szűcs, D. (2017). The modified abbreviated math anxiety scale: A valid and reliable instrument for use with children. *Frontiers in psychology*, 8, 11.
- Eng, T. H., Li, V. L., & Julaihi, N. H. (2010). The relationships between students' underachievement in mathematics courses and influencing factors. *Procedia-Social and Behavioral Sciences*, 8, 134-141.
- Gradwohl, J. Eichler, A.(2018) Predictors of Performance in Engineering Mathematics; INDRUM Network; University of Agder: Kristiansand, Norway.
- Joyce, C., Hine, G., & Anderton, R. (2017). The association between secondary mathematics and first year university performance in health sciences. *Issues in Educational Research*, 27(4), 770-783.
- Malandrakis, G., Bara, E. Z., & Gkitsas, S. (2021). Perceived factors affecting student-teachers' learning about social urban sustainability. *Environmental Education Research*, 27(9), 1360-1382.
- Musengimana, J., Kampire, E., & Ntawiha, P. (2021). Factors Affecting Secondary Schools Students' Attitudes toward Learning Chemistry: A Review of Literature. *EURASIA Journal of Mathematics, Science and Technology Education*, 17(1).
- Nicholas, J., Poladian, L., Mack, J., & Wilson, R. (2015). Mathematics preparation for university: entry, pathways and impact on performance in first year science and mathematics subjects. *International Journal of Innovation in Science and Mathematics Education*, 23(1).
- Qureshi, M. A., Khaskheli, A., Qureshi, J. A., Raza, S. A., & Yousufi, S. Q. (2021). Factors affecting students' learning performance through collaborative learning and engagement. *Interactive Learning Environments*, 1-21.
- Saritas, T., & Akdemir, O. (2009). Identifying factors affecting the mathematics achievement of students for better instructional design. *International Journal of Instructional Technology and distance learning*, 6(12), 21-36.