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The Causes Of Students Failure In The Subject Of Mathematics At Secondary School Level in District Attock

Shareen Bibi

M.Phil. Scholar, University of Education Lahore Attock campus

shareenbibi2020@gmail.com

Dr. Muhammad Adnan Maqbool

Assistant Professor (Education), University of Education Lahore Attock campus,
adnan.maqbool@ue.edu.pk

Abstract

The present study was carried out A study to investigate the causes of students failure in the subject of mathematic at secondary school level in district Attock. A sample of 256 (112 teachers and 144 students) teachers students were selected randomly for the study. The result relevant the fact that students attitude, teacher attitude and commitment, teaching resources, method of teaching and assessment were to a great extent valid factor that influence students poor performance in Mathematics at secondary level . Beside this, the teacher did not pay individual attention to the students. Students did not satisfy with the methodology of their teacher. The course of mathematics is too lengthy. Intermediate classes were overcrowded. These findings suggest that the teacher may give individual attention to the students. AV aids may be used to make the lesson effective. Activities may be included in the curriculum. Researcher training courses may be arranged for the teachers.

Keywords: *Education, Mathematics, Concept of Mathematics, Arithmetic of Creativity*

Introduction

Since mathematics is involved in so many things in our daily lives, both directly and indirectly, it is incredibly important. Having a solid grasp of maths is necessary to secure a successful job. To assure a continuous supply of highly qualified workers to meet the demands of

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industry, research, and technology, high math proficiency is required. A solid foundation in mathematics is essential since many university courses at the tertiary level of study demand it.

A local secondary school results over years revealed an alarming failure rate in the discipline. The poor passing rate in specific mathematics courses is indicated by the students' performance. This goes against the prerequisite for admission to mathematics degree programmes, which calls for extremely high math proficiency. According to the experts, there hasn't been any university research on the high failure rate in mathematics.

Given this situation, further research into the contributing causes to this issue is necessary. The goals of this study are to examine the study habits of the students enrolled in this course and identify the causes of mathematics subject failures. This study focuses on a subset of local school mathematics students.

Education is the process or act of gaining broad information, refining one's ability to think and make decisions, and generally preparing oneself and others intellectually for adulthood. the act of teaching or learning specific knowledge or abilities, as in the case of a vocation.

Meaning and concepts of Mathematics

Concepts are ideas that are abstract. Therefore, a "math concept" is a generalized mathematical idea. Math concepts include counting, multiplication, and addition.

Mathematics, the science of structure, order, and relation, sprang from the fundamental tasks of counting, measuring, and describing object shapes. Its development has involved a growing degree of subject matter idealization and abstraction; it works with quantitative computation and logical reasoning. Since the 17th century, mathematics has been an essential component of technology and the physical sciences. More recently, it has begun to play a comparable role in the quantitative parts of the life sciences.

Many societies have developed much beyond simple counting in mathematics because of the demands of practical activities like trade and agriculture. The most developed regions of society are those that are sufficiently complex to facilitate these kinds of activity, provide opportunities for introspection, and enable mathematicians to build upon the findings of their forebears.

Every mathematical system, including Euclidean geometry, is made up of sets of axioms and theorems that may be deduced logically from the axioms. Elucidating the logical and philosophical underpinnings of mathematics begins with asking if the axioms of a given system

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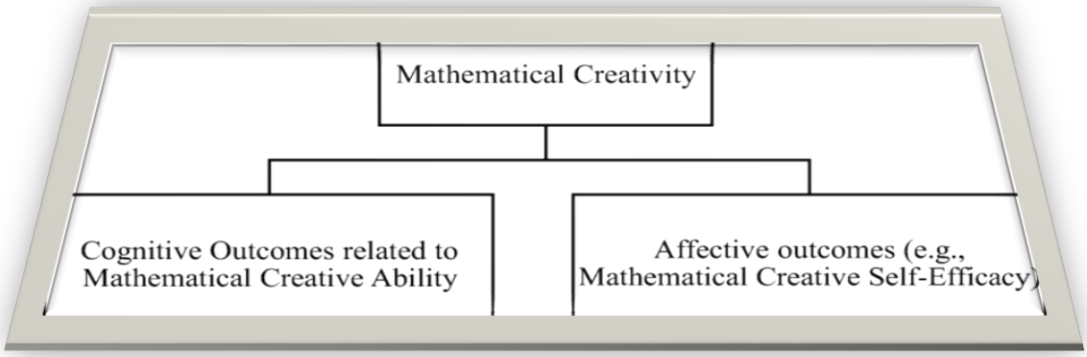
ensure its consistency and completeness. For a thorough explanation of this subject, see Mathematics, Foundations of.

The Arithmetic of Creativity

A lot of people think that creativity is illusive and hard to quantify. However, there is growing evidence that the foundation of artistic expression is mathematics. This idea has long been the subject of experimentation by mathematicians and artists. Let's examine a few research that have shed light on the relationship between math and creativity.

One of the core concepts of the Math of Creativity is Pattern Recognition. Both mathematics and art are built on patterns, and the capacity to identify and work with patterns is at the core of creativity.



Mathematician George Polya once said, "Discovery consists of seeing what everybody has seen and thinking what nobody has thought."

In other words, creativity is the capacity to spot patterns that others have overlooked and utilise them in fresh and creative ways.

This concept is illustrated by the artistic creations of all time. For example, Leonardo da Vinci was well known for his ability to identify patterns in the natural world and use them into his designs. The Mona Lisa, for instance, is made up of a complex network of interlocking designs that employ the golden ratio and other mathematical ideas.

Additionally, artists can now artistically and inventively combine mathematical concepts into their works thanks to technology. For example, 3D printing has allowed artists to create intricate, mathematically based patterns that would be hard to make by hand. Computer

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programmers can also create fractal patterns and other mathematical designs, which can serve as a springboard for creative inspiration.

The goals of teaching mathematics to kids are to:

- Acknowledge that mathematics is all around them;
- Acknowledge that mathematics is beautiful and powerful;
- Develop an affinity for mathematics and the ability to solve problems patiently and persistently.
- Develop a mathematical curiosity and the capacity to solve issues using both logical and inductive reasoning.
- Acquire a critical understanding of how mathematics uses facts and communication devices.
- Acquire the capacity to think critically and logically, as well as to reflect critically on one's own and other people's work.

Communication in Mathematics

Mathematics has a powerful and universal language. Students are expected to use appropriate mathematical language while communicating mathematical concepts, reasoning, and discoveries both orally and in writing.

At the end of the semester, students should be able to:

- ✓ Use different forms of mathematical representation (formulae, diagrams, tables, charts, graphs, and models); Switch between different forms of representation;
- ✓ Use appropriate mathematical syntax (notation, symbols, and terminology) in both written and oral explanations.
- ✓ To impart the fundamental mathematical skills and knowledge needed for future career.
- ✓ In order to meet the demands of (i) daily life; (ii) future mathematical work; and (iii) work in related fields of study, the student will be equipped with the tools needed to build a mathematical mindset and skill set.
- ✓ To give the students the capacity to approximation correctly.
- ✓ To assist the learner in reading, understanding, and interpreting charts, diagrams, and tables; to help them realize the concept of scale and ratio drawing.
- ✓ To provide the individual with the capacity to apply mathematics to a range of practical problems.

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Literature review

Numerous academic works have examined the underlying reasons of high student failure rates in mathematics. Naidoo and Naidoo (2007) established a learning environment that encouraged both traditional and participatory learning using a computer lab. It has been noted that a few of the causes include inadequate class time, a big class size, incorrect method manipulation in problem solution, and a lack of mathematical comprehension. According to Tachie and Chireshe (2013), the high failure rate can be attributed to a number of factors, including a lack of teaching resources, ineffective teachers, and a lack of effort on the part of the students to study mathematics.

Both students and instructors need to grasp the fundamentals of mathematics education in order to address this issue. If not, there will be many mistakes and misunderstandings when learning mathematics (Makonye, 2013). According to a 2013 study by Eng, Li, and Julaihi, students heavily rely on lecture notes as the foundation for their education. While the students demonstrated above-average participation in small groups and the classroom, other aspects of the educational method, such as the use of concrete materials for mathematical investigation and laboratory participation, fell short of expectations.

In an effort to ascertain the causes of low accomplishment in mathematics, a number of researchers (Attwood, 2001; Brodie, 2004; Maree, 1997; Moyana, 1996; Murray, 1997; Malcolm et al., 2000) have claimed that a variety of factors effect secondary school mathematics performance. Some of these variables include the students' abilities, attitudes, and opinions; family and economic circumstances; parent and peer guidance; school-related factors like subpar educational settings and learning cultures; past instances of racial discrimination; and low expectations from principals and teachers.

According to Beggs (1995: 97–106), a mathematics curriculum should address the following topics: mathematical thinking, problem-solving, making connections, and using mathematical tools; mathematical procedures (the work of mathematicians); the settings in which the subjects are selected; assessment methodologies; and appropriate instructional techniques (DoE, 2002).

Hughes (1999) cites the following as the most important conclusions from qualitative studies on the factors related to student achievement in schools: (a) teachers are vital materials; (b) student body type matters; (c) schools matter; and (d) physical amenities, class size, curriculum, instructional strategies, and other resources have an indirect impact on students' learning through their influence on teacher and student behavior.

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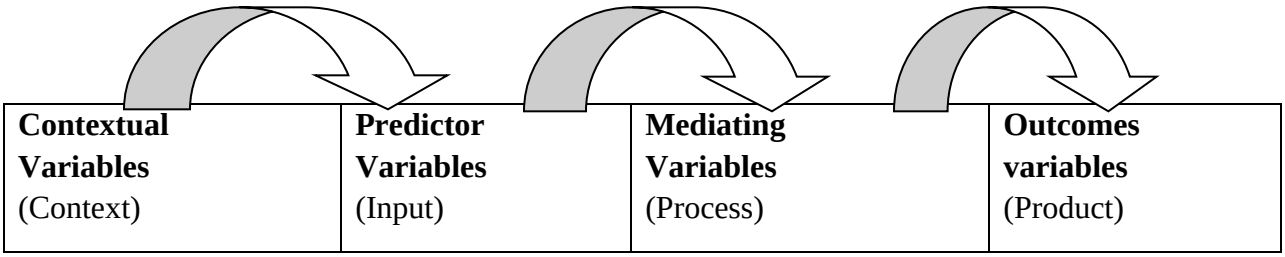
Conceptual Framework

The factors that have an impact on mathematics education were examined in the conceptual framework that follows. A conceptual framework, in the words of Sitko (2013), is a set of concepts, anticipation, expectations, credence, and theories that present as the foundation and informational source for a research project.

How well children perform mathematically depends on the teaching and learning strategy used as well as the cultural backgrounds of the students. Different forms of homework, teacher-centered learning, and student-centered learning are all part of multiple unique teaching strategies. A few of the teaching methods accessible are group problem-solving exercises and individual assignments from the teacher or from textbooks. The way students interact with their teachers may have an impact on how well they succeed in mathematics (Sitko, 2013). However, the classroom environment affects how well students pay attention in class.



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❖ Learning environment ❖ Teacher students interaction ❖ Teaching strategies ❖ Teaching and learning tools ❖ Applicability of textbooks ❖ Curriculum Content are only a few	➢ The power dynamic between the teacher and the students ➢ Students' learning Interest ➢ Teaching prowess ➢ Students' attitudes ➢ Teacher training ➢ Syllabus in use ➢ Teaching Interest ➢ Class size ➢ Learning	❖ Characteristics of teachers ❖ Characteristics of Student's ❖ Skills of learning ❖ subject fear ❖ Teaching styles ❖ Dependence of students ❖ Time table ❖ Teachers personality ❖ Professed the significance of the subject	➢ In Mathematics Student's performance s ➢ Quality of teaching practice ➢ Learners' cleverness in problems ➢ capacity to solve questions accurately ➢ Math subjects interest

Figure 2.1: Conceptual Framework

Selection of Goals of Mathematics

According to Brown et al. (2008), a lot of kids don't think that learning maths would help them in school or achieve their future academic and professional goals. It is seen as an academic discipline that exists in a vacuum with no connections to other academic fields or the outside world, according to Nardi and Steward (2003). Many people, including children, hold the widespread notion that maths is useless for those who excel in it and like it (Matthews and Pepper, 2006; Nardi and Steward, 2003).

Students need to comprehend the significance of their schooling in order to be motivated both internally (a sense of utility in one's life or one's future job and/or occupation) and externally (a perception of utility in one's future employment) (Mujtaba et al., 2014; Mujtaba et al., 2018).

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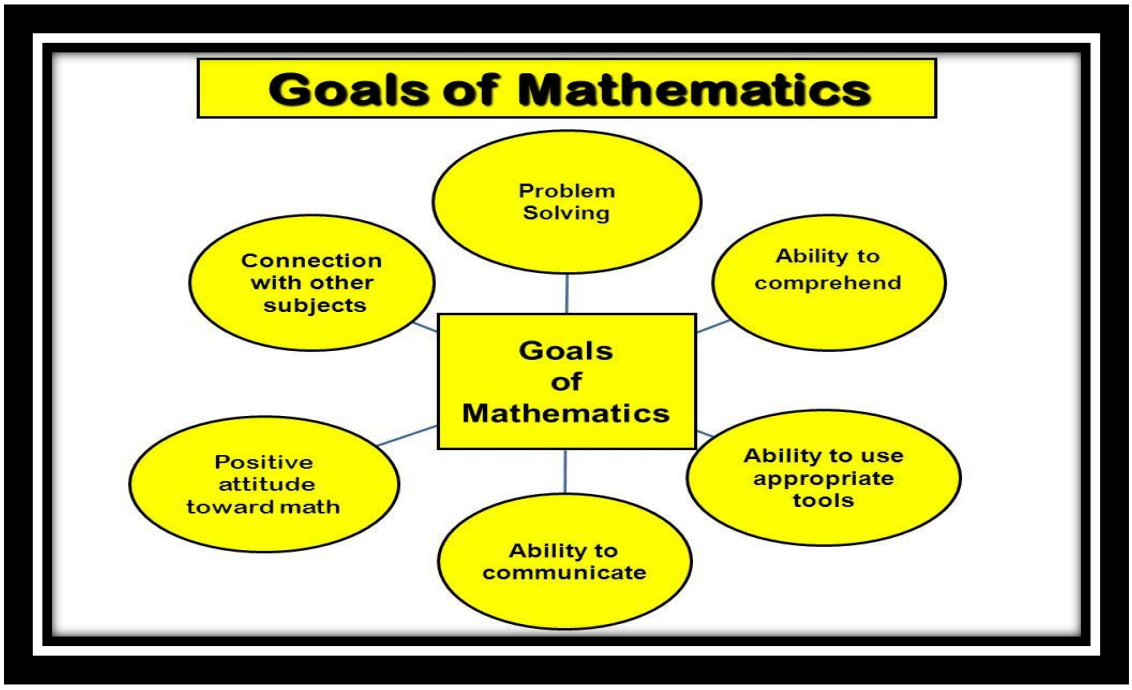

Attitudes Of Students Towards Mathematics

The notion that a student's attitude regarding a subject influences how well they perform in it is widely accepted. Bekee (1987) discovered that students' positive attitudes contributed to their successful academic achievement in mathematics and related fields. When they frequently get bad grades in Mathematics, students lose hope and enthusiasm for the subject. Students who perform well in Math, on the other hand, have favorable perceptions of the topic and are inspired to pursue professions in it. Bekee contends that by using effective teaching methods, a student's attitude can greatly enhance performance on the subject. As a result, by offering encouragement, a teacher can help a student do better in the subject.

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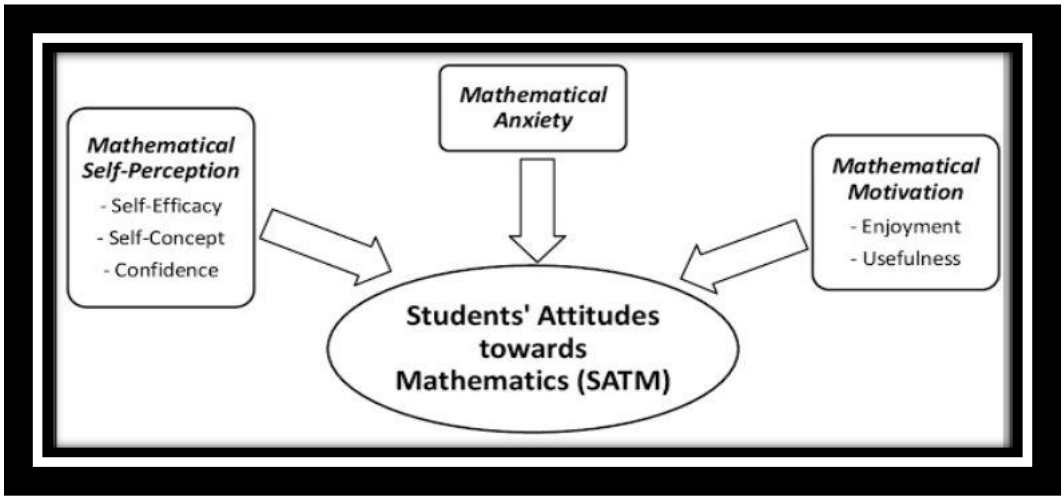

Students' attitudes, according to Newbill (2005), are psychological, emotional, cognitive, and behavioral constructions that serve a number of purposes for learners, including serving as representations of their values and as examples of those values, as well as serving utilitarian and protective purposes. Newbill contends that in order to change students' views, the previous attitude must be eradicated. Teachers should therefore place a high priority on instructional strategies that foster interesting learning environments and have an impact on students' attitudes. In social psychology, attitudes are important affective sources of motivation.

Where do negative math attitudes come from?

People's negative attitudes towards math may be caused by a variety of circumstances, including the belief that math is something that only "clever people" do. The notion is that math is a "boring" subject. Math tasks that are complex and challenging are able to overcome a general lack of trust in one's capacity to learn. A lack of understanding of how math works in the "real world".

Attitude and achievement – a bidirectional relationship

Understanding the relationship between student attitudes and maths achievement is essential if we hope to improve both. It could appear at first that there is a direct correlation between a student's attitude towards maths and their ability to learn, degree of effort, and performance.

Guney Haciomeroglu of Canakkale Onsekiz Mart University asserts that motivation and academic results linked to achievement are significantly influenced by anxiety and attitude towards mathematics.

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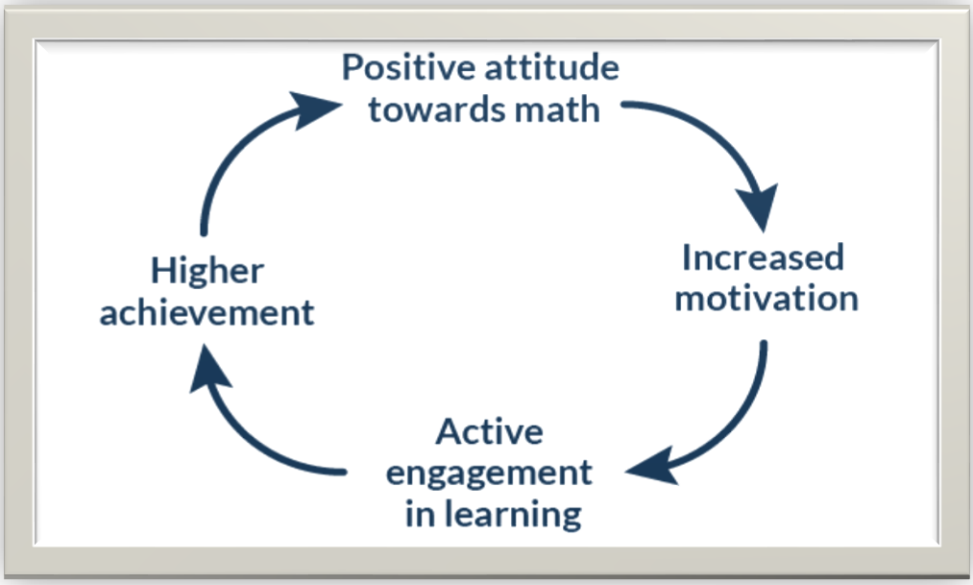
This concept could be developed further. A study found that attitudes and success have both positive and negative relationships. This implies that relationships can form through one of two distinct methods:

A student who has a positive attitude towards arithmetic feels more confident when learning it, values it, is motivated to put in more effort, actively engages in math lessons, practices more, and completes more.

A student who excels in maths has a good outlook on the topic, is more confident, and understands the importance of maths.

According to one study, there is a larger correlation between performance and attitude, suggesting that a student's grade level and real performance have a significant influence on their attitude towards maths.

Success and attitudes can often become entangled in a vicious cycle due to this reciprocal relationship. If you want to raise performance and/or attitudes, you have to break this cycle and begin a new, positive one!



When Kupari and Nissinen (2013), Yang (2013), and Tshabalala Ncube (2016) show that low Math achievement is a result of various variables relating to children, instructors, and schools, they are demonstrating traits that can hinder their mathematical abilities. Several research (Mohamed & Waheed, 2011; Mata, Monteiro, & Peixoto, 2012; Ngussa & Mbuti, 201)

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have found a strong correlation between a student's mental health and their arithmetic performance.

A person's "attitude" is defined by Sarmah and Puri (2014) as their conditioned propensity to respond favourably or unfavourably to an item, circumstance, concept, or other person. Syyeda (2016) points out that viewpoints can shift over time, and that once a constructive perspective has been established, it can improve student performance in the classroom (Akinsola & Olowojaiye, 2008; Mutai, 2011). A poor substitute.

Factors Affecting Performance in Mathematics

Fear

Mathematics is misperceived by students as being challenging. With this idea, they fail because they do not make an effort to comprehend the issue. Anxiety manifests from situations like past failures, discouragement from a parent who fared poorly, tough teachers, or comparison to the best kids. All of these make the student quit and lose hope.

Class, Teacher, Peer, and Parental Experiences

A student's motivation may be affected, and their worry may rise. In rare instances, a student may have endured humiliation or punishment in front of peers for not receiving a response or recognizing a notion. In other situations, it's possible that the kids didn't respond well to a particular teaching method or setting for learning. Despite being in a new scenario, the student keeps expecting that he won't be able to learn the content.

Learning Environment

While earlier experience can occasionally be a psychological element that interferes with pupils' attempts to learn mathematics, the current situation also may be to blame. A student might be associating arithmetic with cruel teachers or bullies at school. She might also be retaliating in response to pressure from her parents, unfavorable experiences shared by her peers, or even just plain old exhaustion. Kids may occasionally be too worn out from after-school events to focus on their schoolwork.

Standardized Test Pressure

Moving on to the following grade, receiving graduation, or getting into college all depend on passing a standardized test. It makes sense that math students would feel anxious in such a situation tests pressure. They concentrate their efforts on worrying about the test because they

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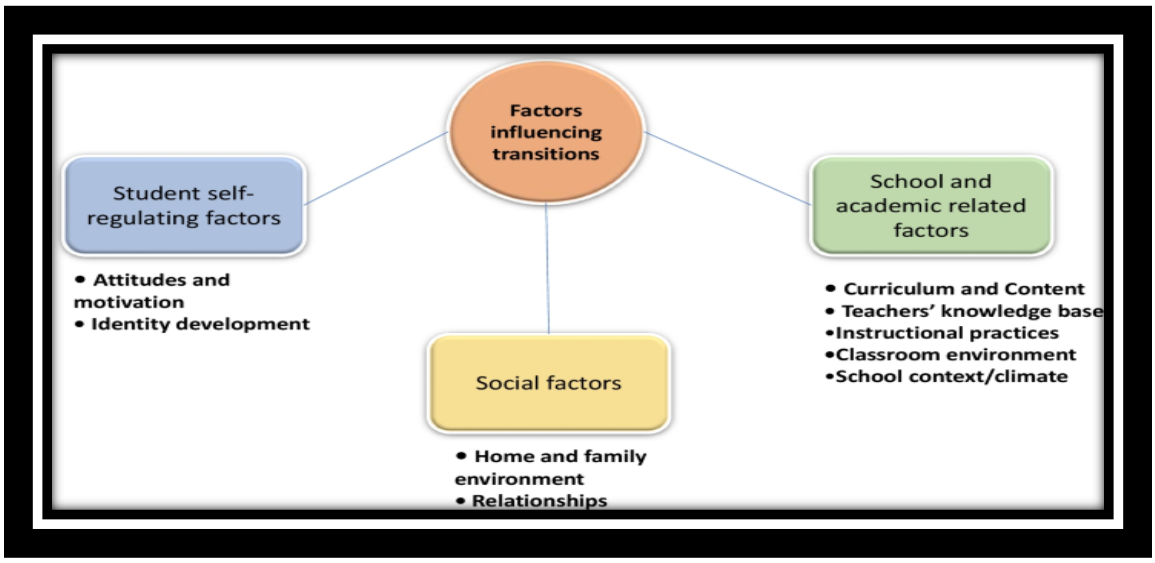
realize how important it is to pass, which causes them to become too anxious to study the actual math skills required for it.



Math Anxiety

A severe but all-too-common example of what could occur when one has a bad attitude towards arithmetic is math anxiety. Physical symptoms that go along with these unpleasant emotions might make a person feel less secure and valuable.

According to Educational Studies in Mathematics, math anxiety is a state of stress and worry that impairs a student's capacity to solve mathematical puzzles.

When someone has math anxiety, they frequently believe that they will fail at the subject and

- Have very low self-esteem.
- I'm just not good at numbers.
- Why bother trying if I'll never be excellent at it?

These negative feelings are accompanied by physical symptoms that may diminish a person's sense of comfort and worth.

- ❖ Sweating excessively
- ❖ Trembling with a fast heartbeat
- ❖ Abdominal pain
- ❖ Fast breathing
- ❖ Tough to think clearly

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Even if a student can answer math issues, anxiety can still have a detrimental impact on their interest in the subject and motivation to learn more. This manifests itself in poorer performance on math homework and exams, which can start a vicious cycle of arithmetic worry.

Teachers

Since teachers are the students' main point of contact while they are learning, they must take part in the process. A lousy attitude, ineffective teaching techniques of a teacher, and poor performance are the results of teachers not interacting with the students.

Education System

Examinations in mathematics are timed scenarios. The possibility of failure and negative public perception make kids anxious. But these are the conventional mathematical teaching practices, enforced authority, a time limit, and public exposure. Different teaching strategies benefit different students, and arithmetic performance increases when students participate in discussions and activities instead of the traditional passive teaching strategies (the teacher speaks, and the students listen).

Significance of the study

This study aims to serve as a reference for future researchers investigating the connections between learning environments, teacher conduct, student aptitude, and how these relationships impact math achievement.

By doing this study, the researcher truly aims to inspire maths teachers to encourage their students' academic performance in mathematics. Before starting actual classroom instruction, teachers will assess whether or not their students grasp the basic concepts of a particular arithmetic unit based on the classroom environment. Teachers can then improve their students' mathematical performance.

The study will also help future researchers draw conclusions about how kids' educational environments relate to each other and how that relationship affects students' mathematical skills.

Analysis and interpretation of data

Discussion

The study's goal was to evaluate the reasons behind students' mathematical failures. The study's primary goals were to: first identify the causes of students' mathematical failures. The

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second is to look into issues surrounding maths instruction. The following research questions were developed for the current investigation. First of all, why are kids failing their maths classes? Second, what issues surround the instruction of mathematics? The following was the response to the research questions.

The past negative assessment of students' attitudes towards mathematics, their fear of it, their inadequate teachers' qualifications, and their inadequate instructional resources were some of the causes of their poor performance in mathematics. By developing a positive outlook, being driven, getting the right coaching, and having access to the right resources, students can do better in math. The study's conclusions show that pupils have a positive perception of mathematics. The research disproved Iheanachor's results (2007).

Teachers

Table 4.2.1

Overall Responses of Teachers regarding Causes of Students' Failure in the Subject of Mathematics

Statement	Gender	N	M	SD	DF	t-value	Sig
Intrest	Girls	56	1.45	.35	110	-.423	.673
	Boys	56	1.48	.27			
Study	Girls	56	1.39	.36	110	-.189	.851
Habits	Boys	56	1.40	.34			
Personality	Girls	56	1.19	.29	110	-.607	.545
Trait	Boys	56	1.23	.27			
Teaching	Girls	56	1.31	.53	110	1.243	.216
Skill	Boys	56	1.21	.30			
Instructional	Girls	56	1.46	.37	110	-1.390	.167
Material	Boys	56	1.63	.78			

Table 4.2.1 Shows that there was no discernible difference between the opinions of male and female teachers regarding personality traits, study habits, teaching abilities, and instructional materials. This indicates that motivation, study habits, personality traits, teaching skills, and instructional materials are not significantly different in this context between male and female teachers, while male teachers perceive these factors to be more crucial in mathematics failure.

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Students

Table 4.2.2

Overall Responses of students regarding Causes of Students' Failure in the Subject of Mathematics

Statement	Gender	N	M	SD	DF	t-value	Sig
Intrest	Girls	72	1.29	.38	142	.247	.805
	Boys	72	1.28	.38			
Study	Girls	72	1.28	.39	142	-1.61	.108
Habits	Boys	72	1.38	.37			
Personality	Girls	72	1.24	.25	142	-2.24	.026
Trait	Boys	72	1.36	.36			
Teaching	Girls	72	1.14	.26	142	-3.12	.002
Skill	Boys	72	1.31	.38			
Instructional	Girls	72	1.42	.31	142	-1.52	.131
Material	Boys	72	1.48	.15			

Table 4.2.2 Shows that there was a significant difference between the perceptions of personality traits and teaching skills held by boys and girls. This indicates that, in this particular scenario, there are noteworthy distinctions between Personality Trait and Teaching Skill, with girls considering the former as having a greater influence on mathematics failure.

Although there was no discernible difference in interest, study habits, or instructional material.

Conclusion

Based on the data, the following results were drawn:

The study's findings are consistent with the hypothesis that a variety of factors, including students' attitudes, instructors' attitudes and dedication, instructional strategies, teaching resources, and assessment techniques, had a substantial impact on the way they performed in mathematics at the secondary school level.

The instructor did not give each pupil their undivided attention. Students expressed dissatisfaction with their teacher's methods. Teachers of mathematics exhibit extremely

severe behavior. The math course is far too long. Classes for intermediate students were packed. In class, students don't cooperate with one another or aid one another. There is a lack of excellent rapport between teachers and pupils, and there are no training programmers set up for the teachers. The effectiveness of the lesson is not enhanced by the use of instructional materials. Students experience anxiety due to the possibility of not passing the maths exam. The curriculum might not include certain activities.

Teachers came to the conclusion that factors like interest, study habits, and personality traits are all agreed upon as reasons why pupils fail math classes. However, teachers had different opinions on the instructional materials and methods. Although there were differences in the perspectives of the professors and the students.

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