

## Exploring the Influential Factors on Students' Mathematical Interest in Schools

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### ABSTRACT

This research study aimed to identify and examine the factors that influence the level of interest among high school students in mathematics education. The study explored various factors, including student characteristics, teacher attributes, government involvement, infrastructure challenges, instructional strategies, class size, and concerns related to mathematics. A central high school in Khost was selected as the research site. A random sampling technique was employed to select participants from each class, ensuring representation based on age and gender. The findings revealed that seven factors significantly predicted high school students' interest in mathematics education. Specifically, the teacher factor, student factor, instructional strategy, math concern, and infrastructure problem positively correlated with the level of interest. At the same time, the class size and government involvement exhibited a negative association. These findings highlight the significance of these factors in shaping students' engagement with mathematics. Based on the results, it is recommended that the government implement regular professional development programs for mathematics teachers to enhance their instructional strategies, enabling them to nurture students' interest in mathematics education effectively.

**Keywords-** Mathematics, Interest, School, Khost, Afghanistan.

### I. INTRODUCTION

The study of mathematics and its importance in education has long been debated and questioned. Students often need more enthusiasm towards mathematics, perceiving it as challenging and uninteresting. This raises the question of why mathematics is a fundamental part of the curriculum, particularly in an era where advanced technology has simplified complex calculations. Understanding the reasons behind the study of mathematics is crucial for educators and policymakers to address students' disinterest effectively. Mathematics education serves a broader purpose beyond the subject itself. It aligns with the overarching goal of education, which is to cultivate critical thinking and reasoning skills. Mathematics and other academic disciplines, such as chemistry, physics, and literature, serve as tools for discovering and comprehending the truth. Its inherent reliance on logic

makes it a cornerstone of effective communication and problem-solving. In a world characterized by intricate social interactions, the ability to navigate and comprehend various mathematical concepts facilitates effective communication within society. Moreover, the study of mathematics plays a vital role in cognitive development. Just as physical exercise is necessary for the body, the brain requires stimulation and exercise to maintain optimal functioning. Mathematics provides this mental exercise, enhancing the mind's logical reasoning and analytical thinking capacity. As an essential component of human progress, mathematics is indispensable for the advancement of societies and the development of the world. Its principles and applications form the foundation for various scientific disciplines, making it a prerequisite for learning other sciences.

In Afghanistan's educational landscape, mathematics is central to the curriculum, with extensive teaching hours allocated throughout high school.

However, despite its significance, many students need help with mathematics during their university studies or entrance examinations. Several factors contribute to this phenomenon, including teacher competence, instructional methods, and other yet-to-be-explored elements.

Considering the importance of mathematics education, it has garnered attention at the national level in various countries. It is recognized as a critical factor in national development and has become a focus of educational agendas. For instance, in the United States, the goal of K-12 education is to nurture mathematical reasoning (National Research Council, 2001). In other countries, mathematics proficiency is deemed an essential employment skill (Katherine-Geller, Chard, Fain, 2008). The performance of schools, the quality of teachers, and the effectiveness of their teaching methodologies have become national priorities for ensuring the quality of student outcomes. Assessing educational achievements through standardized high-stakes testing has highlighted areas of concern, prompting educational and governmental institutions to address deficiencies (Cave & Brown, 2010). Consequently, understanding how students learn and the factors influencing their achievements have become a significant endeavour.

Considering the challenges and the need to enhance students' mathematical interest and proficiency, this research aims to identify and examine the factors influencing high school students' interest in mathematics education. By exploring variables such as teacher factors, student factors, instructional strategies, math concerns, infrastructure problems, class size, and government factors, this study provides insights that can inform effective interventions and strategies to foster students' engagement with mathematics.

## II. STATEMENT OF THE PROBLEM

Mathematics, a fundamental discipline applicable across various domains, shapes individuals' academic and professional trajectories. Despite its significance, many students encounter difficulties learning mathematics, which can hinder their educational and career prospects. Several factors, including teacher competence, class size, curriculum design, and others, have been implicated as potential influences on students' mathematical learning outcomes. However, a comprehensive understanding of these factors and their intricate relationships still need to be discovered.

Therefore, this study aims to investigate and analyze the multifaceted factors that directly and indirectly impact students' mathematics learning experiences. By exploring the role of variables such as teacher ability, class size, curriculum effectiveness, and other potential factors, we aim to shed light on students' underlying challenges in grasping mathematical concepts. Through this research, we seek to provide

valuable insights into the complex interplay of these factors and their implications for mathematics education.

By addressing the gaps in knowledge and understanding surrounding the factors influencing students' mathematics learning, this study endeavours to contribute to the development of evidence-based strategies and interventions that can enhance students' mathematical proficiency. Ultimately, the findings of this research will aid educators, policymakers, and stakeholders in making informed decisions and implementing effective measures to improve mathematics education and empower students to excel in this critical subject.

## III. OBJECTIVES

1. To predict individual students' interests in learning mathematics.
2. To find out the factors affecting student's interest in learning mathematics
3. To find out the proper recommendations for the state regarding this study.

## IV. METHODOLOGY

This study aimed to investigate the issue of students' disinterest in mathematics during their school years. A comprehensive research methodology was employed to address this research objective, ensuring rigorous data collection and analysis.

The research was carried out in the central region of Khost, which was strategically selected due to its proximity and accessibility. The target of the study was Shaheed Matiullah High School, which provided a representative sample of students experiencing the issue of disinterest in mathematics. From each class in high school, two participants were selected through a random sampling technique.

A structured interview approach was utilized as the primary method of data collection. The researchers designed a set of predetermined questions and variables relevant to the research objective. Each interview participant was incentivized with a pen and notebook, fostering their participation and engagement in the interview process. To ensure effective communication, the interviews were conducted in the Pashto language, considering the language preferences of the participants.

Careful consideration was given to the timing of the interviews to minimize disruptions to the student's academic schedule. The interviews were conducted during leisure time between class hours, ensuring students' valuable classroom time was not compromised. Prior permission was obtained from the school administration, and participants were assured of the confidentiality of their identities and responses.

By adhering to ethical guidelines and employing a systematic data collection approach, this research methodology aimed to gather reliable and

representative data regarding students' disinterest in mathematics. The collected data will be subjected to rigorous analysis, enabling the researchers to gain

meaningful insights into the factors contributing to this issue and to formulate evidence-based recommendations for addressing it effectively.

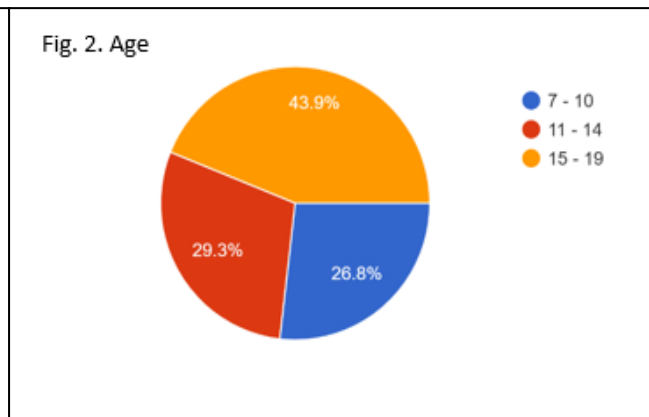
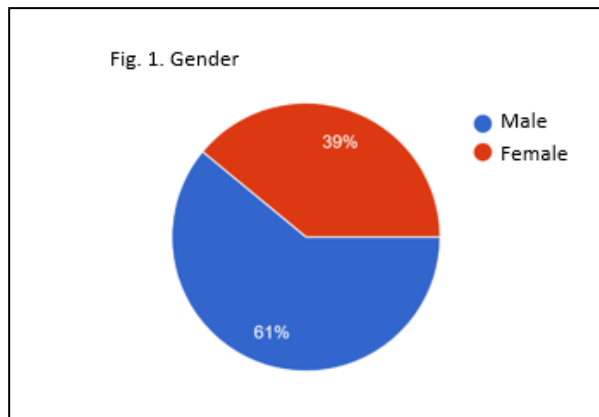
**Table 1: List of some variables with an explanation.**

Variable	Description
Teacher Factors	The abilities, qualities, and instructional approaches of teachers influencing students' mathematical interest
Student Factors	Individual characteristics, attitudes, and prior experiences of students affecting their interest in mathematics
Instructional Strategies	Teaching Methods and approaches employed by Teachers in mathematics education
Math Concerns	Students' worries, anxieties, or perceptions about mathematics as a subject
Infrastructure Problems	Challenges or limitations related to the learning environment, resources, and facilities in mathematics education
Class Size	The number of students in a classroom influences students' engagement and interaction.
Government Factors	The influence of government policies, support, and initiatives on students' interest in mathematics education

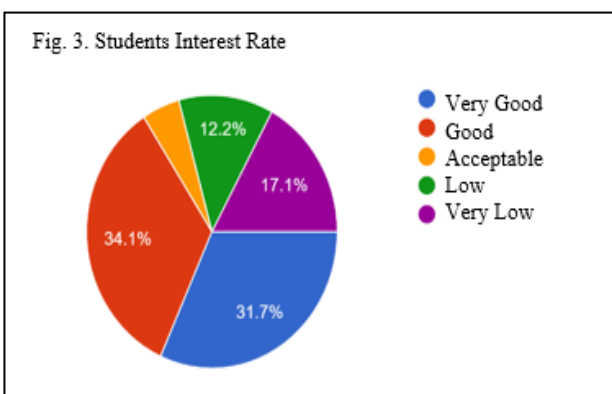
## V. FINDINGS AND DISCUSSION

In the description of this article, as I mentioned in the methodology. This research has been conducted in one of the public schools in Khost city. In this study, 41

were selected randomly among all the students in the school, considering their age, class grade, and gender. As a result, 61 males and 39 females participated in the research. The description of age and gender are provided in Fig 1 and Fig 2, respectively.



One of the factors was considered in the study student's interest. Most of the students were good, and 17.1% demonstrated a low mathematics interest rate. Other scales are presented in Fig. 3.

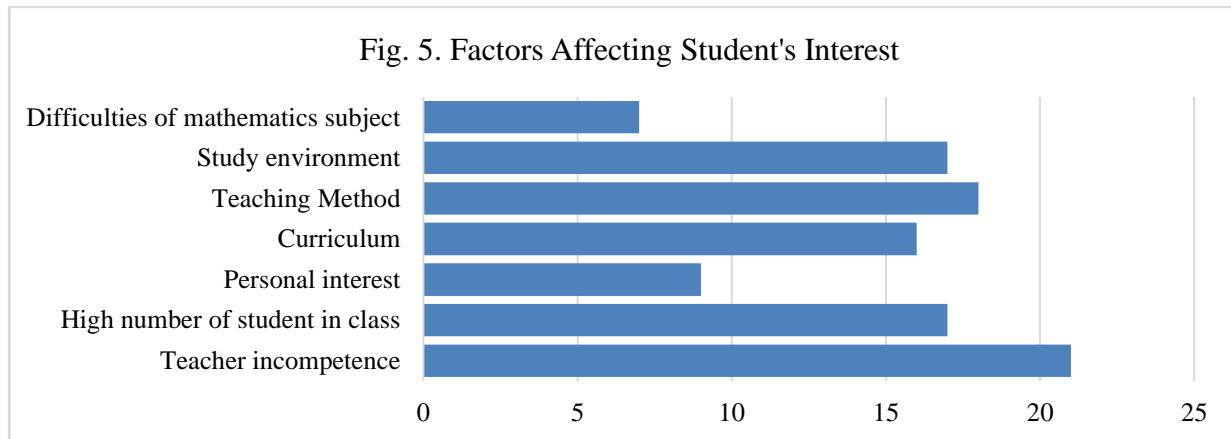


### Teachers' Impact on Students' Learning

The teacher factor is the most suggested factor that affects students' learning. Evidence gathered suggests that it moderates the effects of other risk factors such as parental educational attainment levels, student gender, and socio-cultural and socio-economic backgrounds (Darling-Hammond, 2000; Panta, Belsky, Bender Griffith, Hotes), And Morrison, 2008; Roe, 2003) as cited by (Cave & Brown, 2010). Teachers are responsible for the types of learning and experiences students need daily to set learning goals and develop a full personality. Teachers' professional development in content-focused instruction profoundly affects student achievement. The Blank and de las Alas (2009) study provided scientific evidence for this positive effect. Teacher students who participated in faculty development programs scored higher than those who did not. A study by Hill, Rowan, and Ball (2005) concluded

that a teacher's knowledge of mathematics is strongly correlated with student achievement. Quimbo (2003) states that teachers who are always absent or do not teach have the lowest scores on the math achievement test. Thus, mathematical achievements can be enhanced by improving the teacher's mathematical knowledge,

commitment to the profession, and always engaging in professional development (Anigbo, L. C., & Idigo, E. 2015). Other factors, such as study environment, curriculum, and personal interest, are represented in Fig 5.



## VI. DISCUSSION

The learning process is influenced by various factors, including the learning environment, both within and outside of school. Students' intellectual engagement and motivation can be influenced by external stimuli, such as the support and encouragement they receive from their peers or the competitive atmosphere within a peer group. It is important to recognize that the learning process is a complex and dynamic phenomenon, and there can be variations in how students respond to different factors (Suan, J. S., 2014).

### Hypothesis

**Null Hypothesis (H0):** There is no significant relationship between teacher factors, student factors, instructional strategies, math concerns, infrastructure problems, class size, government factors, and students' mathematical interest in schools.

Based on the research study's findings, the null hypothesis can be confidently rejected. The results indicate a significant relationship between the examined factors and high school student's interest in mathematics education.

**Alternative Hypothesis (H1):** There is a significant positive relationship between teacher factors, student factors, instructional strategies, math concerns, infrastructure problems, and students' mathematical interest in schools.

The study provides strong support for the alternative hypothesis. It reveals that teacher factors, such as the abilities and qualities of the educators, positively correlate with students' mathematical interests. Additionally, student factors, teacher instructional strategies, math concerns, and infrastructure problems are all positively associated with students' interest in mathematics.

**Alternative Hypothesis (H2):** A significant negative relationship exists between class size, government factors, and students' mathematical interest in schools.

The research findings align with the alternative hypothesis, indicating a significant negative relationship between class size, government factors, and student's interest in mathematics education. The study suggests that larger class sizes and increased government involvement harm students' mathematical interests.

In summary, the research study's results support both alternative hypotheses (H1 and H2). The findings demonstrate a significant positive relationship between teacher factors, student factors, instructional strategies, math concerns, and infrastructure problems, indicating their influential role in shaping students' engagement with mathematics. Moreover, the study highlights a significant negative relationship between class size, government factors, and students' mathematical interest, emphasizing the need to address these factors to foster a more conducive learning environment for mathematics education.

## VII. CONCLUSION

In conclusion, this research study provides valuable insights into the factors influencing high school students' interest in mathematics education. The findings highlight the significant role played by various variables, including teachers, students, math concerns, class size, government involvement, instructional strategies teachers employed, and infrastructure availability. It was observed that variables such as the teacher factor, student factor, instructional strategy, math concern, and infrastructure problem exhibited positive relationships with students' interest in mathematics. On the other hand, variables such as class size and government

involvement displayed a negative relationship with students' interests in mathematics learning.

These results underscore the importance of fostering a conducive learning environment that supports students' engagement and enthusiasm towards mathematics. By recognizing the influential factors in this study, educational stakeholders can devise targeted interventions and policies to enhance students' interest in mathematics education. Teachers can benefit from professional development programs to equip them with effective instructional strategies tailored to students' needs. Furthermore, policymakers should address issues related to class size and consider allocating sufficient resources to improve infrastructure, fostering an optimal learning environment for mathematics education.

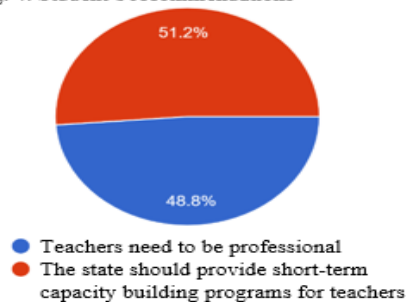
By focusing on these aspects, educators and policymakers can collectively work towards promoting a positive and engaging mathematics learning experience for high school students. Ultimately, the findings from this study contribute to the broader understanding of factors shaping students' interest in mathematics and provide a foundation for future research and educational improvements in the field.

## RECOMMENDATIONS

As noted in the study, students were asked.

1. Teachers need to be professional. In most places, non-professional math teachers are taught in public schools, which has profoundly affected the teaching of mathematics.
2. Most of the teachers are professional, but their capacity could be higher. The government should launch short-term capacity-building programs for these teachers.
3. Other factors, such as the learning environment and increasing the number of students in the classroom, should show similar measures.

Fig. 4. Student's recommendations



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