



ROLE OF INTEREST AND ATTITUDE TOWARDS MATHEMATICS IN ACHIEVEMENT AMONG SECONDARY SCHOOL STUDENTS

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Abstract

The present study aims to examine the role of interest and attitude towards mathematics in influencing mathematics achievement among secondary school students. Mathematics is a significant subject that develops logical reasoning, analytical thinking, and problem-solving abilities. Students' interest and attitude towards mathematics are important psychological factors that determine their motivation, participation, and success in learning the subject. The study was conducted using a descriptive survey method among secondary school students. The relationship between students' interest in mathematics, attitude towards mathematics, and their achievement was analyzed. The findings highlight that positive interest and favourable attitudes towards mathematics contribute significantly to better achievement among students. The study emphasizes the need for learner-centered, activity-based, and innovative teaching approaches to develop students' interest and positive attitudes towards mathematics. Strengthening these factors can enhance mathematical learning outcomes and improve students' overall academic performance.

Keywords: Interest in Mathematics, Attitude Towards Mathematics, Mathematics Achievement, Secondary School Students.

Introduction

Mathematics occupies a central position in secondary school education because it develops students' reasoning ability, logical thinking, problem-solving skills, and quantitative competence. Beyond its academic importance, mathematics enables learners to analyse situations systematically, make informed decisions, and apply knowledge to everyday life. Achievement in mathematics is therefore regarded as an important indicator of students' academic preparedness and their potential for higher education and careers in science, technology, engineering, economics, and related disciplines (National Council of Teachers of Mathematics [NCTM], 2000; National Research Council [NRC], 2001). Despite continuous efforts to improve mathematics education, many secondary school students continue to experience difficulties in learning mathematics. Variations in mathematics achievement cannot be explained solely by differences in intellectual ability or instructional methods. Educational researchers have increasingly emphasized that students' affective characteristics, particularly their interest and attitude towards mathematics, substantially influence learning behaviour and academic success. These psychological variables determine how students perceive mathematics, the extent to which they engage in learning

activities, and their willingness to persist when confronted with challenging mathematical tasks (Ma & Kishor, 1997; Schiefele, 1991).

Interest in mathematics is widely recognised as an important motivational factor that stimulates curiosity, active participation, and sustained engagement in learning. Students who possess genuine interest are more likely to devote time to mathematical activities, seek conceptual understanding, and employ effective problem-solving strategies. Interest also encourages learners to explore mathematical ideas independently, thereby strengthening conceptual learning and academic performance. Conversely, a lack of interest often results in reduced classroom participation, limited learning effort, and lower achievement. Educational psychologists have consistently reported that students with higher levels of academic interest demonstrate greater persistence, intrinsic motivation, and achievement than those with limited interest (Schiefele, 1991; Hidi & Renninger, 2006). Attitude towards mathematics is another important determinant of students' academic performance. It represents students' beliefs, feelings, and behavioural tendencies towards mathematics as a school subject. Positive attitudes foster confidence, enjoyment, and willingness to participate in mathematical learning, whereas negative attitudes frequently lead to mathematics anxiety, avoidance of mathematical tasks, and diminished academic performance. Research has demonstrated a positive relationship between favourable attitudes towards mathematics and higher levels of mathematics achievement, suggesting that affective factors play an important role in shaping students' learning outcomes (Ma & Kishor, 1997; Hembree, 1990). The relationship between interest, attitude, and mathematics achievement can be better understood through established educational theories. Social Cognitive Theory explains how self-efficacy beliefs influence students' motivation, learning behaviour, and academic performance (Bandura, 1997). Expectancy–Value Theory emphasizes that students' achievement depends on their expectations for success and the value they assign to learning mathematics (Eccles & Wigfield, 2002). Similarly, the Theory of Planned Behavior proposes that positive attitudes and behavioural intentions influence students' engagement in learning activities and their academic achievement (Ajzen, 1991). These theoretical perspectives collectively explain why interest and attitude are critical determinants of successful mathematics learning. The paper seeks to explain the relationship among these variables and identify their educational implications. The discussion is expected to contribute to a better understanding of how positive interest and attitudes towards mathematics can be fostered to improve students' achievement and strengthen mathematics education at the secondary school level.

Need and Significance of the Study

Although considerable research has examined mathematics achievement among secondary school students, the findings are dispersed across different psychological, educational, and instructional perspectives. A comprehensive theoretical understanding of how students' interest and attitude collectively influence mathematics achievement remains essential. Integrating these concepts within established educational theories provides a clearer explanation of the mechanisms through which students develop positive learning behaviours and achieve academic success in mathematics. This paper addresses this need by synthesizing theoretical perspectives and research

evidence related to interest, attitude, and mathematics achievement. Such a synthesis helps explain the interconnected nature of these variables and offers a conceptual framework for understanding students' mathematical learning. The paper also identifies the educational relevance of promoting favourable dispositions towards mathematics as a means of enhancing students' engagement and academic performance. The significance of this paper lies in its potential to support evidence-informed educational practice. The theoretical insights presented may assist teachers in planning motivating learning experiences, help schools strengthen mathematics instruction, guide curriculum developers in designing learner-oriented programmes, and provide researchers with a conceptual foundation for further investigations on mathematics achievement among secondary school students.

CONCEPTUAL FRAMEWORK

The conceptual framework of the present paper is based on three interrelated constructs: **interest in mathematics, attitude towards mathematics, and mathematics achievement**. These constructs provide the theoretical basis for understanding how students' affective characteristics influence their learning behaviour and academic performance. Interest encourages students to engage actively in mathematical learning, attitude shapes their perceptions and responses towards mathematics, and mathematics achievement represents the learning outcomes resulting from these cognitive and affective processes.

- **Interest in Mathematics**

Interest in mathematics refers to a student's personal inclination, curiosity, and intrinsic motivation to engage in mathematical learning and problem-solving activities. It reflects the extent to which students enjoy learning mathematics, participate willingly in classroom activities, and demonstrate persistence when encountering challenging tasks. Interest develops through meaningful learning experiences, successful performance, and supportive instructional environments that encourage exploration and active participation (Schiefele, 1991; Hidi & Renninger, 2006). Students with high interest in mathematics are generally more attentive, motivated, and willing to invest greater effort in learning. They tend to employ effective learning strategies, seek conceptual understanding, and persist in solving complex mathematical problems. Consequently, interest contributes significantly to deeper learning, improved academic engagement, and higher mathematics achievement (Eccles & Wigfield, 2002).

- **Attitude towards Mathematics**

Attitude towards mathematics refers to students' beliefs, feelings, and behavioural tendencies regarding mathematics as a subject of study. It encompasses cognitive, affective, and behavioural dimensions that influence students' willingness to learn, confidence in solving mathematical problems, and overall perception of mathematics. Positive attitudes encourage active participation, confidence, and persistence, whereas negative attitudes often result in avoidance behaviour, mathematics anxiety, and reduced academic performance (Aiken, 1970; Ma & Kishor, 1997). A favourable attitude towards mathematics enhances students' motivation, classroom participation, and readiness to undertake mathematical tasks. Teachers, parents, peers, and

classroom experiences play an important role in shaping students' attitudes, making positive attitudes an essential component of successful mathematics learning.

- **Mathematics Achievement**

Mathematics achievement refers to the level of knowledge, understanding, and skills acquired by students in mathematics, usually measured through classroom assessments, standardized tests, and academic examinations. It reflects students' ability to comprehend mathematical concepts, apply procedures accurately, solve problems logically, and use mathematical reasoning in different contexts (National Council of Teachers of Mathematics, 2000). Mathematics achievement serves as an important indicator of educational effectiveness and students' academic competence. High achievement reflects conceptual understanding, analytical thinking, and effective problem-solving ability, whereas low achievement may indicate learning difficulties or inadequate instructional support. Since mathematics achievement is influenced by cognitive, motivational, and environmental factors, understanding the roles of interest and attitude is essential for improving students' learning outcomes and overall academic success.

THEORETICAL FRAMEWORK

The present study is grounded in three well-established educational and psychological theories that explain how students' beliefs, attitudes, motivation, and behavioural intentions influence their learning and academic performance in mathematics. Social Cognitive Theory, Expectancy–Value Theory, and the Theory of Planned Behavior collectively provide a comprehensive framework for understanding the relationship between students' interest, attitude, and mathematics achievement at the secondary school level.

- **Social Cognitive Theory**

Social Cognitive Theory, proposed by **Albert Bandura (1986)**, explains that learning is influenced by the reciprocal interaction of personal factors, behaviour, and the environment. According to this theory, students' beliefs about their capabilities, motivation, and learning strategies play a significant role in determining their academic performance. In mathematics education, the theory suggests that students who possess confidence in their mathematical abilities are more likely to participate actively in classroom activities, persist in solving challenging problems, and adopt effective learning strategies. Self-efficacy encourages students to overcome difficulties and remain committed to learning, while motivation enhances their willingness to invest time and effort in mathematical tasks. Similarly, self-regulated learning enables students to plan, monitor, and evaluate their learning processes, leading to improved conceptual understanding and problem-solving abilities. Therefore, Social Cognitive Theory provides a valuable framework for explaining how psychological factors contribute to mathematics achievement among secondary school students.

- **Expectancy–Value Theory**

Expectancy–Value Theory, developed by **Jacquelynne Eccles** and **Allan Wigfield**, proposes that students' academic performance is determined by their expectation of success and the value they attach to the learning task. Students who believe they can perform successfully in mathematics are more likely to demonstrate confidence, persistence, and active engagement in

classroom learning. Likewise, when students perceive mathematics as interesting, useful, and relevant to their future educational and career aspirations, they develop greater interest and motivation toward the subject. These positive beliefs encourage consistent effort, improved classroom participation, and effective learning behaviours, ultimately leading to higher mathematics achievement. Thus, the theory explains that both expectancy for success and task value are essential determinants of students' academic achievement in mathematics.

- **Theory of Planned Behavior**

The **Theory of Planned Behavior**, proposed by **Icek Ajzen (1991)**, explains that human behaviour is primarily influenced by behavioural intentions, which are shaped by attitudes and perceived behavioural control. In the context of mathematics education, students with positive attitudes toward mathematics are more likely to enjoy learning, participate actively in classroom activities, and demonstrate greater persistence when solving mathematical problems. Positive attitudes also strengthen students' intentions to engage in mathematics learning and encourage them to devote more effort to academic tasks. Furthermore, students who believe they have sufficient ability and control to succeed in mathematics are more confident in overcoming learning difficulties and maintaining consistent academic effort. Consequently, favourable attitudes, strong behavioural intentions, and higher perceived behavioural control contribute significantly to improved mathematics achievement. This theory therefore provides an important explanation of how students' attitudes and beliefs influence their learning behaviour and academic success in mathematics.

6. Interest and Attitude in Mathematics Achievement

Interest and attitude are two important psychological factors that significantly influence students' mathematics achievement. Interest in mathematics encourages students to engage actively in learning activities, while a positive attitude enhances confidence, persistence, and willingness to solve mathematical problems. Students who are interested in mathematics generally devote more time to learning, participate actively in classroom discussions, and apply effective problem-solving strategies. Similarly, students with positive attitudes toward mathematics are more likely to overcome learning difficulties, experience lower levels of mathematics anxiety, and demonstrate higher academic performance. Numerous educational studies have consistently reported that students' interest and attitude are strong predictors of mathematics achievement. Therefore, developing both interest and positive attitudes toward mathematics is essential for improving learning outcomes among secondary school students.

6.1 Influence of Interest on Mathematics Achievement

Interest plays a vital role in enhancing students' mathematics achievement by increasing their motivation, engagement, and persistence in learning. Students who develop genuine interest in mathematics are more attentive during classroom instruction, participate actively in learning activities, and willingly invest additional time in practicing mathematical concepts. Interest also promotes curiosity and encourages students to explore different methods of solving mathematical problems, thereby improving conceptual understanding and critical thinking skills. Furthermore, interested students are more likely to seek assistance when they encounter difficulties and

demonstrate greater perseverance in completing challenging tasks. Consequently, higher levels of interest contribute positively to improved mathematics achievement, whereas lack of interest often leads to reduced participation, lower motivation, and poor academic performance.

6.2 Influence of Attitude on Mathematics Achievement

Students' attitudes toward mathematics significantly affect their learning behaviour and academic success. A positive attitude creates confidence, enthusiasm, and willingness to participate in mathematics learning activities. Students who perceive mathematics as useful, enjoyable, and relevant to their daily lives are more likely to approach mathematical tasks with optimism and determination. Positive attitudes also reduce mathematics anxiety, enhance classroom participation, and encourage consistent effort in learning. In contrast, negative attitudes often result in fear, avoidance of mathematical tasks, low confidence, and decreased academic performance. Therefore, fostering favourable attitudes toward mathematics is essential for improving students' achievement and promoting long-term interest in the subject.

6.3 Relationship between Interest, Attitude, and Mathematics Achievement

Interest, attitude, and mathematics achievement are closely interconnected and mutually reinforcing. Students with greater interest in mathematics generally develop more positive attitudes toward the subject, which in turn encourages active participation, persistence, and effective learning behaviours. Positive attitudes strengthen students' confidence and motivation, while sustained interest promotes continuous engagement with mathematical concepts and problem-solving activities. Together, these psychological factors contribute to higher levels of mathematics achievement by improving students' learning experiences and academic performance. Educational research consistently indicates that interest and attitude are positively correlated with mathematics achievement, suggesting that students who possess both high interest and favourable attitudes perform significantly better than those with low interest and negative attitudes. Accordingly, enhancing students' interest and cultivating positive attitudes should be considered important educational strategies for improving mathematics achievement among secondary school students.

EDUCATIONAL IMPLICATIONS

The findings of the present study have important implications for teachers, schools, parents, and curriculum developers in promoting students' interest and positive attitudes toward mathematics, thereby enhancing mathematics achievement among secondary school students. Since psychological factors such as interest and attitude play a significant role in academic success, all stakeholders should work collaboratively to create a supportive and engaging mathematics learning environment.

- **Implications for Teachers**

Teachers should adopt learner-centred and activity-based instructional strategies that stimulate students' interest in mathematics. The use of real-life examples, interactive teaching methods, educational technology, and collaborative learning can make mathematics more meaningful and enjoyable. Teachers should also provide continuous encouragement, constructive feedback, and opportunities for problem-solving to enhance students' confidence and positive

attitudes toward mathematics. Identifying students with low interest or negative attitudes at an early stage and providing appropriate academic support can further improve their achievement.

- **Implications for Schools**

Schools should create a positive learning environment that encourages curiosity, creativity, and active participation in mathematics. Mathematics clubs, quizzes, exhibitions, competitions, and enrichment programmes can increase students' engagement and interest in the subject. Schools should also ensure the availability of adequate learning resources, digital technologies, and well-equipped classrooms to facilitate effective mathematics instruction. Regular teacher training programmes should be organized to strengthen innovative pedagogical practices and improve students' learning experiences.

- **Implications for Parents**

Parents play an important role in shaping children's interest and attitudes toward mathematics. They should provide emotional support, encourage regular study habits, and create a positive home learning environment. Parents should motivate their children to view mathematics as a valuable and useful subject rather than a difficult one. Maintaining regular communication with teachers and monitoring students' academic progress can further strengthen students' confidence, motivation, and mathematics achievement.

- **Implications for Curriculum Developers and Policymakers**

Curriculum developers should design mathematics curricula that are relevant, engaging, learner-centred, and connected to real-life applications. The curriculum should emphasize conceptual understanding, critical thinking, problem-solving, and the practical use of mathematics rather than rote memorization. Policymakers should support professional development programmes for mathematics teachers, integrate technology into mathematics education, and provide adequate instructional resources to schools. Educational policies should also encourage inclusive and innovative teaching practices that foster students' interest, positive attitudes, and higher achievement in mathematics across different school settings.

Conclusion

Mathematics achievement among secondary school students is influenced not only by cognitive abilities but also by important psychological factors such as interest and attitude toward mathematics. The present study highlights that students who develop a genuine interest in mathematics and maintain positive attitudes toward the subject are more likely to participate actively in classroom learning, demonstrate greater confidence, persist in solving mathematical problems, and achieve higher academic performance. Conversely, low interest and negative attitudes may reduce motivation, increase mathematics anxiety, and adversely affect learning outcomes. The theoretical perspectives of Social Cognitive Theory, Expectancy–Value Theory, and the Theory of Planned Behavior provide a strong foundation for understanding how self-efficacy, motivation, expectancy for success, task value, attitudes, and behavioural intentions contribute to mathematics achievement. These theories collectively emphasize that students' beliefs and perceptions play a crucial role in shaping their engagement and success in mathematics. The study further underscores the shared responsibility of teachers, schools, parents, curriculum

developers, and policymakers in fostering positive learning experiences. By implementing learner-centred instructional practices, creating supportive learning environments, encouraging parental involvement, and developing engaging mathematics curricula, educational stakeholders can enhance students' interest and attitudes toward mathematics. In conclusion, promoting positive interest and favourable attitudes toward mathematics is essential for improving mathematics achievement among secondary school students. Strengthening these psychological factors will not only enhance academic performance but also encourage lifelong confidence, critical thinking, and appreciation for mathematics in both educational and real-life contexts.

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