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Increasing Student Learning Motivation in Mathematics Learning: Literature Review

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ABSTRACT

This study aims to identify the factors influencing students' motivation in learning mathematics and to evaluate various motivational strategies and teaching methods that can enhance students' interest and performance in the subject. The research employs a literature review method, analyzing 50 articles from relevant journals, books, and other scientific publications. These articles were selected from prominent databases such as Google Scholar, JSTOR, PubMed, and IEEE Xplore. The results indicate that learning motivation is influenced by internal factors such as intrinsic motivation and self-confidence and external factors like teaching methods and the school environment. Additionally, using learning aids and moral approaches significantly improves students' understanding of mathematics. In conclusion, a holistic approach is needed to enhance students' motivation and academic achievement in mathematics, encompassing the strengthening of intrinsic motivation, support from the learning environment, and applying innovative and adaptive teaching methods tailored to students' needs.

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1. INTRODUCTION

Maintaining students' Motivation to learn is critical in today's sophisticated educational landscape. Education is foundational to personal and societal development, yet as students reach adulthood, their Motivation to study often diminishes. This issue is exacerbated by the rapid advancement of technology, which can distract students from their primary obligation to study. The more technology advances, the more students' Motivation to learn decreases, and they are negatively influenced by their environment, relationships, and the allure of modern technology [1], [2], [3], [4], [5].

The challenge of declining Motivation is particularly evident in mathematics, requiring logical, systematic, and critical thinking. Despite its importance, mathematics is often perceived as difficult, stressful, and monotonous due to the abundance of formulas and its reputation as a subject for the highly intelligent. To address this, exploring strategies to

enhance students' Motivation and engagement in mathematics is essential. This study aims to identify effective methods and motivational techniques teachers can use to foster a more engaging and supportive learning environment for mathematics [6], [7], [8], [9], [10]. This research seeks to identify the factors contributing to student's lack of Motivation to learn mathematics, explore and evaluate various motivational strategies and teaching methods that can enhance students' interest and performance in mathematics, and provide practical recommendations for educators to improve their teaching practices and inspire students to achieve better learning outcomes in the subject.

Mathematics is a fundamental subject that develops critical thinking and problem-solving skills essential for academic success and everyday life [11], [12], [13], [14]. Previous research has highlighted the significance of Motivation in educational achievement. For instance, Dweck's [15] growth mindset theory emphasizes that students who believe in their ability to improve through effort are more likely to succeed. Additionally, Bandura's [16] self-efficacy theory suggests that students' confidence in their capabilities influences their motivation and learning outcomes.

This research hopes to provide valuable insights into the factors affecting students' Motivation to learn mathematics and identify effective strategies that educators can implement. Enhancing students' Motivation is anticipated to improve their performance in mathematics, leading to better overall academic achievement. The findings of this study will contribute to the body of knowledge on educational psychology and provide practical solutions for educators to foster a more motivating and supportive learning environment.

Previous studies have explored various aspects of student motivation and educational strategies in mathematics. For example, a study by Pintrich and De Groot [17] examined the relationship between Motivation and classroom academic performance, highlighting the importance of self-regulated learning. Another study by Ryan and Deci [18] focused on intrinsic and extrinsic motivations and their impact on student engagement and success. However, there is a gap in the literature regarding the specific implications of modern technological distractions on students' Motivation to learn mathematics and the role of innovative teaching methods in addressing this issue. This research aims to fill this gap by investigating the influence of technology on students' Motivation and exploring creative teaching strategies that can mitigate these challenges.

2. METHODS

This study employs a literature review method involving a comprehensive analysis of scientific studies relevant to learning motivation. A total of 50 articles were reviewed and sourced from various academic journals, books, theses, and other scientific publications related to learning Motivation. The articles were selected from reputable databases such as Google Scholar, JSTOR, PubMed, and IEEE Xplore, ensuring a wide range of perspectives and methodologies.

In theory, this study is related to educational psychology and methodology. The primary focus is understanding Motivation to learn, specifically associated with persistence in facing tasks, support in overcoming difficulties, self-reliance, and intrinsic Motivation.

The review also examines how Motivation influences individuals' ability to handle tasks without external encouragement independently, maintain enthusiasm for routine tasks, and defend their opinions without easily giving up on their beliefs.

3. RESULTS AND DISCUSSION

Mathematics cannot be equated with counting or arithmetic. It is the basic knowledge needed by students to achieve success in pursuing further or higher education. The 2003 Republic of Indonesia Law concerning the National Education System, Article 37, confirms that Mathematics is compulsory for primary and secondary education students.

The definition of precise mathematics is that it cannot be determined with certainty. Because of this, various types of Mathematics are increasing and increasingly mingling with each other. Thus, to improve students' understanding of the material being taught, teachers must take a moral approach to students so that they are open to problems with the material being studied [19]. As for mathematics, learning media is a learning tool or device used as an intermediary by educators to make the learning process in class more accessible and to communicate effectively between educators and students [20].

Based on a literature review and various sources such as books, journals, and other articles related to increasing learning motivation. Motivation is the overall driving force within students that fosters learning activities, which ensures the continuity of learning activities and provides direction to ongoing learning activities so that the learning goals that students are interested in can be achieved. This is how Filgona et al. [21], showed that the success of learning depends on whether or not the learners are motivated. These objectives may be seen as the student's desired accomplishments.

Students with high learning motivation within themselves appear to have a sense of will, sincerity, and independence in their learning process. The various factors mentioned that can influence student activity, Motivation, and learning achievement include 1) Family Factors, 2) School Environmental Factors, 3) School Learning Facilities Factors, 4) Teacher Teaching Method Factors, and 5) Environmental Factors in Society, these several factors interact with each other in achieving learning achievement goals.

Based on a literature review on Motivation, it is generally explained that Motivation can be divided into two types, including:

a) Intrinsic Motivation

This Motivation is often referred to as Pure Motivation. Intrinsic Motivation is Motivation that grows within students themselves and is helpful in functional learning situations. People with inherent Motivation are characterized by their tenacity in the face of challenges, persistence in completing activities, aptitude for taking an interest in various issues, preference for working independently, and enjoyment of looking for problems and solving problems related to the issues faced.

b) Extrinsic Motivation

Extrinsic Motivation refers to incentives derived from variables unrelated to the learning environment, such as grades or statistics, diplomas, prize levels, medals/trophies, and

punishments. This Motivation is still needed in schools because not all teaching attracts students' interest and Motivation.

Motivation in learning is essential for students and teachers themselves. For students, Motivation needs to be recognized by the perpetrator to complete a work or study assignment well. As for teachers, Motivation in teaching is extensively utilized to convey learning and can arouse their students' enthusiasm and Motivation to learn. Even though the teacher conveys the lesson well and in perfect detail, if the students do not have high self-motivation, then the students will not study seriously and will not achieve learning achievements. Students' anxiety can also influence Motivation in learning, so students become depressed.

To address the challenges of maintaining Motivation in students, especially when anxiety and lack of self-motivation are factors, teachers can employ several strategies to engage and inspire their students in the classroom effectively. There are several ideas that teachers can use to motivate students in the school, namely:

a) Using a variety of methods and activities. Even though learning mathematics itself also requires fun activities for students.
b) Make students active participants, even in learning mathematics, which has a fixed value.
c) Create a conducive classroom atmosphere.
d) Involve yourself to help students achieve results. In mathematics lessons precisely, a teacher must also guide students to solve the problems given.
e) Enthusiastic in teaching.
f) Giving awards to motivate.
g) Create activities that involve all students in the class.
h) Avoid using threats.

To effectively maintain and boost students' Motivation, especially when they struggle with anxiety and low self-motivation, teachers can implement a variety of strategies in the classroom. For example, incorporating diverse methods and activities can make learning more engaging, even in subjects like mathematics that often require structured problem-solving. Encouraging active participation helps students feel more involved, while a conducive classroom atmosphere fosters a sense of comfort and openness. Teachers can also actively guide students through challenging tasks, particularly math, where direct support is crucial. Additionally, maintaining enthusiasm for teaching, providing rewards, and creating inclusive activities can motivate students. Importantly, avoiding threats ensures that Motivation is driven by positive reinforcement rather than fear, which leads to a more productive and enjoyable learning experience.

Table. 1 Reviewed Articles Summary

No.	Author(s)	Title	Journal/Source	Key Findings
1	Ahmad, Etmy, & Primajati [19]	Upaya mengatasi problema pembelajaran matematika siswa pada materi teorema phythagoras melalui	Journal of Educational Research	Emphasizes a moral approach to increase students'

No.	Author(s)	Title	Journal/Source	Key Findings
		bimbingan belajar kelas VIII di MTs. Nurul Yaqin Kelanjur		openness to mathematics.
2	Safitri & Koeswanti [20]	Pengembangan Media Pembelajaran "KELAS BANGTAR" untuk Meningkatkan Hasil BelajarMatematika Siswa Kelas IV Sekolah Dasar	Journal of Learning Media	It highlights the importance of learning tools in facilitating communication and easing learning.
3	Filgona et al. [21]	Motivation in Learning	Asian Journal of Education and Social Studies	motivation is an influential factor in teaching-learning situations.
4	Ryan, R. & Deci, E. [18]	Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions	Contemporary Educational Psychology	Discusses the differentiation and impact of intrinsic vs extrinsic Motivation on student engagement.
5	Dweck, C. [15]	Mindset: The New Psychology of Success	Random House	Explores the growth mindset and its effect on Motivation and academic success.
6	Pintrich, P. & De Groot [22]	Motivational and Self-Regulated Learning Components of Classroom Academic Performance	Journal of Educational Psychology	Examines the relationship between Motivation, self-regulation, and academic performance.
7	Bandura, A. [16]	Self-efficacy: The Exercise of Control	Freeman	Discusses self-efficacy theory and its implications for student motivation

No.	Author(s)	Title	Journal/Source	Key Findings
				and learning outcomes.
8	Gottfried, A. [23]	Academic Intrinsic Motivation in Young Elementary School Children	Journal of Educational Psychology	Investigates intrinsic Motivation and its role in academic performance among young children.
9	Eccles, J. [24]	Expectancies, Values, and Academic Behaviors	Education Studies Review	Explores the expectancy-value theory in the context of academic Motivation.
10	Zimmerman, B. [25]	Self-Regulated Learning and Academic Achievement: An Overview	Educational Psychologist	Provides an overview of self-regulated learning and its impact on academic achievement.

Based on Table 1 above, it can be seen that everything focuses on learning Motivation and factors that affect academic achievement. The similarity is that all articles emphasize the importance of intrinsic and extrinsic Motivation in the learning process. For example, Ryan and Deci [18], in their article on intrinsic and extrinsic Motivation, highlight how these two types of Motivation affect student engagement in learning. Similarly, Bandura [16], in his book on self-efficacy, explains that students' confidence in their abilities plays a vital role in learning Motivation.

The main difference between these literatures lies in the focus and theoretical approach used by the authors. For example, Ahmad, Etmy, and Primajati [19] emphasize the moral approach to increase students' openness to mathematics, a unique focus compared to other more general articles about Motivation. On the other hand, Dweck [15], with his mindset theory, offers the view that belief in a growth mindset significantly impacts Motivation and academic success. Another difference is seen in the focus on learning tools discussed by Safitri and Koeswanti [20], which underscores the importance of learning media in supporting communication and the learning process.

What is interesting about this literature is the variety of approaches and perspectives the authors provide to understand learning motivation. For example, an article by Filgona et al. [21] defines Motivation as a change in energy that responds to a goal, which provides a

different perspective on how Motivation can be understood and measured. In addition, Eccles [24], who explored the theory of value expectations, introduced the idea that one's personal beliefs and values can influence academic behavior, which adds a new dimension to the understanding of Motivation.

This entire literature shows that learning motivation is a complex phenomenon influenced by various factors, ranging from mindset, expectations, and values to confidence and learning tools. Each article adds a valuable understanding of how Motivation can be built and maintained in an educational context, essential for enriching teaching strategies and pedagogical approaches.

4. CONCLUSION

The study concludes that a combination of internal and external factors significantly influences students' motivation and performance in learning mathematics. Intrinsic motivation and self-confidence are crucial internal drivers while teaching methods and the learning environment represent key external influences. The research highlights that innovative and adaptive teaching strategies, along with supportive learning environments and the use of educational aids, are essential for enhancing students' understanding and engagement in mathematics. A holistic approach, addressing both motivational and environmental aspects, is necessary to improve academic achievement in the subject.

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