**NOTASI** : Jurnal Pendidikan Matematika
**e-ISSN** : 2988-5908 **Vol. 4, No. 3, Hal. 122-130, September 2026**

# Analysis of the decline in interest in learning mathematics from the perspectives of self-efficacy and expectancy-value

**Indah Simamora**[1*], **Bakher Nenotaek**[1], **Aleksius Madu**[1]
[1]Universitas Nusa Cendana, Nusa Tenggara Timur, Indonesia
[*]Correspondence: indah.simamora@staf.undana.ac.id
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**Abstract**

Decreased interest in learning mathematics is a problem that affects students' academic achievement and their readiness to face the challenges of further education and the world of work. This study aims to analyze the factors that contribute to low interest in learning in terms of Self-Efficacy and Expectancy-Value. The research method used is a descriptive qualitative study with an analysis of literature and survey data which shows that 70% of students consider mathematics as the most difficult subject while 60% of students claim to be less motivated due to monotonous and non-interactive learning. The results of this study show that low self-efficacy causes students to give up quickly in the face of math difficulties. At the same time, the lack of perception of the benefits of mathematics in real life hinders their motivation to learn. To increase students' interest, strategies such as gradual reinforcement of success experiences, use of peer tutors, implementation of project-based learning (PjBL), and utilization of technology in learning are suggested
**Keywords:** Learning Interest, Self-Efficacy, Expectancy-Values

**How to cite:** Simamora, I., Nenotaek. B., & Madu, A. (2026). Analysis of the decline in interest in learning mathematics from the perspectives of self-efficacy and expectancy-value. *Jurnal Notasi*, *4*(3), 122-129. https://doi.org/10.70115/notasi.v4i3.529

Received: 15 Juli 2026 | Revised: 17 Agustus 2026
Accepted: 16 September 2026 | Published: 30 September 2026

## Introduction

Mathematics is a fundamental subject in education that plays an important role in developing logical, analytical, and systematic thinking skills. It is essential not only in academic contexts but also in everyday life and various future career fields. Therefore, developing a sound understanding of mathematics is important for all students. However, in various regions, including East Nusa Tenggara (NTT), declining interest in learning mathematics among students has become a concern. This phenomenon warrants attention because it may adversely affect educational quality and students' preparedness for the demands of the workplace and further education.

Learning interest involves more than simply liking a subject. It also reflects a strong desire to explore a particular field, sustain attention over time, and enjoy the learning process itself. According to (Siagian, 2015; Yanti & Aprianif, 2023), learning interest refers to an individual's tendency to feel attracted to, enjoy, and pay greater attention to a particular object or learning activity. Meanwhile, (Nurgiansah, 2022; Saraswati et al., 2023) suggest that learning interest develops when individuals demonstrate a strong attraction to and enjoyment of a particular activity driven by intrinsic motivation. Hurlock, (1997) also emphasizes that learning interest involves feelings of enjoyment and personal attachment to a particular field, encouraging individuals to explore and understand it more deeply.


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Several internal and external factors influence learning interest. Internal factors include motivation, aptitude, and prior learning experiences, while external factors include teaching methods, the learning environment, social support, and the use of engaging instructional media. According to Dalyono, (2010), enjoyable learning experiences and engaging teaching methods can increase students' interest in learning, making them more active and enthusiastic about understanding the material. Strategies to strengthen learning interest include connecting learning materials to everyday life, implementing varied instructional methods, providing challenges appropriate to students' abilities, and creating a comfortable and supportive learning environment. Therefore, strong learning interest can help students understand and master learning materials more effectively while supporting academic achievement and personal development.

Interest is also influenced by individuals' beliefs about their capabilities to organize and perform the actions required to achieve specific goals, a concept known as *self-efficacy*. Bandura, (1997) introduced this concept within social cognitive theory, emphasizing that self-efficacy plays an important role in shaping how individuals think, feel, and act when facing challenges. Individuals with high self-efficacy tend to demonstrate greater confidence, persistence, and resilience when encountering difficulties, whereas those with low self-efficacy are more likely to doubt their abilities and give up easily. These beliefs are influenced by several factors, including mastery experiences, in which successfully completing previous tasks strengthens confidence in one's capabilities. Observing others succeed in similar tasks can also enhance self-efficacy. Social persuasion, such as encouragement and support from others, further contributes to developing self-efficacy. In addition, physiological and emotional states, including stress and fatigue, can influence individuals' confidence in their abilities.

In education, self-efficacy plays an important role in determining how students respond to academic challenges. Students with high self-efficacy tend to be more motivated, persistent in completing assignments, and resilient when facing difficulties. In contrast, students with low self-efficacy may experience greater anxiety and lower confidence in their academic abilities. Strategies to strengthen self-efficacy include providing challenges appropriate to students' abilities, creating opportunities for successful learning experiences, introducing positive role models, and offering emotional support and encouragement. Strong self-efficacy can help students develop a more optimistic outlook, improve their resilience when facing challenges, and achieve better outcomes across various aspects of their lives.

Learning interest is also influenced by individuals' beliefs about their likelihood of succeeding at a task (*expectancy*) and the value they attach to that task (*values*). These components are central to *Expectancy-Value Theory*, developed by (Eccles & Wigfield, 2002), which proposes that individuals are more motivated to engage in an activity when they believe they can succeed and consider the activity valuable. In educational settings, this theory provides a useful framework for understanding students' learning motivation. Students who believe they can understand a subject and perceive it as important are more likely to invest effort and persist in learning. Conversely, students who perceive a task as having little value or believe they lack the ability to complete it may demonstrate lower motivation. Therefore, teachers can strengthen students' motivation by building their confidence in academic success through opportunities for achievement, constructive feedback, and explanations of how learning materials relate to

everyday life. Understanding the roles of expectancy and task values can help educators design more effective instructional strategies to improve student engagement and academic achievement.

## Method

This study employed a qualitative descriptive approach to explore the factors influencing students' interest in learning mathematics. Data were collected through questionnaires administered to students to examine their interest in mathematics and the factors affecting their learning motivation. The questionnaire consisted of items measured on a five-point Likert scale and covered several aspects, including perceptions of mathematics, teacher support, the relevance of learning materials, and the learning environment.

## Results and Discussion

Most students perceived mathematics as having limited relevance to their everyday lives, which was associated with relatively low interest in learning the subject. The following data on students' learning interest indicate that their interest in mathematics was generally not particularly high.

**Table 1.** Students' Interest in Learning Mathematics

| Interest Category | Percentage (%) |
|---|---|
| Very interested | 20 |
| Interested | 35 |
| Neutral (sometimes interested, sometimes not) | 30 |
| Less interested | 10 |
| Not interested | 5 |

Students' interest in mathematics remains a significant challenge in education. One student stated during an interview, *"I rarely use mathematics at home, so I do not think it is particularly important."* This statement illustrates how some students perceive mathematics as disconnected from their everyday experiences, which may contribute to their limited interest in the subject. This perception is further reflected in the survey findings, which indicate that 45% of students reported low interest in mathematics because they struggled to understand abstract concepts. They perceived the numbers, formulas, and theories taught in class as having little connection to real-world situations, making it difficult for them to recognize the importance of learning mathematics.

Teachers also reported that many students perceived mathematics primarily as a difficult subject rather than one with practical benefits for everyday life. Limited integration of mathematical concepts with local contexts and practical applications, such as household financial management and agricultural calculations, may further distance mathematics from students' lived experiences. When mathematics is taught primarily through abstract theories without concrete examples, students may find it more difficult to understand its relevance and practical value. However Boaler, (2015) argues that students who learn mathematics through real-world contexts tend to demonstrate stronger motivation and conceptual understanding than those who encounter mathematical concepts only in abstract forms.

**Table 2.** Students' Perceptions of Mathematics Teaching Methods

| Perception Category | Percentage (%) |
|---|---|
| Very engaging and effective | 20.0 |
| Moderately engaging and effective | 36.7 |
| Neither particularly engaging nor ineffective | 30.0 |
| Unengaging and less effective | 13.3 |
| Unengaging and ineffective | 0.0 |

Students' perceptions of mathematics teaching methods varied depending on the instructional approaches used by their teachers. According to the survey results, 20% of students considered the teaching methods highly engaging and effective. These approaches involved interactive and innovative activities, including the use of technology in mathematics instruction. Interactive videos, educational applications, and game-based learning activities encouraged students to participate more actively and engage with mathematical concepts. Such approaches may also help students understand abstract material by presenting it through engaging visual and interactive formats.

Meanwhile, 36.7% of students considered the teaching methods reasonably engaging and effective, although they identified opportunities for improvement. Teachers in this category typically used group discussions, collaborative problem-solving activities, and visual learning resources to support students' understanding. Group discussions allowed students to exchange ideas and explain mathematical concepts to one another, potentially deepening their understanding. However, these approaches could be further developed to promote not only conceptual understanding but also stronger interest in mathematics.

In contrast, 30% of students perceived the teaching methods as neither particularly engaging nor ineffective. Although they could understand the material, they reported limited motivation because the instructional approaches tended to be monotonous. Teachers in this category often relied on lectures and routine exercises with limited variation. Although these methods could support students' understanding, insufficient instructional variety may contribute to boredom and reduce learning motivation over time.

Furthermore, 13.3% of students considered the teaching methods both unengaging and ineffective. They perceived mathematics lessons as boring and difficult to understand because instruction frequently involved lengthy lectures, limited discussion, few practical examples, and minimal interaction between teachers and students. These findings suggest that instructional methods may influence students' learning experiences and engagement with mathematics. Teachers may therefore need to incorporate more varied, interactive, and contextually relevant approaches to make mathematics more accessible and engaging.

Without active student participation, the learning process becomes passive, potentially resulting in lower interest in and understanding of mathematics. If this situation persists, students in this category may gradually lose motivation and perceive mathematics as a difficult and unenjoyable subject. (Yusnita et al., 2016) found that lecture-based instruction was associated with low student participation and limited conceptual understanding. In addition, studies by (Wahyu, 2016; Zubaidah, 2019) reported that students engaged in project-based

learning demonstrated a 30% improvement in mathematical conceptual understanding compared with students who received lecture-based instruction.

The survey results also indicate that although some students considered the teaching methods reasonably engaging and effective, many continued to experience difficulties because the instructional approaches lacked variety and interaction. (Harp & Mayer, 1997) emphasized that learning involving interactive elements, such as conceptual visualization and technology, can enhance student engagement. This finding is consistent with (Hattie et al., 2016), who reported that discussion-based instruction and problem-based learning can improve students' understanding compared with traditional lecture methods. Therefore, teachers need to continue developing more dynamic and innovative approaches to mathematics instruction. By integrating technology, active interaction, and real-world learning contexts, teachers can help students understand mathematical concepts while strengthening their motivation and interest in learning.

Students' understanding of mathematics varied considerably, reflecting the different challenges they encountered when learning mathematical concepts. Only 10% of students reported that mathematics was very easy to understand and presented no significant difficulties. Students in this category generally had a strong mathematical foundation from an early age or a high level of interest in numbers and logical reasoning. They could grasp concepts quickly and apply their understanding to more complex situations with relatively few difficulties.

Meanwhile, 20% of students considered mathematics relatively easy to understand but still required additional practice to develop confidence in solving problems. Students in this category may benefit from more interactive instructional approaches, such as group discussions, visual learning resources, and technology-based simulations. Although they may occasionally encounter difficulties, appropriate guidance and a supportive learning environment can help them master the material. (Mayer, 2020) emphasized that visual aids in mathematics instruction can improve students' understanding compared with conventional lecture-based approaches. These findings highlight the importance of varied instructional strategies to help more students achieve an optimal level of mathematical understanding.

The largest group, comprising 35% of students, experienced moderate difficulties in understanding mathematics. These students could sometimes understand a concept but often needed additional time and practice to achieve a thorough understanding. The main factors affecting this group included the complexity of the material, less engaging teaching methods, and insufficient opportunities to practice solving problems. When teachers present theories without practical applications or concrete examples, students may find it more difficult to connect mathematical concepts with familiar situations. Studies by (Dewi Ayu Wisnu Wardani, 2023; Fahrurrozi & Mahmudi, 2014) indicate that students who learn mathematics through problem-based approaches tend to develop a better understanding than those who receive explanations primarily through abstract representations. Therefore, students in this category may benefit from instructional approaches that emphasize practical applications and connections to everyday life.

In contrast, 25% of students reported that mathematics was difficult to understand. They frequently struggled with the learning materials, particularly when concepts appeared too abstract and lacked connections to their everyday experiences. Many students in this group experienced frustration because of limited real-world examples, explanations that were difficult

to follow, and insufficient additional guidance from teachers or the learning environment. Without appropriate support, these students may become increasingly disengaged from mathematics. Research by (Ashcraft, 2002; Oktrifianty, 2021; Salvia et al., 2022) suggests that students who repeatedly struggle to understand mathematics may develop mathematics anxiety, which can further interfere with their learning.

Of particular concern, 10% of students considered mathematics very difficult to understand. These students may require more individualized instruction and targeted support to prevent further declines in motivation. If they continue to experience difficulties without additional assistance, they may come to believe that mathematics is beyond their capabilities and eventually give up. (Fahrurrozi, 2015; Thaib, 2013) reported that emotional support and teacher encouragement can strengthen students' confidence when facing academic challenges. Therefore, teachers should establish a supportive learning environment and adopt flexible instructional strategies that respond to individual learning needs.

These findings are also consistent with the work of Zimmerman & Schunk (2013), which highlights the importance of self-efficacy in students' academic motivation and self-regulated learning. Students with low self-efficacy may be more vulnerable to academic anxiety and less motivated to persist with mathematical tasks. Ashcraft (2002) further explained that mathematics anxiety can interfere with cognitive processing, making it more difficult for students to understand new concepts. Thus, low self-efficacy may represent an important barrier to developing students' interest in learning mathematics.

Furthermore, many students perceived mathematics as having limited relevance to their everyday lives. Approximately 45% of students reported difficulties understanding abstract mathematical concepts, and many believed that the subject had little connection to their real-world experiences. This perception may be reinforced by instructional approaches that emphasize theoretical explanations over practical applications. These findings can be interpreted through *Expectancy-Value Theory*, which emphasizes the roles of students' expectations of success and the subjective value they attach to learning activities (Eccles & Wigfield, 2002). When students perceive mathematics as relevant to their lives, they may be more inclined to maintain their interest and engagement. Boaler, (2015) similarly emphasized the educational value of connecting mathematics instruction with meaningful, real-world problems. These perspectives suggest that strengthening students' perceptions of mathematical relevance, alongside their confidence in their own abilities, may help support greater interest in learning mathematics.

## Conclusion

The decline in students' interest in learning mathematics in East Nusa Tenggara (NTT) is associated with several internal factors, including limited intrinsic motivation and weak foundational knowledge, as well as external factors, such as monotonous teaching methods and negative perceptions of mathematics. Overall, the findings suggest that low interest in mathematics is not solely attributable to academic difficulties but may also reflect a lack of innovative and relevant instructional approaches. Therefore, further efforts are needed to improve mathematics instruction through more interactive and technology-supported methods, provide additional guidance for students experiencing difficulties, establish a positive learning

environment, and connect mathematical concepts with practical applications that are relevant to students' everyday lives. Consistent implementation of these strategies may help increase students' interest in mathematics, strengthen their understanding of mathematical concepts, and enable them to recognize the practical value of mathematics in everyday situations.

A comprehensive solution requires collaboration among multiple stakeholders, including government authorities, teachers, students, parents, and the wider community. The government should improve access to adequate educational facilities, while teachers need professional development opportunities to strengthen their capacity to implement innovative instructional methods. Parental involvement in supporting children's education is also essential for fostering students' interest in learning. Through appropriate strategies, such as project-based learning (PjBL) and the integration of educational technology, schools may create more engaging and meaningful mathematics learning experiences. These efforts are expected to strengthen students' mathematical understanding, interest, and confidence, better preparing them to meet future academic and professional challenges.

**Author Contributions**

Indah Simamora contributed to the conceptualization of the study, formulation of the research objectives, literature search, data analysis, and preparation of the original draft. Bakher Nenotaek contributed to the literature review, interpretation of the findings, and critical review of the manuscript to improve its scientific accuracy. Aleksius Madu contributed to research supervision, evaluation of the analytical results, and review and editing of the manuscript. All authors have read and approved the final version of the manuscript.

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