

Relationship Between Mathematics Self-Efficacy and Attitudes of Grade 6 Pupils at B. Titong Elementary School

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Abstract

This study determined the relationship between mathematics self-efficacy and attitudes toward mathematics among Grade 6 pupils at B. Titong Elementary School during School Year 2024–2025. Anchored on Social Cognitive Theory, Theory of Planned Behavior, and Expectancy-Value Theory, the study examined mathematics self-efficacy in terms of confidence, persistence, competence, effort, and resilience, and attitudes toward mathematics in terms of interest, enjoyment, anxiety, value, and motivation. A descriptive-correlational research design was used, with total enumeration sampling involving the officially enrolled Grade 6 pupils. Data were gathered through a researcher-made questionnaire validated by experts and analyzed using frequency counts, weighted mean, and Pearson correlation. Findings showed that pupils demonstrated moderate to positive mathematics self-efficacy, particularly in persistence, effort, resilience, competence, and confidence, although lower ratings were noted in independent tasks, formula retention, focus, and confidence after difficult exercises. Pupils also showed generally positive attitudes toward mathematics, with strong recognition of its value, although challenges were observed in word problems, projects, competitions, unfamiliar tasks, and test-related confidence. The Pearson correlation result revealed a statistically significant positive relationship between mathematics self-efficacy and attitudes toward mathematics, with an r -value of 0.64. The major challenges included uncertainty in solving exercises, nervousness, difficulty understanding new topics, discouragement, anxiety, frustration, and lack of motivation. The study concludes that pupils with stronger mathematics self-efficacy tend to demonstrate more favorable attitudes toward mathematics. It supports SDG 4 – Quality Education and SDG 3 – Good Health and Well-Being by promoting learner-centered mathematics instruction and addressing anxiety-related learning concerns. Its sustainability impact lies in strengthening educational, psychosocial, and institutional support systems for more confident, motivated, and resilient learners.

Keywords: Anxiety, Attitudes Toward Mathematics, Descriptive-Correlational Research, Grade 6 Pupils, Mathematics Motivation, Mathematics Self-Efficacy, Resilience, Sustainable Education

1. Introduction

Mathematics plays a foundational role in elementary education because it develops pupils' numerical skills, logical reasoning, and problem-solving abilities. However, learners' success in mathematics is influenced not only by cognitive ability but also by affective factors such as confidence, motivation, self-efficacy, anxiety, and attitudes toward the subject. International evidence suggests that many pupils struggle in mathematics partly because of low confidence and negative perceptions of the subject (OECD, 2023). In this context, the present study investigates the relationship between mathematics self-efficacy and attitudes toward mathematics among Grade 6 pupils at B. Titong Elementary School. The study focuses on self-efficacy in terms of confidence, persistence, competence, effort, and resilience, and attitudes toward mathematics in terms of interest, enjoyment, anxiety, value, and motivation.

Mathematics self-efficacy refers to pupils' belief in their ability to successfully perform mathematical tasks. Grounded in social cognitive theory, self-efficacy influences how learners think, feel, behave, persist, and respond to academic challenges (Bandura, 1997). Pupils with strong mathematics self-efficacy are more likely to exert effort, continue solving difficult problems, and recover from mistakes, while those with low self-efficacy may avoid challenging tasks and experience anxiety during mathematics activities (Schunk & DiBenedetto, 2020). Closely related to self-efficacy is pupils' attitude toward mathematics, which includes their interest, enjoyment, emotional response, and perceived value of the subject. Expectancy-value theory explains that learners' attitudes are shaped by their expectations for success and the value they attach to learning tasks, both of which influence academic engagement and behavior (Eccles & Wigfield, 2020; Wigfield et al., 2016). When pupils perceive mathematics as useful and believe they can succeed, they are more likely to participate actively and develop favorable attitudes toward the subject. Educational psychology literature emphasizes that mathematics self-efficacy and attitudes are interrelated constructs. Positive self-beliefs may encourage favorable attitudes, while negative beliefs may result in disinterest, avoidance, and anxiety toward mathematics tasks (Usher & Weidner, 2018).

This relationship is especially important among Grade 6 pupils because they are at a transitional stage where attitudes toward mathematics become more stable and may affect their readiness for secondary education.

Foreign and local literature consistently shows that mathematics self-efficacy is strongly linked to learners' attitudes, motivation, anxiety, engagement, and academic performance. Aydoğdu et al. (2025) found that mathematics self-efficacy influences students' liking of mathematics, while Campanilla (2025), Yang et al. (2024), Cere et al. (2025), Asanre et al. (2025), Zhang et al. (2025), Baog et al. (2025), and Ovat et al. (2024) emphasized that self-efficacy is associated with achievement, motivation, attitudes, mathematical creativity, and learning engagement. Studies by Wang et al. (2023), Putri (2021), Shimizu (2025), Sharp et al. (2025), and Zuo et al. (2023) further indicate that mathematics self-efficacy helps reduce anxiety, which is a major barrier to positive attitudes toward mathematics. Several studies also highlight the role of classroom and social support in strengthening pupils' self-efficacy. Chen et al. (2024), Street et al. (2024), Hidayatullah et al. (2024), Bjerke (2025), Granello et al. (2025), and Soraya et al. (2024) reported that teacher support, mastery experiences, engagement, and interventions designed to improve self-efficacy contribute to more favorable attitudes toward mathematics. Other studies such as Laranang and Bondoc (2020), Du et al. (2021), Ferdinand et al. (2024), and Avgin and Ergen (2025) further support the view that self-efficacy, interest, motivation, and attitudes reinforce one another over time. Local studies provide similar evidence in the Philippine context. Oclarit Jr., Lumacad, and Orboda (2025), Lazarra (2025), Campanilla (2025), Velez and Abuzo (2024), Apostol et al. (2023), Comahig and Abuzo (2024), Retutas and Rubio (2021), Dagdag and Calimag (2023), Fetalver and Merano (2021), and Magallon (2025) collectively show that learners with stronger self-efficacy tend to demonstrate lower anxiety, greater motivation, better persistence, and more positive attitudes toward mathematics. These findings support the present study's focus on determining whether Grade 6 pupils' mathematics self-efficacy is significantly related to their attitudes toward the subject. Related studies further confirm that mathematics self-efficacy and attitudes are important affective predictors of learning outcomes. Pellizzoni et al. (2023), Pérez-Fuentes et al. (2020), Hernandez De la Hera et al. (2023), Hughes et al. (systematic review), Ugras (2025), Ruijia et al. (2025), Zhang and Wang (2020), Ochoa et al. (2026), Cerna et al. (2024), Suhardi et al. (2025), Du et al. (2021), Hanub et al. (2023), Amien et al. (2023), Ali and Issahaku (2024), Sinanan (2022), Tican and Gorgun (2020), Nicolaidou and Philippou (2025), Medova et al. (2020), Ding et al. (2024), Asanre et al. (2025), Chivore (2023), Zakariya et al. (2022), Hidayati et al. (2022), and Granello et al. (2025) show that self-efficacy, anxiety, interest, attitude, teacher support, and learning environment interact in shaping mathematics engagement and performance. In the local context, Jandayan (2025), Paguican and Torreon (2020), Pentang et al. (2023), Aquino and Ibarra (2024), Emata (2023), Nambatac (2025), Portento et al. (2022), Mabuti (2024), Misajon (2025), and Solinap (2024) likewise affirm that self-efficacy is closely connected to learners' motivation, attitudes, mathematical disposition, engagement, and achievement. These studies strengthen the rationale for examining the relationship between mathematics self-efficacy and attitudes among Grade 6 pupils in a specific elementary school setting.

Globally, mathematics education remains a major concern because learners' achievement and participation in mathematics are affected by both cognitive and affective factors. International findings show that confidence, anxiety, motivation, and attitudes influence how pupils engage with mathematical tasks (OECD, 2023). At the national level, Philippine studies indicate that mathematics self-efficacy and attitudes are relevant concerns across grade levels, particularly because learners' confidence and motivation influence their performance and participation in mathematics. Locally, the study is situated at B. Titong Elementary School in Barangay B. Titong, Masbate City, Province of Masbate. The school serves learners from the surrounding rural community and offers complete elementary education from Kindergarten to Grade 6 under the supervision of the Department of Education and the K–12 Basic Education Curriculum. The school was selected because its Grade 6 pupils are at a critical stage where mathematics self-efficacy and attitudes continue to develop before the transition to secondary education. Teachers have observed varying levels of confidence, interest, and engagement among pupils, making the school an appropriate setting for examining how self-efficacy relates to attitudes toward mathematics.

This study is anchored on Social Cognitive Theory (Bandura, 1977, 1986), Theory of Planned Behavior (Ajzen, 1991), and Expectancy-Value Theory (Eccles & Wigfield, 2002). Social Cognitive Theory explains that learners' beliefs in their capabilities influence motivation, effort, and perseverance. In this study, it supports the view that pupils who believe they can perform mathematics tasks are more likely to participate, persist, and develop positive attitudes toward mathematics. The Theory of Planned Behavior (Ajzen, 1991) explains that behavior is influenced by attitudes, subjective norms, and perceived behavioral control. This theory supports the study by showing how pupils' attitudes toward mathematics, together with their confidence in their ability to complete mathematical tasks, may influence their engagement, participation, and problem-solving behavior. Expectancy-Value Theory (Eccles & Wigfield, 2002) explains that motivation and performance are shaped by learners' expectations of success and the value they assign to a task. This theory is relevant because pupils who believe they can succeed in mathematics and perceive the subject as meaningful are more likely to show interest, effort, persistence, and positive attitudes. Together, these theories provide the basis for examining the relationship between mathematics self-efficacy and attitudes among Grade 6 pupils. The conceptual framework follows an input-process-output approach. The inputs include the pupils' level of mathematics self-efficacy, attitudes toward mathematics, significant relationship between the two variables, and challenges encountered in developing self-efficacy

and positive attitudes. The process involves survey questionnaire administration, data gathering, presentation, analysis, and interpretation. The output is the identification of the relationship between mathematics self-efficacy and attitudes of Grade 6 pupils at B. Titong Elementary School, which may provide feedback for teachers, school administrators, parents, learners, and other stakeholders.

Although many local and international studies have examined mathematics self-efficacy, most have focused on older learners or on outcomes such as academic achievement, anxiety, motivation, and performance. Limited attention has been given to how mathematics self-efficacy is directly related to attitudes toward mathematics among elementary pupils, particularly Grade 6 learners who are preparing for the transition to secondary education. In the Philippine context, many studies involve broader samples across schools or higher grade levels, which may not fully capture the classroom-based experiences of pupils in a specific elementary school. At B. Titong Elementary School, no study has yet explored the relationship between Grade 6 pupils' mathematics self-efficacy and attitudes toward mathematics, despite observed differences in learners' confidence, interest, and engagement. This study addresses this gap by providing localized empirical evidence that may guide teachers and school administrators in developing strategies to strengthen pupils' confidence and foster more positive attitudes toward mathematics.

This study is primarily aligned with SDG 4 – Quality Education because it focuses on improving pupils' mathematics learning experiences by examining the relationship between self-efficacy and attitudes toward mathematics. By identifying pupils' levels of confidence, persistence, competence, effort, resilience, interest, enjoyment, anxiety, value, and motivation, the study may help teachers and school administrators design more responsive instructional strategies and school-based interventions that support meaningful mathematics learning. The study also relates to SDG 3 – Good Health and Well-Being in a supportive educational sense because mathematics anxiety, low confidence, and negative attitudes can affect learners' emotional experiences in school. By understanding these affective factors, the study may contribute to learner-centered practices that reduce anxiety and promote healthier academic engagement. It may also support SDG 17 – Partnerships for the Goals by encouraging collaboration among the Department of Education, school administrators, teachers, parents, learners, researchers, and the community in promoting positive mathematics learning outcomes.

The study contributes to educational sustainability by generating evidence that may help improve mathematics instruction, learner support, and school-based academic interventions. Strengthening mathematics self-efficacy and positive attitudes may support long-term learning readiness, especially as Grade 6 pupils transition to secondary education. This makes the study relevant not only to mathematics education but also to educational psychology, curriculum development, classroom management, and learner development. The study also contributes to psychosocial and community sustainability by recognizing that pupils' confidence, anxiety, motivation, and attitudes affect how they participate in learning. Improved mathematics self-efficacy may help pupils become more resilient, motivated, and confident learners, while positive attitudes toward mathematics may contribute to better academic performance and stronger future participation in society. At the institutional level, the findings may guide teachers, school administrators, and education stakeholders in creating learner-centered programs that promote inclusive, supportive, and sustainable mathematics education in a local elementary school context.

This study aims to determine the relationship between mathematics self-efficacy and attitudes toward mathematics among Grade 6 pupils at B. Titong Elementary School during School Year 2024–2025. Specifically, it examines pupils' mathematics self-efficacy in terms of confidence, persistence, competence, effort, and resilience; their attitudes toward mathematics in terms of interest, enjoyment, anxiety, value, and motivation; the significant relationship between these two variables; and the challenges encountered by pupils in developing mathematics self-efficacy and positive attitudes toward mathematics. The study is delimited to officially enrolled Grade 6 pupils of B. Titong Elementary School and uses quantitative data gathered through a self-administered survey questionnaire. It does not include other grade levels, other schools, or other subject areas, and it does not examine other possible influencing factors such as socioeconomic status, parental involvement, teacher characteristics, instructional strategies, prior academic achievement, or cognitive ability. Qualitative methods such as interviews, focus group discussions, and classroom observations are also excluded.

2. Material and methods

2.1 Research Design

The study employed a descriptive-correlational research design to examine the relationship between mathematics self-efficacy and attitudes toward mathematics among Grade 6 pupils at B. Titong Elementary School. The descriptive component was used to determine pupils' level of mathematics self-efficacy in terms of confidence, persistence, competence, effort, and resilience, as well as their attitudes toward mathematics in terms of interest, enjoyment, anxiety, value, and motivation. The correlational component was used to determine whether variations in pupils' mathematics self-efficacy were significantly associated with variations in their attitudes toward mathematics. Since the study aimed to describe existing conditions and examine relationships rather than establish causality, the descriptive-correlational design

was appropriate. A descriptive survey approach was also used to identify the challenges encountered by pupils in developing mathematics self-efficacy and positive attitudes toward mathematics.

2.2 Locale of the Study

The study was conducted at B. Titong Elementary School, located in Barangay B. Titong, Masbate City, Province of Masbate, Philippines. The school operates under the supervision of the Department of Education and follows the K–12 Basic Education Curriculum. It offers complete elementary education from Kindergarten to Grade 6 and serves learners from the surrounding rural community. The school was selected as the locale because it caters to Grade 6 pupils who are at a critical stage of elementary education where mathematics self-efficacy and attitudes toward mathematics are further developed before entering secondary education.

2.3 Respondents of the Study

The respondents of the study were the Grade 6 pupils officially enrolled at B. Titong Elementary School during School Year 2024–2025. They were chosen because they represent learners at a stage where confidence, persistence, competence, effort, resilience, interest, enjoyment, anxiety, value, and motivation toward mathematics may significantly influence their learning experiences and readiness for secondary education.

2.4 Sample and Sampling Procedure

The study used total enumeration sampling, wherein all Grade 6 pupils enrolled at B. Titong Elementary School were included as respondents. This sampling procedure was considered appropriate because the population was manageable and accessible, allowing the researcher to gather data from the entire group without selecting only a subset. The use of total enumeration provided comprehensive representation of the Grade 6 pupil population and supported the reliability of the findings. The manuscript also indicates that 35 copies of the survey instrument were reproduced and released to the respondents.

2.5 Research Instrument

The study used a researcher-made questionnaire as the primary data-gathering instrument. The questionnaire was designed to gather information on pupils' mathematics self-efficacy, attitudes toward mathematics, and challenges encountered in developing confidence and positive dispositions toward the subject. It was written in simple and age-appropriate language to help pupils understand and answer the items accurately. The instrument consisted of three parts. The first part measured mathematics self-efficacy in terms of confidence, persistence, competence, effort, and resilience. The second part measured attitudes toward mathematics in terms of interest, enjoyment, anxiety, value, and motivation. The third part identified the challenges encountered by Grade 6 pupils in developing mathematics self-efficacy and positive attitudes toward mathematics, including learning difficulties, emotional factors, classroom experiences, and external influences. All items were rated using a four-point Likert scale: 4 for Strongly Agree, 3 for Agree, 2 for Disagree, and 1 for Strongly Disagree. To ensure validity, the questionnaire was submitted to subject matter experts for content validation. Their suggestions and recommendations were incorporated before the final administration of the instrument. A pilot test was also conducted to determine reliability, and the reliability coefficient was computed using Cronbach's alpha, which indicated that the questionnaire was reliable for use in the study.

2.6 Data Gathering Procedure

The study followed a systematic procedure for data collection. After the thesis proposal was approved by the school thesis committee, the researcher secured a permit to conduct the study. The permit was noted by the researcher's adviser, submitted to the Office of the Schools Division Superintendent for approval, and then forwarded to the school head and teachers for the release of the survey questionnaires. The survey instrument was prepared and approved by the thesis adviser, validated by teachers and other individuals in education, revised based on recommendations, and finalized before administration. The questionnaires were distributed to the respondents with their approval and later retrieved. The manuscript notes that the retrieval of the survey instrument extended beyond the one-month timeframe, which delayed data processing. School activities and other concerns also affected the pace of manuscript preparation. After retrieval, the responses were tallied, statistically treated with the help of an expert statistician, and interpreted to derive the study findings and implications.

2.7 Data Analysis Techniques

The data were analyzed using frequency counts, weighted mean, and Pearson correlation. Frequency counts were used to organize and summarize pupils' responses. The weighted mean was used to determine the level of mathematics self-efficacy, attitudes toward mathematics, and challenges encountered by Grade 6 pupils in developing mathematics self-efficacy and positive attitudes toward mathematics. Pearson correlation was used to determine whether there was a significant relationship between mathematics self-efficacy and attitudes toward mathematics. The interpretation of the correlation coefficient followed the stated ranges in the manuscript, where values from 0.70 to 1 indicated a strong positive linear relationship, 0.40 to 0.69 indicated a moderate positive linear relationship, values close to zero indicated a weak

relationship, 0 indicated no linear relationship, and negative values indicated weak to moderate negative linear relationships depending on their magnitude.

3. Results and Discussion

3.1 Mathematics Self-Efficacy of Grade 6 Pupils

3.1.1 Confidence

The results showed that Grade 6 pupils generally demonstrated a moderate level of confidence in mathematics, with an overall weighted mean of 2.61, interpreted as Agree. The highest-rated indicator was pupils' confidence in understanding new math lessons, with a weighted mean of 2.86. This was followed by confidence in solving math problems correctly, answering math questions in class, and solving word problems, each with a weighted mean of 2.83. However, lower ratings were found in completing math assignments on time, explaining solutions to classmates, improving in math with practice, and remembering formulas and rules, with the lowest weighted mean of 2.31 recorded for remembering math formulas and rules. These findings indicate that pupils are more confident when dealing with guided classroom tasks but less confident in independent performance tasks that require retention, explanation, and sustained responsibility. This suggests the need for instructional strategies that strengthen formula retention, mathematical communication, and independent task completion. Soraya et al. (2024) found that interventions designed to improve self-efficacy resulted in better problem-solving confidence and engagement. Retutas and Rubio (2021) further emphasized that students' attitudes, disposition, and confidence in mathematics are closely associated with self-efficacy levels. Magallon (2025) showed that higher self-efficacy is associated with more positive attitudes and greater enjoyment of mathematics, while Mabuti (2024) emphasized that interactive and engaging instruction strengthens learners' confidence and fosters positive attitudes toward mathematics.

3.1.2 Persistence

The findings revealed that pupils showed a favorable level of persistence in mathematics, with an overall weighted mean of 3.07, interpreted as Agree. The highest-rated indicator was not giving up when they do not understand a math topic, with a weighted mean of 3.60, interpreted as Strongly Agree. This was followed by continuing to work until solving a math problem, with a weighted mean of 3.29, and keeping on learning math even when it is challenging, with a weighted mean of 3.26. The lowest-rated indicator was trying different ways to solve a math problem, with a weighted mean of 2.74. These results suggest that pupils are willing to continue learning and working on mathematics tasks despite difficulty, but they may still need support in using flexible problem-solving strategies and maintaining focus. This aligns with existing research which shows that self-efficacy and persistence are positively correlated constructs in mathematics learning, where students with higher self-efficacy tend to demonstrate greater persistence in engaging with academic tasks and overcoming difficulties. Asoy & Picaza (2025). Furthermore, research examining motivation, self-efficacy, and persistence in mathematics contexts highlights that self-efficacy beliefs contribute meaningfully to students' engagement and sustained effort, underscoring the role of persistence as an important psychological factor in mathematics learning. Madrilejos (2025).

3.1.3 Competence

The pupils generally demonstrated a moderate level of perceived competence in mathematics, with an overall weighted mean of 2.74, interpreted as Agree. The highest-rated indicator was completing math homework correctly, with a weighted mean of 3.23, followed by identifying mistakes in math work, with a weighted mean of 3.17, and using formulas correctly in math exercises, with a weighted mean of 3.00. However, pupils rated themselves lower in solving math problems independently, understanding new lessons easily, and answering questions without help from others, with the lowest weighted mean of 2.31 recorded for the last two indicators. These findings imply that pupils feel more competent when performing familiar or structured tasks, such as homework and formula use, but are less confident when required to work independently or understand new concepts without assistance. This points to the need for guided practice, scaffolding, and gradual development of independent problem-solving skills. Research on mathematics self-efficacy supports these patterns, showing that students' beliefs about their competence are positively associated with their mathematical performance and understanding. Arifin et al., (2021). Furthermore, studies among primary and upper elementary students have shown that higher levels of self-efficacy and perceived competence are linked to better achievement outcomes, though this relationship can be moderated by factors such as anxiety and self-concept Nuñez et.al. (2020), Talib et al., (2022).

3.1.4 Effort

The findings showed that pupils demonstrated a positive level of effort in learning mathematics, with an overall weighted mean of 2.93, interpreted as Agree. The highest-rated indicator was studying math every day, with a weighted mean of 3.20. This was followed by active participation in math class, with a weighted mean of 3.17, and reading and reviewing math materials at home, with a weighted mean of 3.14. The lowest-rated indicator was focusing during math lessons, with a weighted mean of 2.46, interpreted as Disagree. These results indicate that pupils show effort through studying, participating, reviewing, practicing, and asking for help, but maintaining focus during lessons remains a concern. This suggests that mathematics instruction may benefit from more engaging activities, classroom routines, and attention-

building strategies. Hidayatullah, Abidin, and Muqit (2024), found that pupils with higher mathematics self-efficacy exhibited greater behavioral engagement, including consistent study habits and active participation in mathematics tasks.

3.1.5 Resilience

The pupils generally exhibited a positive level of resilience in mathematics, with an overall weighted mean of 2.89, interpreted as Agree. The highest-rated indicator was staying positive when making mistakes in math, with a weighted mean of 3.25. This was followed by trying again when they do not understand a math topic and overcoming frustration in math activities, both with a weighted mean of 3.23. However, the lowest-rated indicator was remaining confident after facing difficult math exercises, with a weighted mean of 2.23, interpreted as Disagree. These findings show that pupils can remain positive and continue trying after mistakes, but their confidence weakens when mathematical exercises become difficult. This implies the need for reinforcement, supportive feedback, and coping strategies that help learners view challenges as opportunities for improvement. Digamo and Abuza (2024), found a positive relationship between mathematics self-efficacy and math resilience among students, indicating that pupils with stronger self-efficacy beliefs tend to demonstrate greater resilience in mathematics learning contexts.

3.2 Attitudes of Grade 6 Pupils Toward Mathematics

3.2.1 Interest

The results showed that pupils had a positive level of interest toward mathematics, with an overall weighted mean of 2.87, interpreted as Agree. The highest-rated indicator was eagerness to solve math exercises, with a weighted mean of 3.17, followed by enjoyment in participating in math activities, with a weighted mean of 3.00. Pupils also agreed that they liked learning math in class and were curious about math concepts, both with a weighted mean of 2.89. The lowest-rated indicator was interest in learning new math topics, with a weighted mean of 2.60. These findings suggest that pupils are more interested in active and participatory mathematics tasks than in encountering new topics. This indicates the importance of using engaging, relatable, and activity-based teaching strategies to sustain pupils' curiosity. Franco (2025), found that Grade 6 pupils' interest in mathematics was significantly correlated with their mathematics performance, indicating that pupils who are interested and motivated are more likely to engage actively in mathematics tasks. Atay (2025) reported that students' interest in mathematical concepts enhances their active participation and willingness to practice problems, aligning with the finding that pupils are most eager to solve math exercises and participate in class activities.

3.2.2 Enjoyment

The findings revealed that pupils had a moderate level of enjoyment in mathematics, with an overall weighted mean of 2.69, interpreted as Agree. The highest-rated indicator was having fun learning math in class, with a weighted mean of 3.11, followed by enjoying math games or activities, with a weighted mean of 3.14, and enjoying sharing math solutions with classmates, with a weighted mean of 2.91. However, pupils disagreed that they enjoyed solving word problems, working on math projects, and participating in math competitions, with the lowest weighted mean of 2.11 recorded for math competitions. These results indicate that pupils enjoy interactive and collaborative mathematics activities, but they are less inclined toward more demanding or competitive tasks. This suggests that teachers may need to make word problems, projects, and competitions more engaging, supportive, and developmentally appropriate. Evidence from longitudinal research indicates that mathematics enjoyment is an important component of students' overall attitude toward mathematics, even as enjoyment may fluctuate across grade levels, which aligns with the moderate enjoyment scores. Chen et al., (2023). Findings from studies involving elementary learners reveal that enjoyment and positive emotional responses toward math activities are related to overall attitudes and engagement, consistent with the result that pupils enjoy sharing solutions and math games. Mazana et al., (2019).

3.2.3 Anxiety

The pupils generally showed a moderate level of confidence and calmness in mathematics, with an overall weighted mean of 2.62, interpreted as Agree. The highest-rated indicator was confidence in participating in math discussions, with a weighted mean of 3.00. This was followed by remaining calm when learning difficult math topics, with a weighted mean of 2.83, and feeling relaxed during math homework, with a weighted mean of 2.77. However, pupils disagreed that they felt confident during math tests, comfortable solving math problems in class, and unafraid to try new math problems, with the lowest weighted mean of 2.20 recorded for not being afraid to try new math problems. These findings suggest that while pupils can participate in discussions and remain calm in some learning situations, anxiety remains evident in tests, in-class problem solving, and unfamiliar tasks. This implies the need for anxiety-reducing strategies, confidence-building activities, and supportive classroom practices. According to Sagarduy et al. (2024), mathematics anxiety is present among primary school students and can affect their emotional responses during mathematics learning. Wang et al. (2023) demonstrated that math self-efficacy mediates the relationship between parenting style and math anxiety, indicating that stronger self-efficacy reduces anxiety. Cere et al. (2025) found that students' mathematics attitudes and self-efficacy were significantly related, while anxiety negatively influenced both.

3.2.4 Value

The findings showed that pupils strongly recognized the value of mathematics, with an overall weighted mean of 3.27, interpreted as Strongly Agree. The highest-rated indicator was the belief that math is important in daily life, with a weighted mean of 3.63. This was followed by seeing math as necessary for success, with a weighted mean of 3.57, and believing that math helps in other subjects and goals, both with a weighted mean of 3.43. The lowest-rated indicator was the belief that math improves thinking skills, with a weighted mean of 2.94, although it was still interpreted as Agree. These results indicate that pupils view mathematics as useful for daily life, success, goals, and personal growth, but they may need deeper understanding of how mathematics develops thinking, problem-solving, and decision-making skills. Evidence from elementary contexts suggests that pupils who understand the relevance of mathematics in solving real-world problems often hold more positive attitudes toward the subject. Mazana et.al. (2019) Studies indicate that students who perceive mathematics as valuable tend to show higher engagement and positive attitudes. Hidayat et al., (2023).

3.2.5 Motivation

The pupils demonstrated a positive level of motivation in mathematics, with an overall weighted mean of 3.14, interpreted as Agree. The highest-rated indicator was aiming to get good grades in math, with a weighted mean of 3.49. This was followed by trying their best to do well in math and staying motivated to learn math every day, both with a weighted mean of 3.40. Seeking help when facing difficulties in math also received a high weighted mean of 3.34. The lowest-rated indicator was working hard to improve math skills, with a weighted mean of 2.83. These findings indicate that pupils are motivated by grades, daily learning, effort, and help-seeking, but sustained work toward skill improvement and timely assignment completion need further strengthening. Baog et al. (2025) established that self-efficacy mediates the relationship between goal setting and academic motivation in mathematics. Motivation and attitude are closely linked, suggesting that pupils with strong self-efficacy develop more positive dispositions toward mathematics. Hidayatullah et al. (2024) showed that self-efficacy mediates motivation and behavioral engagement in primary education. Since engagement reflects attitude, this directly supports the present study's focus on elementary pupils.

3.3 Relationship Between Mathematics Self-Efficacy and Attitudes Toward Mathematics

The Pearson correlation result showed a computed r-value of 0.64, interpreted in the manuscript as a strong positive linear relationship between mathematics self-efficacy and attitudes toward mathematics. With 33 degrees of freedom, a 0.05 level of significance, and a critical r-value of ± 0.3338 , the computed r-value was greater than the critical value. Therefore, the null hypothesis was rejected, indicating that the relationship between mathematics self-efficacy and attitudes toward mathematics was statistically significant. This finding means that pupils who demonstrate higher levels of confidence, persistence, competence, effort, and resilience in mathematics are more likely to show positive attitudes, including interest, enjoyment, motivation, value, and lower anxiety toward the subject. The result suggests that strengthening pupils' self-efficacy through supportive instruction, consistent practice, encouragement, and learner-centered strategies may positively influence their attitudes toward mathematics and contribute to better engagement and academic outcomes.

3.4 Challenges in Developing Mathematics Self-Efficacy and Positive Attitudes

The findings showed that pupils experienced challenges in developing mathematics self-efficacy and positive attitudes, with an overall weighted mean of 2.76, interpreted as Agree. The highest-rated challenge was feeling unsure about their ability to solve math exercises, with a weighted mean of 2.94. This was followed by feeling nervous when solving math problems and having difficulty understanding new math topics, both with a weighted mean of 2.91. Pupils also agreed that they get discouraged when making mistakes, feel anxious during math tests or quizzes, feel frustrated when problems are challenging, and lack motivation to practice or study math. The lowest-rated challenge was feeling bored or uninterested during math activities, with a weighted mean of 2.54. These results indicate that the major challenges are related to uncertainty, nervousness, difficulty understanding new topics, discouragement, anxiety, frustration, and motivation. Such challenges may weaken pupils' confidence, reduce engagement, and affect their attitudes toward mathematics. Learners who struggle with conceptual understanding often develop lower self-confidence and increased anxiety in mathematics. Pérez-Fuentes et al., (2020). Test anxiety and frustration during difficult tasks are barriers to mathematics achievement and positive attitudes. Talib et.al. (2022). Pupils with lower self-efficacy tend to show decreased persistence and engagement, which may contribute to boredom and disengagement in mathematics learning. Arifin, et.al. (2021).

4. Conclusion & Recommendations

The study concluded that Grade 6 pupils at B. Titong Elementary School demonstrated moderate to positive mathematics self-efficacy in terms of confidence, persistence, competence, effort, and resilience, although lower ratings were observed in independent tasks, formula retention, focus, and confidence after difficult exercises. The pupils also showed generally positive attitudes toward mathematics in terms of interest, enjoyment, anxiety, value, and motivation, with strong recognition of the importance of mathematics but some difficulty in handling challenging tasks, word problems, projects, competitions, and unfamiliar problems. The findings further revealed a strong positive linear relationship between mathematics self-efficacy and attitudes toward mathematics, indicating that pupils with higher self-efficacy tend to demonstrate more favorable attitudes toward the subject. Moderate challenges were also identified, particularly in solving

exercises confidently, understanding new topics, maintaining focus, and managing anxiety, frustration, and motivation in mathematics learning.

Based on the findings and conclusions, teachers are encouraged to design classroom strategies that strengthen pupils' confidence in independent tasks such as remembering formulas, completing assignments, and explaining solutions to peers. To improve interest, enjoyment, and motivation, teachers should integrate real-life applications, math games, collaborative projects, and interactive exercises. Interventions should also be introduced to help pupils manage anxiety, maintain concentration, and cope with challenging topics through mindfulness exercises, structured problem-solving routines, gradual exposure to complex tasks, and one-on-one support. Teachers should also model coping strategies, provide feedback focused on effort, and use reflective activities to build persistence and resilience, while future researchers may explore other variables, wider populations, or different approaches to further validate and enrich the study.

The study was limited to officially enrolled Grade 6 pupils of B. Titong Elementary School during School Year 2024–2025 and focused only on mathematics self-efficacy, attitudes toward mathematics, their relationship, and the challenges encountered by pupils in developing confidence and positive attitudes toward the subject. It relied only on quantitative data gathered through a self-administered survey questionnaire and did not include pupils from other grade levels, schools, or subject areas. The study also did not examine other possible influencing factors such as socioeconomic status, parental involvement, teacher characteristics, instructional strategies, prior academic achievement, or cognitive ability, and it excluded qualitative methods such as interviews, focus group discussions, and classroom observations.

Compliance with ethical standards

The study was conducted in accordance with institutional ethical standards and proper research protocols, ensuring that all procedures observed respect for the rights, welfare, and dignity of the respondents. Participation was voluntary, and informed consent was secured before data collection, with the respondents properly informed about the purpose of the study and their right to withdraw at any time. The researcher declares that there is no conflict of interest in the conduct of the study, acknowledges the assistance and contributions of individuals and institutions involved, and affirms that copyright ownership and authorship responsibility are properly observed in accordance with academic and ethical research standards.

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