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Classroom Engagement and Attitudes towards Mathematics among Junior High School Students

Andrea Michelle B. Arre[1], Gerome C. Jatulan[2]

Author Information:
[1-2] Master of Arts in Education Student, Eastern Samar State University Borongan Main Campus, Philippines

Correspondence:
Annmichelle0515@gmail.com

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Abstract. Classroom engagement refers to students' active participation in learning through behavioral actions, emotional involvement, cognitive effort, and social interaction, while attitude toward mathematics describes their beliefs, feelings, and perceptions regarding the subject. This study aimed to assess the levels of classroom engagement and attitudes toward mathematics, as well as determine the relationship between these variables, among 175 junior high school students at Bagacay National High School using a descriptive-correlational research design. Results showed a very high level of cognitive engagement (grand mean = 3.29), with the highest score in seeking alternative solutions when encountering difficulties (M = 3.58); behavioral engagement was high (grand mean = 3.20), marked by strong adherence to instructions (M = 3.50) and perseverance despite challenges (M = 3.31), though active participation in discussions was the lowest (M = 2.85). Social engagement was also high (grand mean = 3.26), with students showing respect and attentiveness to peers (M = 3.59) and willingness to seek teacher assistance (M = 3.39), yet sharing personal ideas remained limited (M = 2.95). Emotional engagement was rated high (grand mean = 2.90), with students reporting anticipation for classes and calmness during lessons (M = 3.08), but confidence in their own mathematical abilities was low (M = 2.66). Overall attitude toward mathematics was positive (grand mean = 2.98); students strongly valued the subject's importance for future work (M = 3.54) and expressed a desire to improve their skills (M = 3.58), though they lacked confidence in advanced topics and class participation (M = 2.56). Statistical analysis revealed a moderate, positive, and significant correlation between classroom engagement and attitude toward mathematics (Spearman's rho = 0.469, $p < 0.05$), confirming that greater engagement is associated with more favorable attitudes toward the subject.

Keywords: Attitude towards Mathematics; Classroom Engagement; Cognitive Engagement; Emotional Engagement; Junior High School Students

Introduction

Mathematics plays a critical role in shaping students' analytical thinking and problem-solving skills, which are essential for academic and real-world success. However, a persistent challenge in mathematics education is students' low engagement and negative attitudes, both of which significantly influence their learning outcomes (Gherasim, Butnaru, & Mairean, 2013).

Classroom engagement refers to students' active involvement in learning activities, including behavioral participation, emotional interest, and cognitive investment (Bond et al., 2020; Reschly & Christenson, 2012). In mathematics, engagement is particularly vital due to the subject's hierarchical structure, where gaps in understanding can hinder long-term learning. Highly engaged students tend to exhibit more persistence, motivation, and willingness to tackle challenging problems (Wang et al., 2019). This aligns with the Self-Determination Theory (Deci & Ryan, 1985), which suggests that students are more likely to engage when their needs for competence, autonomy, and relatedness are supported in the classroom. Despite its importance,

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maintaining student engagement in mathematics classrooms remains a struggle for educators, especially in less urbanized or resource-limited areas.

Attitude toward mathematics, defined as students' emotional disposition and beliefs about the subject, also plays a key role in learning. Research indicates that positive attitudes are strongly associated with increased motivation, self-confidence, and performance in mathematics (Chen et al., 2022). Conversely, negative attitudes contribute to math anxiety and avoidance behaviors, undermining academic success. These attitudes are shaped by various factors, including prior experiences, teaching quality, and perceived usefulness of mathematics. This perspective is supported by the Expectancy-Value Theory (Eccles & Wigfield, 2002), which explains that students' attitudes and engagement are influenced by their expectations of success and the value they assign to the subject.

The relationship between classroom engagement and attitudes toward mathematics is deeply interconnected. Students who are actively engaged in the classroom are more likely to develop positive attitudes, as engagement fosters a sense of competence and achievement. Conversely, students with negative attitudes may disengage from learning activities, creating a cycle that hinders academic success. This reciprocal relationship is further explained by Self-Efficacy (Bandura, 1997), which emphasizes that students' belief in their ability to succeed influences both their level of engagement and their attitudes toward learning. Additionally, the Social Constructivism perspective (Vygotsky, 1978) highlights the importance of active participation and social interaction in enhancing both engagement and meaningful learning in mathematics.

At the junior high school level, students encounter more abstract mathematical concepts, which can either enhance their interest or lead to frustration. This stage is critical because students begin to form long-term perceptions about mathematics that may influence their future academic and career choices (Boaler, 2022). Research indicates that students who experience difficulties during this stage are more likely to develop mathematics anxiety and disengage from learning (Namkung, Peng, & Lin, 2019; Barroso et al., 2021).

In the Philippine context, students' performance in mathematics has been a persistent concern, as reflected in international assessments such as the Programme for International Student Assessment (PISA) (OECD, 2019; OECD, 2022). Various factors, including teaching strategies, classroom environment, and resource availability, contribute to students' engagement and attitudes. Traditional teacher-centered approaches may limit opportunities for active participation, thereby affecting students' interest and motivation (Mladenovici et al., 2022).

Several recent studies have explored either classroom engagement or attitude toward mathematics separately, yet there is limited research examining the relationship between the two, particularly in Philippine public schools. Research on classroom engagement in mathematics has focused on behavioral, emotional, and cognitive involvement, with studies emphasizing its role in promoting persistence and learning outcomes (Lo & Hew, 2021; Papageorgiou, Wong, Liu, Khalil, & Cabo, 2025). On the other hand, studies on attitude toward mathematics highlight its influence on motivation, self-efficacy, and achievement (Hwang & Son, 2021; Capuno et al., 2019). While these studies provide valuable insights, most have been conducted in urban or international contexts, leaving a gap in understanding how these constructs interact in rural schools such as Bagacay National High School in Samar. This lack of localized research hinders the development of targeted interventions that address the unique challenges faced by students in these communities where resources and instructional approaches may differ from those in urban schools (Papageorgiou et al., 2025).

Research Questions

This study aims to assess the level of classroom engagement and attitudes towards mathematics among junior high school students in Bagacay National High School. It also seeks to determine whether a significant relationship exists between these two variables.

Specifically, the study seeks to answer the following questions:

1. What is the level of classroom engagement among students in mathematics classes in terms of:
   1.1 Cognitive engagement?
   1.2 Behavioral engagement?
   1.3 Social engagement?
   1.4 Emotional engagement?
2. What are the students' attitudes towards mathematics?
3. Is there a significant relationship between the level of classroom engagement among students and their attitudes towards mathematics?

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Scope and Delimitation of the Study

This study focuses on examining the relationship between classroom engagement level and students' attitudes towards mathematics. The focus of this study will be the junior high school students who are enrolled in Bagacay National High School. The scope is limited to this group due to accessibility, and the researchers' current affiliation with the school. The researchers are not allowed to conduct off campus visit for the development of this study. Moreover, this study will not cover external factors such as parental influence, socioeconomic status, and previous subject performance which may affect students' attitudes towards mathematics as including these variables would require more extensive data collection methods beyond the researchers' current capacity and approval. The duration of this study will span within the 2nd semester of academic year 2025-2026. This timeframe aligns with the academic calendar and ensures that students have had sufficient exposure to mathematics instruction to provide meaningful responses.

Literature Review

Classroom Engagement Level

Student engagement refers to classroom and related learning practices that yield measurable educational outcomes. It is a multifaceted construct encompassing behavioral, emotional, and cognitive dimensions, all of which significantly influence academic success (Joshi et al., 2022). Engagement is foundational to effective learning; indeed, a school's overall academic performance is closely tied to its students' level of engagement (Rimm-Kaufman et al., 2015). Highly engaged students demonstrate sustained attention, active participation, motivation, and interest in learning, while disengaged students tend to show boredom, passivity, low motivation, and poorer grades. Research further confirms that students with higher engagement attend school more regularly and achieve better results than their less engaged peers (Bear et al., 2018). In mathematics education, engagement is similarly multifaceted, covering affective, cognitive, and behavioral domains, and its quality directly shapes learning outcomes (Al-Mutawah & Fateel, 2018). When students expect to succeed in mathematics, they are more likely to engage deeply with and enjoy the subject (Putwain et al., 2018). There is some variation in how the construct is operationalized: Saqib, Kausar, and Ashraf (2024) conceptualize mathematics learning engagement as three interconnected dimensions—cognitive, social, and emotional—whereas Wang et al. (2016) frame it as four dimensions: cognitive, emotional, behavioral, and social. This study adopts the four-dimensional framework to capture the full scope of engagement observed in classroom settings.

Cognitive Engagement

Cognitive engagement describes students' willingness to invest effort in mastering content and sustaining focus on learning tasks (Prahmana & Gunur, 2019). Koszalka and Lee (2016) note that it can be measured through students' use of cognitive and metacognitive strategies, specifically rehearsal, elaboration, organization, and critical thinking. In mathematics, cognitive engagement involves critical analysis, complex problem-solving, and the deliberate application of mathematical reasoning (Sen, 2022). Students with high cognitive engagement actively seek to grasp underlying principles, apply reasoning to unfamiliar problems, and connect new concepts to prior knowledge; in contrast, students with low cognitive engagement often rely on rote memorization without deep understanding or struggle to transfer concepts to new contexts (Zhang et al., 2023). Notably, Karjanto and Acelajado (2022) found that flipped classroom pedagogy for college algebra significantly improved cognitive engagement alongside greater motivation, learning responsibility, and more positive attitudes toward mathematics, suggesting that instructional approaches can directly shape this dimension of engagement.

Behavioral Engagement

Behavioral engagement refers to the extent to which students actively participate in learning activities, including listening attentively, completing tasks, and joining class discussions (Chiu, 2022; El-Sayad et al., 2021). Broadly, it encompasses the physical actions, effort, and persistence students demonstrate during instruction (Borup et al., 2020). Multiple studies confirm a consistent positive link between behavioral engagement and academic performance (Vermeulen & Volman, 2024). In mathematics, this engagement may be reflected in consistent practice, active group work participation, and timely completion of assignments (Martin & Rimm-Kaufman, 2015). Students who regularly participate in mathematical activities and persist through challenges typically achieve better results, as sustained effort and diligence are critical to mastering hierarchical mathematical concepts. Vermeulen and Volman (2024) add that behavioral engagement can be strengthened through activities

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that maintain focus, encourage effort, reduce barriers, and offer flexibility. Teachers play a key role in fostering this engagement by providing clear instructions, constructive feedback, and a supportive atmosphere where students feel safe taking risks and learning from mistakes (Hong et al., 2020).

Social Engagement

Social engagement involves students' communication, interaction, and sense of belonging and support within academically focused activities (Bond & Bergdahl, 2022). High social engagement is marked by collaborative problem-solving, active group discussion, and the open exchange of ideas during mathematical tasks. Peer learning is particularly valuable here, as discussing strategies and sharing diverse perspectives deepens conceptual understanding for all participants (Roche et al., 2023). Even students with social anxiety may participate in learning during social activities, though their engagement may be less visible or assertive (Bergdahl, 2022). Levels of social engagement are shaped by multiple factors, including teacher leadership, classroom management, instructional approaches, and available resources (Bergdahl & Bond, 2021); feelings of friendship and psychological safety also play critical roles in encouraging students to participate socially (Panadero & Järvelä, 2015). Bergdahl and Hietajärvi (2022) further explain that social engagement covers interaction, reflection, and collaborative learning, and extends beyond individual knowledge construction—though research does not always distinguish clearly between internal student factors and external classroom conditions that drive these practices.

Emotional Engagement

Emotional engagement encompasses students' feelings and perceptions about mathematics, including interest, motivation, and confidence in their abilities. When emotionally engaged, students tend to enjoy the subject, feel capable of succeeding, and persist through setbacks. Teachers can strengthen this engagement through targeted praise and encouragement, particularly when students work through difficult content (Rimm-Kaufman et al., 2015). Strong emotional engagement builds a positive relationship with mathematics, reduces anxiety, and fosters resilience; conversely, low emotional engagement may lead to frustration, boredom, or avoidance that hinders long-term progress (Jansen et al., 2023). Caranfil and Robu (2017) found that a supportive emotional tone from teachers boosts student engagement and academic performance, while Alrajeh and Shindel (2020) note that instructional support has the strongest influence on engagement, followed closely by emotional support—consistent with Daher (2020), who found that effective instructional support positively shapes students' affective experiences in learning.

Programme for International Student Assessment (PISA) 2022 data shows that 79% of Filipino students report their teachers show interest in every learner's progress (compared to the OECD average of 63%), and 81% receive extra support when needed (OECD average: 70%). This highlights the teacher's critical role in creating a safe, responsive environment that meets students' unique needs (Ruzek et al., 2016). A sense of connection to the school community also strengthens emotional engagement, though Subramanian et al. (2017) identify barriers including large class sizes, long lessons, and negative affective states among students or teachers that reduce engagement. Conversely, students who receive consistent emotional support from teachers demonstrate higher engagement across cognitive, social, and emotional domains (Muhtadi et al., 2018). While Sabanal et al. (2024) found that Filipino secondary students have moderate engagement in mathematics overall, there remains room for improvement. Evidence suggests that linking lessons to real-life contexts can boost engagement by making content more relevant to students' daily experiences (O'Connor et al., 2019), and that sustainable mathematics education requires an inclusive, ethically grounded culture that integrates local knowledge systems (Muller, 2025). Ultimately, prioritizing engagement not only improves mathematical achievement but also nurtures long-term appreciation for the subject (Nayir, 2015; Yang et al., 2021).

Attitude Towards Mathematics

Attitude is a distinct domain of affective study, differing from emotion in that it is more cognitive and stable over time; emotions are more fleeting and responsive to immediate circumstances (Goldin et al., 2016). Attitude toward mathematics is a key predictor of academic performance (Reddy et al., 2020). Unlike emotions and beliefs, it is defined as a learned tendency to respond favorably or unfavorably to the subject, shaped by experience and social context (Mazana et al., 2018). Scholars have proposed multiple overlapping frameworks for its core dimensions. Kibrislioglu (2016) describes it as encompassing liking or disliking the subject, willingness to engage in mathematical activities, belief in one's own ability, and perceptions of the subject's usefulness. Davadas and Lay (2017) identify motivation, enjoyment, self-confidence, and perceived value as key components, while Primi et al. (2020) note that it reflects a combination of emotional responses, beliefs, and behaviors. For large-

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scale comparative research such as the Trends in International Mathematics and Science Study (TIMSS), attitude is consistently operationalized through three core dimensions: enjoyment of mathematics, perceived value of mathematics, and confidence in mathematics (Mullis et al., 2020). Researchers also note that academic achievement and attitude form a reciprocal cycle: positive outcomes foster positive feelings, while repeated struggles reinforce negative ones, creating virtuous or vicious patterns over time (Schukajlow et al., 2017).

Positive Attitude toward Mathematics

Students with positive attitudes enjoy mathematics, recognize its practical and academic value, and feel confident in their abilities, making them more likely to prioritize learning the subject (Kiwanuka et al., 2020). Studies consistently link positive attitudes to higher academic achievement (Tuncer & Yilmaz, 2020). Enu, Agyman, and Nkum (2015) found that college students in Ghana held broadly positive attitudes and expressed willingness to learn, while Szczygieł (2023) reported generally positive attitudes among adult learners, suggesting this foundation can support sustained engagement. However, context shapes specific dimensions of attitude: in the Philippines, Capuno et al. (2019) observed that high school students in Cebu valued mathematics highly but showed neutral attitudes toward their own confidence, enjoyment, and motivation. This indicates that positive valuation alone is insufficient to foster fully favorable attitudes, and that interventions must specifically target confidence and enjoyment alongside perceived utility.

Negative Attitude towards Mathematics

Negative attitudes often emerge early: some secondary students report disliking or fearing mathematics since elementary or middle school (Aguilar, 2021). Many perceive the subject as inherently difficult and inaccessible (Gafoor & Kurukkan, 2015), with one study finding 92.5% of respondents disliked mathematics and 86.25% experienced unnecessary anxiety toward it (Suleiman & Hammed, 2019). When students lack confidence in their abilities, they may develop persistent negative perceptions that are difficult to reverse. While some researchers argue attitude is a broader construct that incorporates both emotions and beliefs (Hannula et al., 2016), self-confidence remains a central element (Manzana et al., 2019). Negative attitudes and perceptions of difficulty are key barriers to effective instruction (Enu, Agyman, & Nkum, 2015; Kafata & Mbetwa, 2016), making it critical for teachers to provide consistent encouragement and challenge misconceptions to support both cognitive growth and more positive attitudes.

Relationship between Classroom Engagement Level and Attitude Towards Mathematics

Most existing research demonstrates a close link between engagement and attitudes toward mathematics: more positive engagement is generally associated with more favorable attitudes (Zhang, 2020), though the direction and strength of this relationship vary across contexts. Irvine (2020) found that classroom interventions targeting affect significantly improved both engagement and attitudes among Grade 10 students, emphasizing the need for holistic approaches that address both variables together. In a study of 1,000 secondary learners, Martina et al. (2021) found affective engagement was the strongest predictor of mathematical performance, suggesting that strengthening emotional connections to the subject can drive better outcomes. However, Mzomwe et al. (2019) noted that attitudes tend to decline as students progress through school, and are shaped heavily by teaching practices and the social environment—indicating that interventions must be sustained across grade levels.

Gopal et al. (2018) observed that positive attitudes toward statistics supported greater engagement among university students, while Lazarides et al. (2018) found that teacher support and a positive classroom climate strengthen both engagement and attitudes. Irvine (2020) also confirmed that reform-oriented practices such as active learning and real-world connections improve both variables. Still, important questions remain: Travero and Japos (2024) highlight the need for more research on how teaching methods interact with affective factors like motivation and self-efficacy, particularly in Philippine settings. Marpa (2016) found that affective engagement is shaped by both attitudes and perceived teacher competence, while Wangdi (2023) confirmed that positive attitudes correlate with higher achievement, and that interventions including collaborative learning, anxiety reduction, and growth mindset instruction improved both attitudes and performance. Notably, Sen (2022) found no significant correlation between engagement and attitudes in one middle school sample, indicating the relationship may be context-dependent and requires further local investigation. Overall, research shows that engagement and attitudes are closely connected but distinct, and that instructional strategies supporting participation, relevance, and positive relationships can foster more favorable outcomes in both areas.

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Methodology

Research Design

Descriptive-correlational design was used as a method of this research using questionnaires as the main instrument in data gathering. It was employed in this study since the goal of the researchers is to describe the relationship between students' classroom engagement level and their attitudes towards mathematics subject. Specifically, a descriptive design was utilized to describe the current levels of classroom engagement and attitudes of junior high school students towards mathematics. Moreover, correlational design, according to Creswell (2012), provides an opportunity for researchers to describe and measure the degree of association or relationship between two or more variables using statistical data. Thus, this will be used to determine if there is a significant relationship between classroom engagement and attitudes toward mathematics.

Sampling Design

This study employed proportionate stratified random sampling to ensure fair and representative participation of Junior High School students at Bagacay National High School. The study population consisted of 315 Junior High School students from Grades 7 to 10. Using the Krejcie and Morgan Sample Size Table, a total sample of 175 students was determined. To ensure that each grade level was proportionately represented, the population was stratified according to grade level, and the sample size for each stratum was determined using proportional allocation. Accordingly, 51 students were selected from Grade 7, which had a population of 91; 55 students from Grade 8, with a population of 100; 28 students from Grade 9, with a population of 50; and 41 students from Grade 10, with a population of 74. Within each grade-level stratum, participants were selected through simple random sampling, giving every student an equal opportunity to be included in the study. This sampling procedure helped ensure that the final sample accurately reflected the distribution of students across the different grade levels.

Research Locale

This study was conducted at Bagacay National High School, a public secondary educational institution located in the municipality of Hinabangan, Samar, Philippines. The school offers education from junior to senior high school levels, adhering to the K-12 curriculum implemented by the Department of Education. This locale was selected due to the researchers' accessibility to the participants and familiarity with the school environment. Within this locale, the researchers endeavor to capture the classroom engagement levels including the emotional, cognitive, social and behavioral engagement, and students' attitude towards mathematics. Conducting the study in this locale allowed the researchers to gather first-hand data from a relevant and manageable population.

Research Participants

The respondents of this study were the bonafide junior high school students of Bagacay National High School, during the academic year 2025-2026. This study comprises the 315 Grade 7 - 10 students of Bagacay National High School. The selection of the respondents included all students from all sections of all grade levels who are enrolled in mathematics classes. This cohort was selected to provide comprehensive insights into the classroom engagement levels and students' attitude towards mathematics.

Research Instrument

The research instruments used in this study were adapted from established and widely used measurement tools, namely the Student Engagement Instrument (SEI) developed by Appleton et al. (2006) and the Fennema-Sherman Mathematics Attitude Scales (FSMAS) developed by Fennema and Sherman (1976). Both instruments have been extensively used in educational research and have demonstrated strong psychometric properties across different contexts. In the Philippine setting, the SEI has been reported to yield high internal consistency, with a Cronbach's alpha of 0.922 (Murillo & Tan, 2019), indicating excellent reliability in measuring student engagement. Likewise, the FSMAS has been utilized in local research involving Filipino secondary and senior high school students, where it was adapted to measure learners' attitudes toward mathematics, particularly in terms of confidence, usefulness, and anxiety. One Philippine-based study that employed a modified FSMAS among senior high school students found that the instrument was appropriate for the local context and produced acceptable reliability results (Sanchez & Perez, 2023). Given that both instruments have been used and validated in international and Philippine contexts, they were deemed suitable for this study. The established use of these

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instruments in local studies provides sufficient evidence of their appropriateness for measuring classroom engagement and attitudes toward mathematics among junior high school students. All items in the questionnaire will be rated using a 4-point Likert scale**,** ranging from 1 (Strongly Disagree) to 4 (Strongly Agree).

Data Gathering Procedure

The researchers employed a quantitative descriptive-correlational design to collect and analyze data. Prior to the data collection, the researchers first sought permission from the school principal of Bagacay National High School and obtained informed consent from the participants. A standardized survey questionnaire was used as the main data gathering tool. The questionnaire was divided into two parts: the first part assessed the level of classroom engagement during mathematics classes, and the second part measured students' attitudes towards mathematics. Both parts used a Likert scale to quantify responses. Once the necessary approvals are granted, the researchers administered the questionnaires to all participants during their available class periods. Participants were given instructions and sufficient time to answer the questionnaire. In this study, two primary variables will be measured**:** classroom engagement and student attitude towards mathematics**.** Each variable was assessed using an adapted version of a standardized instrument to ensure reliability and validity. The level of classroom engagement was measured using selected items from the Student Engagement Instrument (SEI). The following scale was used to interpret the respondent's responses on their classroom engagement, which is adapted from Fredricks, Blumenfeld, & Paris (2004).

To determine the level of classroom engagement among students in mathematics classes in terms of behavioral, social, and emotional engagement, the study used descriptive statistical tools such as mean and standard deviation. Each subscale of engagement was analyzed separately using the weighted mean to determine the average level of student responses. These results will be interpreted based on a predefined scale to categorize engagement levels as very low, low, high, or very high. Moreover, to determine the students' attitudes towards mathematics, a similar descriptive approach was applied. Student responses were summarized using weighted means to measure their overall attitude toward the subject. This allowed the researchers to assess whether students have strongly negative, negative, positive, or strongly positive attitudes towards mathematics. Finally, to determine whether there is a significant relationship between classroom engagement and students' attitude toward mathematics, the study employed a correlational design. Specifically, the Pearson Product-Moment Correlation Coefficient (Pearson r) was used to examine the strength and direction of the relationship between the two variables. This statistical test is appropriate since the Shapiro–Wilk test indicated that both classroom engagement and students' attitudes toward mathematics were normally distributed. The analysis evaluated whether higher levels of classroom engagement are associated with more positive attitudes toward mathematics. The level of significance was set at 0.05. If the computed p-value is less than 0.05, the result is considered statistically significant, indicating a meaningful relationship between the two variables.

Results and Discussions

Problem 1: What is the level of classroom engagement among students in mathematics classes in terms of Cognitive Engagement, Behavioral engagement, social engagement, and Emotional engagement?

Table 1. Students' Level of Cognitive Engagement

	Indicators	Mean	SD	Interpretation
1.	Connecting new math lessons to prior knowledge	3.32	0.795	Very High
2.	Looking for different ways to solve math problems when they get stuck.	3.58	0.507	Very High
3.	Understand the reasoning behind math concepts, not just memorize steps.	3.26	0.476	Very High
4.	Staying focused on math tasks, even when they are difficult.	3.08	0.638	High
5.	Self-questioning to ensure understanding of what they are learning in math.	3.18	0.555	High
	Grand Mean	**3.29**		**Very High**

Table 1 reflects a very high level of cognitive engagement in mathematics among the students, with a grand mean of 3.29. This indicates that learners are actively involved in thinking processes such as understanding

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concepts, making connections, and applying problem-solving strategies. Among the indicators, the highest mean score (M=3.58; SD=0.507) was obtained for *"looking for different ways to solve math problems when stuck,"* suggesting that students exhibit strong persistence and flexibility in problem-solving. Similarly, students showed a high tendency to connect new lessons to prior knowledge (M=3.32; SD = 0.795) and to understand the reasoning behind mathematical concepts (M=3.26; SD=0.476), both interpreted as very high engagement. On the other hand, indicators such as *staying focused during difficult tasks* (M=3.08; SD=0.638) and *self-questioning for understanding* (M=3.18; SD=0.555) were rated as high, indicating that while students are generally engaged, there is still some variability in sustaining attention and metacognitive practices. The very high cognitive engagement observed among students reflects a strong capacity for flexible problem-solving and making connections between new and prior knowledge. This finding aligns with Balacuit et al. (2025), who reported that Filipino junior high school students who employ deeper cognitive strategies tend to perform better academically. This pattern can be explained by Self-Determination Theory, particularly the need for competence, which suggests that students engage more deeply when they feel capable of mastering learning tasks.

Table 2. Students' Level of Behavioral Engagement

	Indicators	Mean	SD	Interpretation
1.	Paying attention during math lessons.	3.06	0.538	High
2.	Completing math assignments on time.	3.27	0.627	Very High
3.	Actively participate in math class discussions.	2.85	0.526	High
4.	Trying hard to do well in math, even when it's difficult.	3.31	0.946	Very High
5.	Following teacher's instructions during math class.	3.50	0.615	Very High
	Grand Mean	**3.20**		**High**

Table 2 reveals that students exhibited a high level of behavioral engagement with a grand mean of 3.20. This implies that students generally display observable behaviors associated with participation and effort in mathematics classes. The highest-rated indicators include *following the teacher's instructions* (M=3.50; SD=0.615) and *trying hard to do well despite difficulty* (M=3.31; SD=0.946), both interpreted as very high engagement. These findings indicate that students are disciplined and demonstrate perseverance in completing mathematical tasks. Additionally, *completing assignments on time* (M=3.27; SD=0.627) also received a very high rating, reflecting students' responsibility and commitment to academic tasks. However, *active participation in class discussions* recorded the lowest mean (M=2.85; SD=0.526), although still interpreted as high. This suggests that while students are generally compliant and hardworking, they may be less confident or less inclined to verbally engage during discussions. The high behavioral engagement observed, particularly in following instructions and persisting despite difficulty, reflects sustained motivation in learning tasks. However, the lower active participation in class discussions is consistent with the High School Survey of Student Engagement (Yazzie-Mintz, 2010), which reported that many students are "present but not participating." Anabo (2020) also noted a gap between classroom compliance and actual performance among Filipino learners. This pattern may also be understood through Self-Determination Theory, as limited autonomy in classroom participation may reduce students' willingness to actively engage in discussions.

Table 3. Students' Level of Social Engagement

	Indicators	Mean	SD	Interpretation
1.	Comfortable working with classmates during math group activities.	3.13	0.895	High
2.	Helping classmates when they don't understand a math problem.	3.22	0.645	High
3.	Ask questions or seek help from the teacher when needed	3.39	0.566	Very High
4.	Enjoy sharing math ideas with others in class.	2.95	0.689	High
5.	Listening and respecting classmates' ideas in group work.	3.59	0.492	Very High
	Grand Mean	**3.26**		**Very High**

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As shown in Table 3, students demonstrated a high level of social engagement in the mathematics classroom, with a grand mean of 3.26. The highest-rated indicator was *listening and respecting classmates' ideas in group work* (M=3.59, SD=0.492), which fell within the Very High interpretation. This suggests that students strongly value mutual respect and active listening during collaborative activities. Similarly, *asking questions or seeking help from the teacher when needed* also received a Very High rating (M=3.39, SD=0.566), indicating that students feel comfortable seeking academic support when necessary. The indicator *helping classmates when they don't understand a math problem* yielded a high mean score (M=3.22, SD=0.645), reflecting a willingness to provide peer assistance. Likewise, *feeling comfortable working with classmates during math group activities* also received a high rating (M=3.13, SD=0.895). The lowest-rated indicator in the social engagement dimension was "Enjoy sharing math ideas with others in class" (M=2.95, SD=0.689), which, while still interpreted as High, suggests that students may be slightly less enthusiastic about verbally sharing their own mathematical thinking compared to other forms of social interaction. In terms of social engagement, students demonstrated strong receptive behaviors such as listening to classmates and seeking help from teachers. However, their lower willingness to share mathematical ideas suggests limited expressive participation. This is consistent with Turner et al. (2002), who noted that adolescents often experience social anxiety when explaining mathematical reasoning. In the Philippine rural context, Gahi and Edig (2026) found that collaborative problem-solving enhances engagement, with emotional intelligence playing a mediating role. These findings are explained by Social Constructivism, which emphasizes that learning is constructed through interaction, dialogue, and shared meaning-making.

Table 4. Students' Level of Emotional Engagement

	Indicators	Mean	SD	Interpretation
1.	Enjoying learning new math topics.	2.94	0.704	High
2.	Feeling excited when solving a difficult math problem.	2.75	0.972	High
3.	Feeling confident in math abilities.	2.66	0.658	High
4.	Looking forward to attend math class.	3.08	0.900	High
5.	Feeling calm and confident during math lessons.	3.08	0.715	High
	Grand Mean	**2.90**		**High**

Table 4 reveals that a high level of emotional engagement was observed among students with grand mean scores consistently falling within the high range across all five indicators. The highest means were observed in *looking forward to attending math class* (M=3.08, SD=0.900) and *feeling calm and confident during math lessons* (M=3.08, SD=0.715), both interpreted as High. The indicator *enjoying learning new math topics* yielded a mean of 2.94 (SD = 0.704), interpreted as High. Lower, though still within the High range, were *feeling excited when solving a difficult math problem* (M=2.75, SD=0.972) and *feeling confident in math abilities* (M=2.66, SD=0.658). The standard deviation for excitement (SD=0.972) indicates greater variability among students compared to other indicators. For emotional engagement, lower confidence and reduced excitement toward challenging problems can be explained through the Self-Efficacy Theory. This theory posits that students' beliefs in their capability to succeed strongly influence their motivation, persistence, and emotional responses. In this study, lower confidence may have contributed to hesitation and reduced positive emotions toward mathematics tasks.

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Problem 2: What are the students' attitudes towards mathematics?

Table 5. Students' Level of Attitude towards Mathematics

	Indicators	Mean	SD	Interpretation
1.	Being sure that mathematics can be learned.	3.26	0.634	Strongly Positive
2.	Believing that Math will be important in life's work.	3.54	0.604	Strongly Positive
3.	Math is a worthwhile, necessary subject.	3.27	0.551	Strongly Positive
4.	Using mathematics in many ways as an adult.	3.17	0.526	Positive
5.	Being naturally curious about how math works.	3.07	0.649	Positive
6.	Enjoying math because it helps reach academic goals.	3.38	0.709	Strongly Positive
7.	Valuing math because it is used in everyday life.	3.02	0.735	Positive
8.	Feeling happy and rewarded when understanding a math topic.	3.08	0.647	Positive
9.	Respecting math because it teaches discipline and logic.	3.42	0.495	Strongly Positive
10.	Wanting to excel in math to reach future career goals.	3.50	0.624	Strongly Positive
11.	Staying motivated in math because it aligns with values and beliefs.	2.85	0.929	Positive
12.	Would like to have a career or a job that involves math.	2.85	0.695	Positive
13.	Finding math problems interesting and challenging.	2.87	0.864	Positive
14.	Feeling positive when getting good grades in math.	3.23	0.425	Positive
15.	Believing effort in math will lead to success.	3.26	0.725	Strongly Positive
16.	Seeing a purpose for what is being learned in math	3.07	0.732	Positive
17.	Wanting to develop mathematical skills even more.	3.58	0.561	Strongly Positive
18.	Being confident to learn advanced mathematics	2.56	0.612	Positive
19.	Comfortable answering questions in math class.	2.56	0.583	Positive
20.	Believing studying mathematics helps with problem-solving in other subjects.	3.24	0.428	Positive
	Grand Mean	**2.98**		Positive

Table 5 summarizes students' attitudes toward mathematics, with means ranging from 2.56 to 3.58 on a 4-point scale. The overall grand mean was 2.98, interpreted as Positive. The highest-rated indicator was *wanting to develop mathematical skills even more* (M=3.58, SD = 0.561), followed by *math being important in life's work* (M=3.54, SD=0.604), and *wanting to excel in math to reach future career goals* (M=3.50, SD=0.624), all interpreted as Strongly Positive. Other indicators that fell under Strongly Positive included *respecting math for teaching discipline and logic* (M=3.42, SD=0.495), *enjoying math because it helps reach academic goals* (M=3.38, SD=0.709), *math being a worthwhile and necessary subject* (M=3.27, SD=0.551), *being sure that math can be learned* (M=3.26, SD=0.634), and *believing effort in math leads to success* (M=3.26, SD=0.725).

Indicators interpreted as Positive included *feeling positive when getting good grades in math* (M=3.23, SD=0.425), *using mathematics in many ways as an adult* (M=3.17, SD=0.526), *believing that studying mathematics helps with problem-solving in other subjects* (M=3.24, SD=0.428), *feeling happy and rewarded when understanding a math topic* (M=3.08, SD=0.647), *seeing a purpose for what is being learned in math* (M=3.07, SD=0.732), *being naturally curious about how math works* (M=3.07, SD=0.649), *valuing math because it is used in everyday life* (M=3.02, SD=0.735), *finding math problems interesting and challenging* (M=2.87, SD=0.864), *staying motivated in math because it aligns with values and beliefs* (M=2.85, SD=0.929), *wanting a career or job that involves math* (M=2.85, SD=0.695), *being confident to learn advanced mathematics* (M=2.56, SD=0.612), and *being comfortable answering questions in math class* (M=2.56, SD=0.583).

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Problem 3: Is there a significant relationship between the level of classroom engagement among students and their attitudes towards mathematics?

Table 6. Correlation of the Classroom Engagement and Attitude towards Mathematics Among Junior High School Students in BNHS

Variables	r	p-value	df	Interpretation
Classroom Engagement & Attitude toward Mathematics	0.481	<.001	173	Moderate Positive

Table 6 presents the correlation analysis between classroom engagement and attitude toward mathematics among junior high school students. A moderate, positive, and significant correlation was found between the two variables. This indicates that as classroom engagement increases, attitude toward mathematics tends to increase in a similar direction. The correlation coefficient of 0.481 falls within the moderate range, suggesting a meaningful association between the two constructs. The p-value of < .001 indicates that the observed correlation is statistically significant at the 0.05 alpha level.

Table 7. Correlation between Classroom Engagement Subscales and Attitude Towards Mathematics Among Junior High School Students in BNHS

Variables	r	p-value	df	Interpretation
CE - AT	0.288	<.001	173	Weak Positive
BE - AT	0.376	<.001	173	Moderate Positive
SE – AT	0.375	<.001	173	Moderate Positive
EE - AT	0.293	<.001	173	Weak Positive

Table 7 presents the correlation analysis between the different dimensions of classroom engagement and students' attitude toward mathematics among junior high school students. A weak to moderate, positive, and significant relationship was found between all engagement subscales and students' attitude toward mathematics. This indicates that as students become more engaged cognitively, behaviorally, emotionally, and socially, their attitude toward mathematics tends to improve. The correlation coefficients showed that cognitive engagement (r = 0.288), behavioral engagement (r = 0.376), emotional engagement (r = 0.293), and social engagement (r = 0.375) all fall within the weak to moderate positive range, suggesting meaningful but varying associations between each dimension of engagement and attitude toward mathematics. All correlations were statistically significant (p < .001), indicating that the observed relationships are unlikely due to chance. The moderate, positive, and significant correlation between classroom engagement and attitude toward mathematics suggests that these constructs are related but distinct. This finding aligns with Expectancy-Value Theory, which explains that students' motivation is shaped by both their expectations of success and the value they place on learning tasks. In this study, students showed higher perceived usefulness of mathematics but lower self-concept and attainment value, which may explain the moderate relationship between engagement and attitude.

Ethical Considerations

Before the conduct of this study, the researchers followed the appropriate ethics guidelines. Consent from the participants was secured prior to the usage of their responses given. The researchers provided sufficient information and assurance for them to understand and to be fully informed about the study. The researchers ensured that participants were fully informed about the purpose, procedure, and benefits of the research. They were given freedom whether to take part in it without any pressure. All students who participated in this study was assured that their responses will be kept confidential and cannot be used in any legal actions against them. The researchers also ensured that the identity and personal information of the respondents will be protected. The researchers also adhere to the Data Privacy Act and ensured that the gathered data will be stored and used ethically and responsibly.

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Conclusions

Based on the results of this study, it is concluded that students in Bagacay National High School in Samar demonstrate very high cognitive engagement and high behavioral engagement in mathematics, particularly in flexible problem-solving, following instructions, and persisting through difficulty. However, areas of weakness were identified in active class participation, sharing mathematical ideas, confidence, and excitement toward challenging problems. Students also exhibited high levels of social engagement in receptive forms such as listening and respecting peers, but lower willingness to express their own mathematical thinking. Furthermore, a moderate, positive, and significant correlation was found between classroom engagement and attitude toward mathematics, indicating that more engaged students tend to hold more positive attitudes toward the subject.

Recommendations

The probable implications of these findings are twofold. First, classroom interventions should target not only cognitive and behavioral engagement but also the expressive aspects of social engagement and the emotional confidence of students. Strategies such as low-anxiety participation structures, think-pair-share activities, growth mindset messaging, and scaffolded problem-solving tasks may help address these gaps. Second, because engagement and attitudes are positively correlated, schools should address both dimensions simultaneously rather than isolation. By addressing both engagement and attitudes together, educators can help improve mathematics learning outcomes for junior high school students in rural and underserved communities. For future research, similar studies should be conducted across different grade levels, school types, or regions to validate these findings and may employ mixed-method or longitudinal designs and examine other contributing factors such as instructional approaches and family support to gain a more comprehensive understanding of how engagement and attitudes evolve and influence one another.

References

Anabo, R. O. (2023). Correlates of mathematics performance of Grade 9 learners in secondary schools division of Eastern Samar amidst pandemic. *EPRA International Journal of Multidisciplinary Research*, 9(6), 1–10. https://doi.org/10.36713/epra2023

Barroso, C., Ganley, C. M., McGraw, A. L., Geer, E. A., Hart, S. A., & Daucourt, M. C. (2021). A meta-analysis of the relation between math anxiety and math achievement. *Psychological Bulletin*, 147(2), 134–168. https://doi.org/10.1037/bul0000307

Boaler, J. (2022). *Mathematical mindsets: Unleashing students' potential through creative math, inspiring messages and innovative teaching* (2nd ed.). Jossey-Bass.

Bond, M., Buntins, K., Bedenlier, S., Zawacki-Richter, O., & Kerres, M. (2020). Mapping research in student engagement and educational technology in higher education: A systematic evidence map. *International Journal of Educational Technology in Higher Education*, 17, Article 2. https://doi.org/10.1186/s41239-019-0176-8

Capuno, R., Necesario, R., Etcuban, J. O., Espina, R., Padillo, G., & Manguilimotan, R. (2019). Attitudes, study habits, and academic performance of junior high school students in mathematics. *International Electronic Journal of Mathematics Education*, 14(3), 547–561. https://doi.org/10.29333/iejme/5768

Chen, L., Bae, S. R., Battista, C., Qin, S., Chen, T., Evans, T. M., et al. (2018). Positive attitude toward math supports early academic success: Behavioral evidence and neurocognitive mechanisms. *Psychological Science*, 29(3), 390–402. https://doi.org/10.1177/0956797617735528

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74(1), 59–109. https://doi.org/10.3102/00346543074001059

Gherasim, L. R., Butnaru, S., & Mairean, C. (2013). Classroom environment, achievement goals and maths performance: Gender differences. *Educational Studies*, 39(1), 1–12. https://doi.org/10.1080/03055698.2012.663480

Guijarmo, A. C. (2022). *Barriers in teaching-learning mathematics in rural senior high schools: Bases for instructional improvement plan* [Doctoral dissertation, West Visayas State University]. WVSU Institutional Repository and Electronic Dissertations and Theses PLUS.

Hwang, S., & Son, T. (2021). Students' attitude toward mathematics and its relationship with mathematics achievement. *Journal of Education and e-Learning Research*, 8(3), 272–280. https://files.eric.ed.gov/fulltext/EJ1313916.pdf

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https://ijroms.com
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Lazarides, R., Buchholz, J., & Rubach, C. (2018). Teacher enthusiasm and self-efficacy, student-perceived mastery goal orientation, and student motivation in mathematics classrooms. *Teaching and Teacher Education*, 69, 1–10. https://doi.org/10.1016/j.tate.2017.08.017

Lo, C. K., & Hew, K. F. (2021). Student engagement in mathematics flipped classrooms: Implications of journal publications from 2011 to 2020. *Frontiers in Psychology*, 12, 672610. https://doi.org/10.3389/fpsyg.2021.672610

Martina, M., et al. (2021). The influence of student engagement on mathematical achievement among secondary school students. *Mathematics*, 10(1), 41. https://doi.org/10.3390/math10010041

Mladenovici, V., Ilie, M. D., Maricuțoiu, L. P., & Iancu, D. E. (2022). Approaches to teaching in higher education: The perspective of network analysis using the revised approaches to teaching inventory. *Higher Education*, 84, 255–277. https://doi.org/10.1007/s10734-021-00766-9

Namkung, J. M., Peng, P., & Lin, X. (2019). The relation between mathematics anxiety and mathematics performance among school-aged students: A meta-analysis. *Review of Educational Research*, 89(3), 459–496. https://doi.org/10.3102/0034654319843494

OECD. (2019). *PISA 2018 results (Volume I): What students know and can do*. OECD Publishing. https://doi.org/10.1787/5f07c754-en

OECD. (2021). *Education at a glance 2021: OECD indicators*. OECD Publishing. https://doi.org/10.1787/b35a14e5-en

OECD. (2023). *PISA 2022 results (Volume I): The state of learning and equity in education*. OECD Publishing. https://doi.org/10.1787/53f23881-en

P. Balacuit, I. C., B. Nabua, E., & G. Saludares, J. R. (2025). Examining conceptual understanding and engagement in mathematics students. *Indonesian Journal of Mathematics Education*, 8(1), 1–15.

Papageorgiou, E., Wong, J., Liu, Q., Khalil, M., & Cabo, A. (2025). A systematic review on student engagement in undergraduate mathematics: Conceptualization, measurement, and learning outcomes. *Educational Psychology Review*, 37, Article 66. https://doi.org/10.1007/s10648-025-10046-y

Reschly, A. L., & Christenson, S. L. (Eds.). (2012). *Handbook of research on student engagement*. Springer. https://doi.org/10.1007/978-1-4614-2018-7

Reschly, A. L., & Christenson, S. L. (2022). Jingle-jangle revisited: History and further evolution of the student engagement construct. In A. L. Reschly & S. L. Christenson (Eds.), *Handbook of research on student engagement* (pp. 3–24). Springer. https://doi.org/10.1007/978-3-031-07853-8_1

Schunk, D. H., & DiBenedetto, M. K. (2020). Motivation and social cognitive theory. *Contemporary Educational Psychology*, 60, 101832. https://doi.org/10.1016/j.cedpsych.2019.101832

Wang, M. T., Degol, J. L., & Henry, D. A. (2019). An integrative development-in-sociocultural-context model for children's engagement in learning. *American Psychologist*, 74(9), 1086–1102. https://doi.org/10.1037/amp0000522

