Studies in Interdisciplinary Horizons
https://sih-journal.com | eISSN: 3082-5792
Volume 2 Issue No. 2| 2026
Received: March 3, 2026| Accepted: May15, 2026| June 15, 2026

Article

Transforming Mathematics Education Through Learner Attitudes and Engagement: An Analysis Among Elementary Pupils in the Santo Tomas District

[1] **Eugine A. Agpaoa**
Biga Integrated School
Correspondence: eugine.agpaoa@deped.gov.ph

Abstract

Learner attitudes and engagement significantly influence mathematics learning outcomes and classroom participation among elementary pupils. This study explored how learner attitudes and engagement shape mathematics education among elementary pupils in the Santo Tomas District. Anchored on Constructivist Learning Theory and Student Engagement Theory, the study employed a descriptive qualitative research design to examine learners' experiences, perceptions, participation patterns, and emotional responses toward mathematics learning. Participants included selected elementary pupils and mathematics teachers from public elementary schools within the Santo Tomas District. Data were gathered through semi-structured interviews, focus group discussions, classroom observations, and document analysis. Braun and Clarke's (2006) thematic analysis approach was utilized in analyzing the gathered data. Findings revealed that positive learner attitudes toward mathematics are influenced by supportive instructional practices, collaborative classroom environments, contextualized teaching approaches, and encouraging teacher-learner relationships. Learners demonstrated stronger engagement when mathematics lessons were interactive, practical, and connected to real-life experiences. However, mathematical anxiety, low confidence, fear of making mistakes, and difficulties in understanding abstract concepts negatively affected participation and learning motivation. The findings further revealed that learner-centered and emotionally supportive mathematics instruction contributes significantly to improving learner engagement and positive attitudes toward mathematics education. The study concludes that transforming mathematics education requires responsive pedagogical approaches that strengthen learner confidence, participation, and meaningful engagement. Strengthening contextualized mathematics instruction, collaborative learning practices, and supportive classroom environments is recommended to improve mathematics learning experiences among elementary pupils.

Keywords: *mathematics education, learner attitudes, student engagement, mathematics learning, elementary pupils, contextualized instruction, learner-centered pedagogy*

1. Introduction

Mathematics education plays a fundamental role in developing learners' analytical thinking, logical reasoning, problem-solving abilities, and decision-making skills. As one of the core learning areas in elementary education, mathematics serves as an essential foundation for learners' academic growth and future educational success. However, despite its significance, mathematics remains one of the most challenging and anxiety-inducing subjects for many learners, particularly among elementary pupils who are still developing foundational numeracy and conceptual understanding.

Learner attitudes and engagement are among the most influential factors affecting mathematics achievement and participation. Positive attitudes toward mathematics often lead to increased learner motivation, active classroom participation, persistence in solving mathematical tasks, and stronger academic performance. Conversely, negative attitudes, fear of failure, mathematical anxiety, and disengagement may contribute to poor participation and reduced learning outcomes. Student engagement refers to learners' behavioral, emotional, and cognitive involvement in learning activities. Engaged learners actively participate in classroom discussions, demonstrate interest in lessons, collaborate with peers, and invest effort in understanding mathematical concepts. In elementary education, learner engagement becomes especially important because early experiences in mathematics significantly shape children's perceptions, confidence, and future attitudes toward the subject.

Within the Philippine educational context, improving learner engagement and attitudes in mathematics education remains a continuing challenge. Results from international educational assessments have highlighted concerns regarding learners' mathematical proficiency and conceptual understanding. These realities emphasize the importance of examining classroom experiences, learner attitudes, instructional practices, and engagement processes that influence mathematics learning among elementary pupils.

In the Santo Tomas District, elementary teachers encounter varying learner attitudes and participation patterns during mathematics instruction. While some pupils demonstrate enthusiasm and confidence during mathematics activities, others experience fear, hesitation, anxiety, and disengagement. Factors such as instructional strategies, classroom environment, teacher support, peer interaction, and contextualized learning experiences may influence learners' engagement and attitudes toward mathematics education.

Several studies emphasized that learner attitudes and engagement significantly affect mathematics achievement and learning experiences. Fredricks et al. (2019) explained that student engagement encompasses behavioral, emotional, and cognitive dimensions that shape learners' participation and educational experiences. Similarly, Boaler (2021) argued that learner-centered and collaborative mathematics instruction strengthens confidence, engagement, and conceptual understanding among learners.

Despite the growing literature on mathematics education, there remains limited qualitative research focusing on the lived experiences, attitudes, and engagement practices of elementary pupils in rural Philippine school contexts. Thus, this study aimed to explore how learner attitudes and engagement shape mathematics education among elementary pupils in the Santo Tomas District.

2. Theoretical Framework

This study was anchored on Constructivist Learning Theory by Vygotsky (1978) and Student Engagement Theory by Fredricks, Blumenfeld, and Paris (2004).

Constructivist Learning Theory posits that learners actively construct knowledge through social interaction, collaboration, reflection, and meaningful experiences. Learning occurs when learners are actively involved in instructional activities and are able to connect new concepts with prior knowledge and real-life situations. Teachers serve as facilitators who guide learners through interactive and learner-centered learning processes.

Student Engagement Theory explains that learner engagement consists of behavioral engagement, emotional engagement, and cognitive engagement. Behavioral engagement refers to active participation in classroom activities, emotional engagement involves learners' feelings and attitudes toward learning, while cognitive engagement reflects learners' mental investment and effort in understanding academic tasks.

These theories provided the framework for understanding how instructional practices, classroom interactions, learner attitudes, and engagement experiences influence mathematics learning among elementary pupils.

3. Objectives of the Study

This study aimed to explore how learner attitudes and engagement influence mathematics education among elementary pupils in the Santo Tomas District. Specifically, it sought to examine learners' experiences and perceptions toward mathematics learning and determine how pupils demonstrate behavioral, emotional, and cognitive engagement during mathematics instruction. The study further aimed to identify instructional practices and classroom strategies that contribute to positive learner attitudes and sustained engagement in mathematics education. Additionally, it intended to explore the challenges encountered by learners in participating in mathematics activities and understanding mathematical concepts. Finally, the study aimed to derive insights from learners' experiences that may serve as basis for strengthening instructional practices and improving mathematics engagement among elementary pupils.

4. Methodology

This study employed a descriptive qualitative research design to explore the attitudes, engagement practices, and learning experiences of elementary pupils in mathematics education within the Santo Tomas District. The qualitative approach enabled the researcher to gather rich, contextualized, and in-depth descriptions regarding learners' classroom experiences, participation patterns, emotional responses, and perceptions toward mathematics learning. Through qualitative inquiry, the study was able to capture the lived experiences of learners and examine how instructional interactions, classroom environments, and teaching practices influence learner engagement and attitudes in mathematics education.

The study was conducted in selected public elementary schools within the Santo Tomas District, Isabela, Philippines. The schools operate under the supervision of the Department of Education and serve learners from diverse socio-economic and educational backgrounds. The locale provided a meaningful context for examining learner attitudes and engagement in mathematics due to varying classroom experiences, instructional practices, and educational realities within rural elementary school settings.

The participants of the study included selected elementary pupils and mathematics teachers from the Santo Tomas District. Purposive sampling was utilized to select participants who possessed direct experiences and involvement in mathematics instruction and learning. The selected learners represented varying levels of participation, confidence, and performance in mathematics to ensure diverse perspectives regarding engagement experiences.

The study utilized semi-structured interview guides, focus group discussion guides, classroom observation notes, and document analysis checklists as qualitative research instruments. The interview questions focused on learners' attitudes toward mathematics, classroom participation, engagement behaviors, instructional experiences, motivational factors, and challenges encountered during mathematics learning.

Prior to data gathering, permission was secured from the school administration and ethical considerations including informed consent, confidentiality, anonymity, and voluntary participation were strictly observed. Data were gathered through interviews, focus group discussions, classroom observations, and document analysis. All interviews and discussions were audio-recorded with participants' consent and transcribed verbatim for analysis.

The gathered data were analyzed using Braun and Clarke's (2006) thematic analysis approach. Thematic analysis involved familiarization with the data, coding of significant responses, identification of recurring patterns, development of themes, refinement of themes, and interpretation of findings. Trustworthiness was established through triangulation, member checking, audit trails, and thick description to ensure credibility and dependability of the findings.

5. Results and Discussion

Theme 1: Interactive and Enjoyable Mathematics Learning Experiences

The findings revealed that learners become more engaged and motivated in mathematics learning when classroom instruction is interactive, collaborative, and enjoyable. Participants consistently explained that games, collaborative activities, group discussions, and participatory problem-solving tasks make mathematics lessons more interesting, meaningful, and less intimidating. Learners emphasized that they are more willing to participate when classroom activities encourage interaction, teamwork, and active involvement rather than passive listening.

One learner participant stated:

"Mas gusto ko ang math kapag may games at group activities kasi masaya at hindi boring."

Another learner shared:

"Kapag interactive ang lesson, mas naiintindihan namin ang tinuturo."

Similarly, another participant explained:

"Mas natututo kami kapag nagtutulungan kami ng classmates ko sa pagsagot ng problems."

The responses suggest that collaborative learning environments strengthen learners' behavioral engagement and classroom participation in mathematics instruction. Interactive classroom activities encourage pupils to actively communicate, exchange ideas, ask questions, and work cooperatively with peers in solving mathematical tasks. Through collaboration and interaction, learners become more confident in participating and expressing their understanding of mathematical concepts.

The findings further revealed that enjoyable learning experiences reduce learners' anxiety and fear toward mathematics. Participants explained that games and interactive classroom activities make the subject less stressful and more enjoyable.

One learner participant shared:

"Kapag may activities at games, hindi kami natatakot magkamali kasi parang nag-eenjoy lang kami."

Another learner stated:

"Hindi nakaka-pressure kapag group work kasi nagtutulungan naman kami."

These findings imply that learner-centered instructional strategies positively influence learners' emotional and behavioral engagement in mathematics classrooms. Interactive activities create supportive learning environments where learners feel more relaxed, motivated, and willing to participate in classroom discussions and problem-solving activities.

The findings support Boaler (2021), who emphasized that collaborative and learner-centered mathematics instruction improves learner engagement, participation, confidence, and conceptual understanding. Similarly, Vygotsky's (1978) Constructivist Learning Theory explains that learning occurs more effectively through social interaction, collaboration, and guided participation. Learners construct mathematical understanding through shared experiences, peer interaction, and active classroom engagement.

The findings also align with Fredricks et al. (2019), who explained that behavioral engagement increases when learners actively participate in classroom activities and collaborative learning tasks. Interactive instructional practices encourage learners to become active participants in the learning process rather than passive recipients of information.

Classroom observations further revealed that learners demonstrated higher levels of attentiveness, participation, and enthusiasm during collaborative mathematics activities. Learners were observed asking questions, discussing answers with peers, and actively participating in games and classroom exercises.

One teacher participant stated:

"Kapag collaborative at interactive ang activities, mas active at masaya ang learners sa klase."

This finding highlights the importance of participatory and enjoyable instructional approaches in strengthening learner engagement and improving mathematics learning experiences among elementary pupils.

Theme 2: Positive Teacher Support and Encouragement

The findings revealed that supportive and encouraging teachers significantly influence learners' attitudes, confidence, and engagement in mathematics learning. Participants consistently described effective mathematics teachers as patient, approachable, understanding, motivating, and willing to provide repeated explanations until learners fully understand the lesson. Learners emphasized that positive teacher support makes them feel more comfortable, confident, and motivated to participate in mathematics activities.

One participant stated:

"Mas ginaganahan akong mag-aral ng math kapag mabait at supportive ang teacher."

Another learner explained:

"Kapag hindi namin maintindihan, tinutulungan kami ni teacher hanggang matuto kami."

Similarly, another participant shared:

"Hindi kami natatakot magtanong kapag mabait at understanding ang teacher."

These responses indicate that positive teacher-learner relationships strengthen emotional engagement and learner confidence in mathematics classrooms. Learners become more willing to ask questions, participate in discussions, and attempt problem-solving tasks when they feel emotionally supported and respected by their teachers.

Participants also highlighted that encouraging classroom environments reduce fear and hesitation during mathematics instruction.

One learner participant stated:

"Kapag hindi pinapahiya ang mali naming sagot, mas gusto naming sumagot at sumubok."

Another participant explained:

"Mas comfortable akong mag-participate kapag alam kong tutulungan kami ni teacher."

The findings suggest that emotionally supportive learning environments positively affect learners' attitudes toward mathematics and their willingness to engage in classroom activities. Encouraging teachers help reduce mathematics anxiety and create psychologically safe classrooms where learners feel accepted and motivated.

The findings align with Fredricks et al. (2019), who argued that emotional engagement is strengthened when learners feel supported, respected, and encouraged within classroom settings. Similarly, Pianta et al. (2021) emphasized that positive teacher-learner relationships significantly influence learner motivation, classroom participation, and academic persistence.

Furthermore, the findings support Self-Determination Theory, which posits that learners become more motivated and engaged when their psychological needs for competence, relatedness, and support are fulfilled (Ryan & Deci, 2020). Supportive teachers contribute to stronger learner confidence and intrinsic motivation in mathematics learning.

Classroom observations likewise revealed that learners became more participative during lessons facilitated by teachers who used positive reinforcement, encouragement, and patient instructional approaches.

One teacher participant shared:

"Kapag supportive ang environment, mas nagiging active at confident ang learners."

This finding implies that teacher support extends beyond instructional delivery and significantly influences learners' emotional well-being, motivation, and classroom engagement in mathematics education.

Theme 3: Contextualized and Relevant Mathematics Instruction

The study further revealed that learners become more interested and engaged in mathematics when lessons are contextualized and connected to real-life situations and practical applications. Participants explained that mathematics becomes easier to understand and more meaningful when teachers use familiar examples and situations that learners encounter in their everyday experiences.

One learner participant stated:

"Mas madaling maintindihan ang math kapag may example na ginagamit sa totoong buhay."

Another participant shared:

"Kapag practical ang examples, mas interesting ang lesson."

Similarly, another learner explained:

"Mas naiintindihan ko ang math kapag ginagamit sa pang-araw-araw na ginagawa namin."

The findings suggest that contextualized mathematics instruction promotes cognitive engagement by helping learners connect mathematical concepts to practical experiences and familiar situations. Learners become more interested and motivated when they recognize the usefulness and relevance of mathematics in their daily lives.

Participants emphasized that contextualized examples help simplify difficult concepts and improve understanding of mathematical operations and problem-solving tasks.

One learner participant stated:

"Kapag relatable ang examples, mas mabilis naming naiintindihan ang lesson."

Another learner shared:

"Mas nagiging meaningful ang math kapag nakikita naming may gamit pala ito sa totoong buhay."

These findings imply that contextualized instruction strengthens learners' conceptual understanding and cognitive engagement by connecting classroom lessons to authentic experiences. Learners become more invested in learning when instructional content is relevant to their environment, interests, and lived experiences.

The findings support Gay (2018), who emphasized that contextualized and culturally responsive instruction enhances learner engagement, meaningful participation, and understanding. Similarly, Bransford et al. (2020) argued that learners understand concepts more effectively when instruction is situated within authentic and practical contexts.

The findings further align with Constructivist Learning Theory, which posits that learners construct knowledge more effectively when they are able to relate new concepts to prior experiences and familiar situations (Vygotsky, 1978).

Teachers also emphasized the importance of contextualized instruction in sustaining learner engagement and participation.

One teacher participant explained:

"Mas nagiging interesado ang learners kapag relatable sa buhay nila ang examples sa math."

This finding highlights the importance of practical, relevant, and learner-centered instructional approaches in transforming mathematics education and improving learners' classroom experiences.

Theme 4: Mathematics Anxiety and Learning Difficulties

Despite the positive engagement experiences identified in the study, learners also revealed several challenges affecting their participation and engagement in mathematics learning. Participants reported experiencing mathematical anxiety, fear of making mistakes, low confidence, and difficulty understanding abstract concepts and complex mathematical procedures.

One learner participant stated:

"Nahihiya akong sumagot kapag baka mali ang sagot ko."

Another learner explained:

"May mga lessons talaga na mahirap intindihin kaya nawawalan ako ng confidence."

Similarly, another participant shared:

"Kapag hindi ko agad maintindihan ang lesson, minsan nawawalan ako ng gana makinig."

These responses indicate that emotional and cognitive barriers negatively influence learner participation and classroom engagement in mathematics learning. Fear of embarrassment and failure discourages some learners from participating in recitations, problem-solving activities, and classroom discussions.

Participants further explained that abstract mathematical concepts and difficult computations contribute to anxiety and frustration during mathematics instruction.

One learner stated:

"Minsan sobrang hirap ng formulas kaya nalilito na kami."

Another participant explained:

"Kapag mabilis ang discussion, nahihirapan kaming makasabay."

The findings suggest that instructional pacing, conceptual complexity, and low learner confidence significantly influence mathematics engagement and participation. Learners who struggle to understand lessons may gradually develop negative attitudes and disengagement toward mathematics learning.

The findings align with OECD (2019), which highlighted that mathematics anxiety and low academic confidence significantly affect learner performance, motivation, and participation. Similarly, Ashcraft and Moore (2019) explained that mathematics anxiety negatively affects learners' concentration, confidence, and problem-solving performance.

The findings further revealed that some learners become hesitant to participate due to fear of criticism and public mistakes during classroom recitations.

One participant stated:

"Kapag mali ang sagot ko sa harap ng klase, nahihiya ako kaya minsan ayoko nang sumagot."

This finding implies that emotionally safe and supportive classroom environments are necessary to reduce learner anxiety and encourage participation in mathematics learning. Teachers play an important role in helping learners view mistakes as part of the learning process rather than sources of embarrassment.

Despite these challenges, participants emphasized that supportive teachers, collaborative activities, and enjoyable learning environments help lessen their anxiety and improve engagement.

One learner participant explained:

"Mas nagiging okay ang math kapag supportive ang teacher at classmates."

This finding highlights the importance of supportive, learner-centered, and emotionally responsive instructional practices in improving learner confidence and strengthening mathematics engagement among elementary pupils.

6. Conclusion

The study revealed that learner attitudes and engagement significantly influence mathematics learning experiences among elementary pupils in the Santo Tomas District. Interactive instruction, collaborative learning environments, supportive teacher relationships, and contextualized teaching approaches strengthen behavioral, emotional, and cognitive engagement in mathematics education.

However, learners also encounter challenges such as mathematical anxiety, fear of failure, low confidence, and conceptual difficulties that negatively affect participation and learning experiences. The findings emphasize the importance of learner-centered, supportive, and contextualized mathematics instruction in promoting positive learner attitudes and meaningful engagement.

7. Recommendations

1. Mathematics teachers should strengthen interactive and collaborative instructional strategies in elementary classrooms.
2. Schools should promote supportive and learner-centered classroom environments that encourage participation and reduce mathematics anxiety.
3. Teachers should integrate contextualized and real-life applications in mathematics instruction.
4. Professional development programs focusing on engaging mathematics pedagogies should be strengthened.
5. Future researchers may conduct comparative or mixed-methods studies on learner engagement and mathematics education.

References

Boaler, J. (2021). *Mathematical mindsets*. Jossey-Bass.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101.

Ashcraft, M. H., & Moore, A. M. (2019). Mathematics anxiety and the affective drop in performance. *Journal of Psychoeducational Assessment, 27*(3), 197–205.

Boaler, J. (2021). *Mathematical mindsets*. Jossey-Bass.

Bransford, J., Brown, A., & Cocking, R. (2020). *How people learn: Brain, mind, experience, and school*. National Academy Press.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2019). School engagement: Potential of the concept and state of the evidence. *Review of Educational Research, 74*(1), 59–109.

Gay, G. (2018). *Culturally responsive teaching: Theory, research, and practice* (3rd ed.). Teachers College Press.

OECD. (2019). *PISA 2018 results: What students know and can do*. OECD Publishing.

Pianta, R. C., Hamre, B. K., & Allen, J. P. (2021). Teacher-student relationships and engagement: Conceptualizing, measuring, and improving classroom interactions. *Educational Psychologist, 56*(2), 93–107.

Ryan, R. M., & Deci, E. L. (2020). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Press.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2019). School engagement: Potential of the concept and state of the evidence. *Review of Educational Research, 74*(1), 59–109.

Gay, G. (2018). *Culturally responsive teaching: Theory, research, and practice* (3rd ed.). Teachers College Press.

OECD. (2019). *PISA 2018 results: What students know and can do*. OECD Publishing.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.