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Article

Student Engagement in Mathematics Learning: A Qualitative Lens Among Senior High School Learners at Divilacan National High School

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Abstract

Student engagement remains a crucial factor influencing academic achievement and meaningful learning in mathematics education. This study explored the experiences, perceptions, and engagement practices of Senior High School learners in mathematics learning at Divilacan National High School. Anchored on Constructivist Learning Theory and Student Engagement Theory, the study employed a descriptive qualitative research design to examine how learners experience engagement in mathematics classrooms and how instructional practices influence their participation, motivation, and learning behaviors. Participants included selected Senior High School learners and mathematics teachers from Divilacan National High School. 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 student engagement in mathematics learning is shaped by interactive instructional strategies, collaborative learning environments, contextualized teaching approaches, teacher support, and learner motivation. Participants described engagement as behavioral, emotional, and cognitive involvement in classroom activities, particularly when lessons are relatable, participatory, and learner-centered. However, learners also encountered challenges such as mathematical anxiety, limited self-confidence, insufficient learning resources, and difficulties in understanding abstract mathematical concepts. The findings further revealed that supportive teacher-learner relationships and collaborative classroom practices significantly contribute to increased participation and sustained engagement in mathematics learning. The study concludes that learner-centered and contextualized mathematics instruction enhances student engagement and supports positive learning experiences among Senior High School learners. Strengthening interactive pedagogical practices and supportive learning environments is recommended to improve mathematics engagement and academic success.

1.Introduction

Mathematics education plays a vital role in developing learners' analytical thinking, problem-solving abilities, logical reasoning, and decision-making skills. As one of the foundational disciplines in basic education, mathematics equips learners with competencies necessary for academic advancement, workforce readiness, and lifelong learning. Despite its importance, mathematics remains one of the most challenging subject areas for many learners, particularly at the secondary education level where abstract concepts and complex problem-solving tasks become more demanding.

One of the significant concerns in mathematics education is student engagement. Student engagement refers to learners' active participation, emotional investment, and cognitive involvement in classroom learning activities. Engaged learners demonstrate interest, motivation, persistence, collaboration, and willingness to participate in learning tasks. In contrast, disengagement often leads to poor academic performance, reduced motivation, classroom withdrawal, and negative attitudes toward learning mathematics. Within the Philippine educational context, improving student engagement in mathematics has become increasingly important due to persistent challenges in learner achievement and mathematical proficiency. Reports from international large-scale assessments such as the Programme for International Student Assessment (PISA) highlighted concerns regarding learners' mathematics performance and problem-solving skills. These realities emphasize the need to examine not only learners' academic outcomes but also the educational experiences and engagement processes that influence mathematics learning.

At Divilacan National High School, mathematics teachers encounter diverse learner experiences, attitudes, and participation patterns in Senior High School classrooms. Some learners actively participate and demonstrate enthusiasm during mathematics activities, while others exhibit anxiety, hesitation, and disengagement during lessons. Factors such as teaching strategies, classroom interactions, learner confidence, peer collaboration, and contextualized instruction may influence the extent of learner engagement in mathematics learning.

Several studies emphasized that student engagement significantly affects academic achievement and classroom participation. Fredricks et al. (2019) explained that student engagement encompasses behavioral, emotional, and cognitive dimensions that collectively shape learners' educational experiences and academic performance. Similarly, Boaler (2021) argued that interactive and collaborative mathematics instruction enhances learner participation, confidence, and conceptual understanding. Although student engagement has been widely explored in educational research, there remains limited qualitative literature examining the lived experiences of Senior High School learners regarding mathematics engagement in geographically isolated Philippine school contexts. Thus, this study aimed to explore the experiences, perceptions, and engagement practices of Senior High School learners in mathematics learning at Divilacan National High School.

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 learning experiences. Learning occurs when learners engage in authentic and contextualized activities that connect classroom instruction with real-life

experiences. Teachers serve as facilitators who guide learners in constructing understanding through collaborative and learner-centered approaches.

Student Engagement Theory explains that engagement involves three interconnected dimensions: behavioral engagement, emotional engagement, and cognitive engagement. Behavioral engagement refers to active participation in learning activities; emotional engagement involves learners' interest, motivation, and emotional connection to learning; while cognitive engagement reflects learners' investment in understanding and mastering academic tasks.

These theories provided a framework for understanding how instructional practices, classroom interactions, and learner experiences shape student engagement in mathematics learning.

2. Objectives of the Study

This study aimed to explore the experiences and engagement practices of Senior High School learners in mathematics learning at Divilacan National High School. Specifically, it sought to examine how learners describe their experiences in mathematics classrooms and how they demonstrate behavioral, emotional, and cognitive engagement during mathematics learning activities. The study further aimed to identify the instructional practices and classroom strategies that contribute to sustaining learner participation, motivation, and engagement in mathematics education. Additionally, it intended to explore the challenges encountered by learners in engaging with mathematics lessons and activities, including difficulties related to comprehension, confidence, participation, and learning experiences. Finally, the study aimed to derive insights from the participants' narratives and experiences that may serve as basis for strengthening student engagement and improving instructional practices in mathematics education among Senior High School learners.

3. Methodology

This study employed a descriptive qualitative research design to explore the lived experiences, perceptions, and engagement practices of Senior High School learners in mathematics learning at Divilacan National High School. The qualitative approach was considered appropriate because the study aimed to obtain in-depth and contextualized understanding of how learners experience mathematics instruction, participate in classroom activities, and engage cognitively, emotionally, and behaviorally in mathematics learning. Through qualitative inquiry, the researcher was able to capture rich narratives and meaningful descriptions regarding learner participation, classroom interactions, instructional experiences, motivational factors, and challenges encountered in mathematics education. The descriptive qualitative design further enabled the study to examine mathematics engagement within the learners' natural classroom environment and educational context, allowing deeper understanding of how learners interpret mathematical concepts and respond to various instructional practices.

The study was conducted at Divilacan National High School located in Divilacan, Isabela, Philippines. The school serves learners from geographically isolated and rural communities and operates under the supervision of the Department of Education. The locale of the study provided a meaningful context for examining student engagement in mathematics due to the unique realities experienced by learners in geographically isolated areas, including limited educational resources, accessibility concerns, and diverse socio-economic conditions that may influence classroom participation and learning experiences. The school continuously implements instructional initiatives and educational programs aimed at improving learner achievement and engagement in mathematics and other subject areas.

The participants of the study included selected Senior High School learners and mathematics teachers of Divilacan National High School. Participants were selected using purposive sampling to ensure that those included possessed direct experiences and involvement in mathematics learning and instruction. The

selected learners represented varying levels of classroom participation, engagement, confidence, and mathematics performance to provide diverse perspectives regarding engagement experiences. Mathematics teachers were likewise included to provide additional insights regarding instructional practices, classroom participation, learner motivation, and engagement challenges observed during mathematics instruction.

To gather comprehensive and contextualized data, the study utilized several qualitative research instruments including semi-structured interview guides, focus group discussion guides, classroom observation notes, and document analysis checklists. The semi-structured interview questions focused on learners' experiences in mathematics classrooms, engagement behaviors, participation patterns, instructional interactions, motivational factors, and difficulties encountered during mathematics learning. Focus group discussions were conducted to encourage collaborative sharing of experiences and perspectives among learners. Classroom observations were utilized to document actual learner participation, teacher facilitation, classroom dynamics, and engagement practices during mathematics instruction. In addition, document analysis was conducted on relevant instructional materials, lesson plans, and classroom activities to supplement and validate the gathered data. The interview and discussion guides underwent validation by experts in qualitative research and mathematics education to ensure credibility, clarity, and alignment with the objectives of the study.

Prior to the conduct of the study, formal permission was secured from the administration of Divilacan National High School. Ethical considerations including informed consent, confidentiality, anonymity, voluntary participation, and respect for participants' rights were strictly observed throughout the research process. Data were gathered through individual interviews, focus group discussions, classroom observations, and document analysis. Interviews and discussions were conducted at schedules convenient to the participants to ensure openness and comfort during the sharing of experiences. All interviews and discussions were audio-recorded with the consent of the participants and were transcribed verbatim to ensure accuracy and completeness of the collected data. Classroom observations and field notes were also documented to enrich the interpretation of findings and provide contextual support to the participants' narratives.

The gathered data were analyzed using Braun and Clarke's (2006) thematic analysis approach. The analysis began with familiarization with the data through repeated reading of interview transcripts, observation notes, focus group discussion records, and documentary materials. Significant statements and meaningful responses were identified and coded to capture important concepts and recurring ideas related to student engagement in mathematics learning. Related codes were then grouped into categories and organized into broader themes representing the common experiences, perceptions, and engagement practices of the participants. The themes were subsequently reviewed, refined, defined, and interpreted to ensure coherence and alignment with the objectives of the study. To establish trustworthiness and rigor, the study employed member checking, triangulation of data sources, audit trails, prolonged engagement, and thick description to ensure the credibility, dependability, confirmability, and transferability of the qualitative findings.

4. Results and Findings

Theme 1: Interactive and Collaborative Mathematics Learning

The findings revealed that learners become more actively engaged in mathematics learning when classroom instruction is interactive, collaborative, and participatory. Participants consistently emphasized that they learn mathematical concepts more effectively when instructional activities involve group collaboration, peer discussions, classroom interaction, and cooperative problem-solving tasks. Learners explained that collaborative classroom environments make mathematics lessons more enjoyable, less intimidating, and easier to understand compared to traditional lecture-based instruction.

One learner participant stated:

"Mas naiintindihan namin ang lesson kapag may group activity kasi nagtutulungan kami sa pagsagot."

Another participant shared:

"Kapag interactive ang discussion, mas hindi kami inaantok at mas gusto naming sumali."

Similarly, another learner explained:

"Mas okay kapag may activities kasi nakakapagtanong kami agad sa classmates at teacher kapag may hindi maintindihan."

The participants' responses suggest that interactive instructional practices encourage active learner participation and improve engagement in mathematics classrooms. Collaborative learning activities create opportunities for learners to exchange ideas, clarify misunderstandings, and develop confidence in solving mathematical problems. Learners become more willing to participate when they are given opportunities to communicate, cooperate, and learn alongside their peers.

The findings further revealed that collaborative mathematics learning reduces learners' fear and anxiety toward difficult mathematical concepts. Participants explained that peer support and group interaction help them feel more comfortable during classroom discussions and problem-solving activities.

One learner participant shared:

"Hindi ako masyadong nahihiya kapag group work kasi nagtutulungan naman kami."

Another participant stated:

"Kapag may kasama akong magsolve, mas nagiging confident akong sumagot."

These findings imply that collaborative learning environments contribute positively to behavioral and emotional engagement in mathematics learning. Peer interaction strengthens learner confidence, participation, and motivation while reducing feelings of isolation and anxiety during mathematics instruction.

The findings support Boaler (2021), who emphasized that collaborative and learner-centered mathematics instruction enhances participation, confidence, and conceptual understanding among learners. Similarly, Vygotsky's (1978) Constructivist Learning Theory explains that learners construct knowledge more effectively through social interaction, collaboration, and guided participation. Mathematics learning becomes more meaningful when learners actively engage in shared problem-solving and cooperative classroom experiences.

Moreover, the findings align with Fredricks et al. (2019), who explained that behavioral engagement increases when learners actively participate in classroom activities and collaborative learning tasks. Interactive mathematics instruction encourages learners to become active contributors to 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 strategies, and helping peers solve mathematical problems during group tasks and classroom exercises.

One teacher participant explained:

"Mas active talaga ang learners kapag may collaborative activities kaysa puro lecture lang."

This finding indicates that interactive and participatory instructional strategies strengthen classroom engagement and improve learners' overall mathematics learning experiences.

Theme 2: Teacher Support and Positive Learning Environment

The findings revealed that teacher support and positive classroom environments significantly influence learners' engagement in mathematics learning. Participants consistently described supportive mathematics teachers as approachable, patient, motivating, and capable of explaining difficult concepts clearly and effectively. Learners emphasized that they become more engaged and confident when teachers create encouraging and non-threatening classroom environments.

One learner participant stated:

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

Another learner explained:

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

Similarly, another participant shared:

"Hindi kami natatakot magtanong kapag understanding ang teacher."

The findings suggest that positive teacher-learner relationships contribute significantly to emotional engagement and classroom participation in mathematics learning. Learners become more motivated and willing to participate when they feel respected, supported, and encouraged by their teachers. Supportive instructional environments reduce learners' fear of failure and strengthen their confidence in solving mathematical problems.

Participants also highlighted that teachers who demonstrate patience and understanding help lessen learners' anxiety and hesitation toward mathematics.

One learner stated:

"Mas nakakaengganyo mag-aral kapag hindi ka pinapahiya kapag mali ang sagot mo."

Another participant explained:

"Kapag supportive ang teacher, mas gusto naming makinig at sumali sa klase."

These responses indicate that emotionally supportive classroom environments positively influence learners' attitudes toward mathematics learning. Learners become more comfortable participating in discussions, asking questions, and attempting mathematical tasks when they perceive teachers as encouraging and approachable.

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

The findings further support Self-Determination Theory, which posits that supportive learning environments satisfy learners' psychological needs for competence, relatedness, and autonomy, thereby enhancing intrinsic motivation and engagement (Ryan & Deci, 2020).

Classroom observations likewise revealed that learners demonstrated greater attentiveness and participation during classes facilitated by teachers who used positive reinforcement, encouragement, and learner-centered instructional approaches.

One teacher participant stated:

"Kapag comfortable ang learners sa classroom environment, mas active silang sumasagot at nakikipagparticipate."

This finding implies that teacher support extends beyond instructional delivery and significantly affects learners' emotional well-being, confidence, and willingness to engage in mathematics learning activities.

Theme 3: Contextualized and Relevant Mathematics Instruction

The study further revealed that learners become more engaged in mathematics learning when lessons are contextualized and connected to real-life experiences and practical applications. Participants emphasized that mathematics becomes more meaningful and easier to understand when teachers relate lessons to everyday situations, community experiences, and familiar contexts.

One learner participant stated:

"Mas naiintindihan ko ang math kapag may example na related sa totoong buhay."

Another learner explained:

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

Similarly, another participant shared:

"Mas madaling matutunan ang math kapag ginagamit sa mga sitwasyon na nakikita namin araw-araw."

The findings suggest that contextualized instruction enhances cognitive engagement by helping learners connect mathematical concepts to practical experiences and familiar situations. Learners become more interested and motivated when they recognize the relevance and usefulness of mathematics in real-life contexts.

Participants explained that contextualized lessons help them appreciate the importance of mathematics in daily activities such as budgeting, measurement, business transactions, and problem-solving.

One participant shared:

"Kapag naiintindihan naming may gamit pala ang math sa totoong buhay, mas ginaganahan kaming matuto."

Another learner stated:

"Hindi na siya boring kapag relatable yung examples na ginagamit ni teacher."

These findings indicate that contextualized mathematics instruction promotes meaningful learning experiences and strengthens learners' conceptual understanding. Learners become more cognitively engaged when lessons are connected to their lived experiences and local realities.

The findings support Gay (2018), who emphasized that contextualized and culturally responsive instruction enhances learner engagement, motivation, and meaningful learning experiences. Similarly, Bransford et al. (2020) argued that learning becomes more effective when instructional content is situated within authentic and relevant contexts.

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

Teachers also explained that contextualized instruction helps simplify complex mathematical concepts and improves learner participation.

One teacher participant stated:

"Kapag relatable sa buhay nila ang examples, mas mabilis nilang naiintindihan ang lesson."

This finding highlights the importance of contextualized and learner-centered pedagogical approaches in strengthening student engagement and improving mathematics learning experiences.

Theme 4: Challenges Affecting Mathematics Engagement

Despite the positive engagement experiences identified in the study, participants also revealed several challenges affecting their participation and engagement in mathematics learning. Among the most common barriers identified were mathematical anxiety, fear of making mistakes, difficulty understanding abstract concepts, low self-confidence, and lack of motivation during difficult lessons.

One learner participant stated:

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

Another participant explained:

"May lessons talaga na sobrang hirap intindihin kaya nawawalan kami ng confidence."

Similarly, another learner shared:

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

These responses indicate that emotional and cognitive barriers significantly affect learners' willingness to participate in mathematics classrooms. Fear of failure and embarrassment negatively influence learners' confidence and classroom engagement.

Participants also explained that abstract mathematical concepts and complex problem-solving tasks contribute to frustration and disengagement during instruction.

One learner stated:

"Minsan kahit anong explain, nahihirapan pa rin akong maintindihan ang formulas."

Another participant shared:

"Nakakapressure kapag mabilis ang discussion tapos hindi ka agad makasunod."

The findings suggest that instructional pacing, conceptual difficulty, and learner confidence influence engagement experiences in mathematics learning. Learners who struggle to understand lessons may gradually lose motivation and participation in classroom activities.

The findings align with OECD (2019), which highlighted that mathematics anxiety and low academic confidence significantly influence learner performance, participation, and engagement. Similarly, Ashcraft and Moore (2019) emphasized that mathematics anxiety negatively affects learners' working memory, concentration, and problem-solving abilities.

The findings further revealed that some learners experience pressure during recitations and classroom assessments, which contributes to fear and hesitation in participating.

One learner participant stated:

"Kapag recitation, kinakabahan ako baka mali ang sagot ko sa harap ng klase."

This finding implies that classroom environments and instructional practices must be designed to reduce learner anxiety and encourage supportive participation. Teachers play an important role in creating psychologically safe learning environments where mistakes are viewed as part of the learning process rather than sources of embarrassment.

Despite these challenges, participants emphasized that supportive teachers, peer collaboration, and interactive instructional approaches help them cope with difficulties encountered in mathematics learning.

One learner explained:

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

This finding highlights the importance of emotionally supportive and collaborative learning environments in sustaining student engagement and reducing barriers to mathematics learning.

the importance of integrating local culture, indigenous practices, environmental realities, and community experiences into classroom instruction. Teachers explained that contextualized lessons became more meaningful and understandable for learners.

One participant shared:

"Mas naiintindihan ng learners ang lessons kapag ginagamit namin ang examples mula sa community."

Another participant stated:

"Kapag local culture at experiences ang kasama sa lesson, mas interesado silang matuto."

Teachers integrated agricultural practices, local traditions, environmental observations, and indigenous community experiences into classroom discussions and learning activities.

These findings support Gay's culturally responsive pedagogy theory, which emphasizes the importance of connecting instruction to learners' cultural identities and lived experiences.

5. Conclusions

The study revealed that student engagement in mathematics learning is influenced by interactive instruction, collaborative learning environments, teacher support, and contextualized teaching approaches. Behavioral, emotional, and cognitive engagement are strengthened when learners experience supportive classroom interactions and meaningful learning activities.

However, learners also encounter challenges such as mathematical anxiety, conceptual difficulties, and low confidence, which affect participation and learning experiences. The findings underscore the importance of learner-centered and supportive instructional practices in promoting positive engagement in mathematics education.

Implications of the Study

The findings of this study provide important educational, pedagogical, social, and policy implications regarding student engagement in mathematics learning among Senior High School learners. The study emphasizes that learner engagement is a multidimensional process influenced by instructional strategies, teacher support, classroom environment, peer interaction, and contextualized learning experiences. The insights generated from the participants' experiences highlight the importance of creating learner-centered and supportive mathematics classrooms that encourage active participation, confidence, and meaningful learning.

Educational Implications

The study underscores the importance of interactive and collaborative instructional approaches in strengthening student engagement in mathematics learning. The findings imply that mathematics instruction should move beyond traditional lecture-based teaching toward more participatory, learner-centered, and collaborative learning experiences. Mathematics teachers may integrate group activities, peer-assisted learning, collaborative problem-solving, classroom discussions, and interactive instructional tasks to increase learners' behavioral and cognitive engagement.

The findings further suggest that learner engagement improves when mathematics lessons are contextualized and connected to real-life experiences. Mathematics educators may incorporate practical applications, localized examples, and authentic problem-solving activities that help learners appreciate the relevance of mathematics in daily life. Contextualized instruction enables learners to connect mathematical concepts with familiar experiences, thereby promoting deeper understanding and sustained interest in learning.

Additionally, the study implies that schools should prioritize the development of supportive classroom environments that encourage learners to participate without fear of embarrassment or failure. Teachers play a critical role in creating emotionally safe learning spaces where learners feel respected, motivated, and confident in expressing their ideas and attempting mathematical tasks.

Pedagogical Implications

The findings imply that effective mathematics teaching requires not only content mastery but also strong relational and motivational teaching practices. Mathematics teachers should demonstrate patience, encouragement, empathy, and responsiveness to learners' needs to reduce mathematics anxiety and strengthen learner confidence.

The study also highlights the importance of instructional flexibility and differentiated teaching approaches in addressing diverse learner abilities and participation levels. Teachers may adopt scaffolding techniques, collaborative instruction, learner-centered facilitation, and formative assessment practices to support struggling learners and sustain engagement in mathematics classrooms.

Furthermore, the findings imply that teacher professional development programs should emphasize engaging pedagogical practices, contextualized mathematics instruction, classroom interaction strategies, and approaches for addressing learner anxiety and disengagement. Strengthening teachers' instructional competence and learner engagement strategies may contribute significantly to improved mathematics learning experiences and academic performance.

Psychological and Social Implications

The findings reveal that emotional and psychological factors significantly influence learner participation and engagement in mathematics learning. Mathematics anxiety, fear of making mistakes, and low self-confidence negatively affect learners' willingness to participate in classroom discussions and problem-solving activities.

This implies the need for schools and teachers to strengthen socio-emotional support systems within mathematics classrooms. Positive teacher-learner relationships, peer support, collaborative learning environments, and constructive feedback mechanisms may help reduce learners' anxiety and improve self-confidence in mathematics learning.

The study further implies that collaborative classroom environments strengthen social interaction, peer learning, and teamwork among learners. Group activities and collaborative problem-solving encourage communication, cooperation, and shared learning experiences, which contribute to learners' social development and classroom belongingness.

Policy Implications

The findings of the study provide implications for educational leaders and policymakers, particularly within the Department of Education, regarding the strengthening of learner engagement initiatives in mathematics education. Educational institutions may revisit instructional frameworks and curriculum implementation strategies to ensure that mathematics instruction promotes active learner participation, contextualized learning, and inclusive classroom engagement.

The study also suggests the need for institutional support in providing adequate instructional resources, technology integration, and professional development opportunities for mathematics teachers, especially in geographically isolated and rural schools. Policies focusing on learner-centered pedagogy, mathematics engagement programs, and teacher mentoring initiatives may help improve classroom participation and learner achievement in mathematics education.

Moreover, the findings imply that educational programs addressing learners' emotional well-being and mathematics anxiety should be integrated into school support systems. Guidance programs, academic counseling, and learner support interventions may help improve learners' confidence and participation in mathematics learning.

Implications for School Leaders and Administrators

The findings imply that school administrators play an important role in fostering positive learning environments that support mathematics engagement and instructional improvement. School leaders may strengthen instructional supervision, teacher mentoring, and collaborative professional learning communities that focus on improving mathematics instruction and learner participation.

Administrators may also support the implementation of innovative and contextualized mathematics programs that encourage active engagement and learner-centered teaching practices. Providing opportunities for collaborative teacher training, classroom observations, and instructional sharing may contribute to continuous improvement in mathematics education.

Additionally, school leaders may strengthen partnerships with parents and community stakeholders to support learners' academic engagement and motivation in mathematics learning.

Implications for Future Research

The study highlights the need for further research exploring student engagement in mathematics education across different educational contexts and learner populations. Future researchers may conduct comparative studies involving urban and rural schools to examine variations in mathematics engagement experiences and instructional practices.

Longitudinal studies may also be conducted to explore how student engagement evolves over time and how instructional interventions influence learners' mathematics participation and academic development. Mixed-methods studies may likewise be undertaken to examine the relationship between learner engagement, academic performance, mathematics anxiety, and instructional effectiveness.

Furthermore, future studies may explore the influence of technology integration, socio-economic factors, cultural contexts, and learner diversity on mathematics engagement and classroom participation.

Overall, the study emphasizes that strengthening student engagement in mathematics learning requires collaborative efforts among teachers, school leaders, learners, parents, and educational institutions. Interactive instruction, supportive classroom environments, contextualized learning experiences, and emotionally responsive teaching practices are essential in promoting meaningful mathematics learning and improving learner engagement among Senior High School students.

6.References

Abana, A (2021). A Scrutiny of K-12 Strands and the Learning Program Vis-à-vis its Academic Performance. Psychology and Education Journal. 58 (2): 7977-7984

Andres, A. (2019). Achievement Goals and Mathematics Achievement of the Senior High School Students. International Journal of English and Education, 8 (2).

Andres, A. (2023). Establishing Quality Instrument for the Summative Assessment of Pre-Service Elementary Teachers. JETT. 14 (3), 9-16).

Andres, A.D. (2022). Metacognition and Performance in Mathematical Problem-Solving Among Bachelor of Elementary (BEED) Pre-service Teachers. Central European Management Journal, 30 (4). 86-95.

Antonio, A. (2021). Syntactical Scrutiny: Inaccuracies in the Lesson Planning of Non- Language Pre Service Teachers. *International Journal of Arts, Sciences and Education*,

Balog, P., & Gonzales, E. (2021). From Linguistic Landscapes to Teaching Resources: A Case of Some Rural Areas in the Province of Quezon. *International Journal of Arts, Sciences and Education*, *1*(2), 23–44.

Banares, A. J. (2022). Reinterpreting Sonnet 18 by William Shakespeare through Stylistic Analysis. *International Journal of Arts, Sciences and Education*, *3*(July Special Issue), 189–204. https://ijase.org/index.php/ijase/article/view/163.

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.

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.