



Research Article

Towards an Experiential Learner-Centered Education Framework for Grade Seven Mathematics Curriculum

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Abstract. The current junior high school curriculum in the Philippines, the revised K-12 curriculum, explicitly promotes learner-centered education (LCE) by emphasizing pedagogical strategies, particularly experiential learning. This study sought to assess the extent of the implementation of experiential learning approaches, namely (1) abstract conceptualization, (2) active experimentation, (3) concrete experience, and (4) reflective observation. This study used a quantitative descriptive research approach. Thirty-five (35) grade seven learners in a private school were the respondents. Findings revealed that the experiential learning approaches are significant in addressing learner-centered education as perceived by the learners: abstract conceptualization, active experimentation, concrete experience, and reflective observation. A framework was proposed in this study to maintain the significance of the learning approaches towards an experiential learner-centered education. Emphasizing learners' engagement, future research should investigate activities implemented that are less engaging and explore ways to optimize hands-on learning methods for diverse learners, particularly in group settings. They could also identify factors that explain why students show less enthusiasm for problem analysis and explore strategies to foster deeper engagement in mathematical reasoning.

Keywords: *Experiential learning; Learner-centered education; Mathematics curriculum; Mathematics education; Descriptive research.*

In recent years, educational reforms worldwide have increasingly emphasized the importance of learner-centered education (LCE), an approach that redefines the role of students from passive recipients of information to active participants in the learning process. By encouraging problem-solving, collaboration, and hands-on experiences, LCE aims to make education more meaningful, engaging, and relevant to learners' lives. Numerous studies have highlighted the positive impact of learner-centered practices on student motivation, critical thinking skills, and academic achievement. Moreover, learner-centered education (LCE) has gained prominence as an effective approach to enhance student learning outcomes and engagement. Studies show that implementing LCE positively affects students' learning skills, strategies, and motivation (National Council of Teachers of Mathematics, 2020). Students exposed to LCE demonstrate higher levels of critical thinking, independence, and ownership in their learning process (Felipe, 2025).

The Philippine education system has undergone significant reforms to enhance quality and align with international standards, particularly through the implementation of the K to 12 program mandated by the



Enhanced Basic Education Act (Republic Act No. 10533). This reform extended basic education from ten to twelve years, including kindergarten and senior high school, and emphasized a shift toward learner-centered, inclusive pedagogy that develops critical thinking, problem-solving, and practical skills. Despite these advances, implementing learner-centered approaches still faces challenges, especially in effectively engaging students in subjects like mathematics (Department of Education, 2013; Okabe, 2013; Philippine Journal of Education Studies, 2024). Within the revised K to 12 framework, the Grade 7 mathematics curriculum is structured around three core content domains: Number and Algebra, Measurement and Geometry, and Data and Probability. These domains provide foundational mathematical skills vital for students' academic progression. However, current instructional practices remain predominantly teacher-centered and do not fully harness experiential learning strategies, which encourage active student involvement through concrete experiences, reflective observation, abstract conceptualization, and active experimentation (Kolb & Kolb, 2017). Integrating such approaches can foster deeper understanding and engagement with mathematical concepts (Department of Education, 2023).

Experiential learning and Transformative Learning Theory were employed because, together, these theories advocate for curricula that engage students actively through experiential cycles, encourage critical reflection to transform understanding, integrate collaborative real-world tasks, and support diverse learning needs while promoting autonomy and metacognitive development. This integrated framework provides a robust theoretical basis for assessing the experiential approach in the Grade 7 mathematics curriculum that is learner-centered, ultimately nurturing motivated and capable learners.

This study aimed to assess experiential learning approaches in the Grade 7 mathematics curriculum in relation to learner-centered education. Specifically, the study addresses the following salient areas of concern: (1) To what extent are the experiential learning approaches implemented to address learner-centered education in terms of abstract conceptualization, active experimentation, concrete experiences, and reflective observation? (2) Based on the findings, what experiential learner-centered education framework for the Grade 7 Mathematics curriculum may be proposed?

This study addresses these pedagogical gaps by assessing experiential learning approaches in the Grade 7 mathematics curriculum and proposing a framework that incorporates experiential learning in learner-centered education. The proposed framework seeks to enhance student engagement, promote critical thinking, and improve learning outcomes through active participation and real-world application of mathematical concepts. By aligning with national education reforms and best practices, this research aims to help make mathematics education more effective and relevant for Grade 7 learners.

Methodology

Research Design

This research employed a quantitative descriptive approach to identify learners' perceptions of their engagement in hands-on activities in Mathematics, including reflecting on them, forming theories, and testing them. Quantitative descriptive research methods involve systematically collecting and analyzing numerical data to characterize or summarize a population. It emphasizes objective measurement and statistical analysis of data to produce a clear description of the study issue (Unimrkt Research, 2023). This study uses it to systematically document and characterize how the four stages of learning manifest in learner-centered education. This approach enables the identification of prevailing patterns, such as which stages are emphasized, and how learner autonomy and facilitation strategies influence the experiential cycle.

Participants and Sampling Technique

In accordance with the Central Limit Theorem (Stroock, 2024), the study included thirty-five (35) of the one hundred forty (140) Grade 7 students in a private school in Santa Rosa City, Laguna, randomly selected.

Research Instrument

The research instrument is a structured Likert-scale questionnaire designed to measure Grade 7 learners' perception of their learning experiences aligned with the four stages of Kolb's Experiential Learning Cycle, contextualized within a learner-centered Mathematics curriculum. The instrument has twenty items, with five indicators at each stage. It uses a five-point Likert scale with verbal interpretations ranging from 5 (Very High Extent) to 1 (Very Low Extent), allowing respondents to rate how well each indicator reflects their experiences.

Three Master Teachers from public junior high schools validated the research instrument. They have extensive experience and background in the field. These teachers assessed the tool for clarity, relevance, and consistency with the research objectives. After validation, the research instrument received a total rating of 4.5185, which means "Excellent." Thus, the results validate that the instrument is well-crafted and ready for implementation. This validation shows the instrument is valid and suitable for providing useful information for the study. The research instrument underwent pilot testing with twenty (20) private school Grade 7 students in a different locale and obtained a Cronbach's Alpha score of 0.930. This result demonstrates excellent reliability and affirms the research instrument's internal consistency.

Data Gathering Procedure

The researchers collected data face-to-face. The researchers personally distributed and retrieved questionnaires from available participants on-site. The researchers briefed all participants on the study's purpose and assured them that their responses would remain confidential and their participation would be anonymous. The researchers strictly observed ethical standards, and all communication regarding the study was conducted with transparency and integrity. The researchers fully disclosed the methods, instruments, and procedures used for data collection, analysis, and interpretation to ensure the accuracy and credibility of the findings. The collected data were carefully encoded and subsequently subjected to appropriate statistical treatments for analysis and interpretation.

Data Analysis Procedure

The study used quantitative data analysis techniques to address the specific objectives and test the formulated hypotheses. The data collected from the questionnaires were encoded, organized, and analyzed using appropriate statistical procedures in statistical software. For descriptive analysis, the weighted mean was used to compute the average rating per indicator and per construct across the four experiential learning stages and to provide a snapshot of the typical student experience, enabling comparison across the stages. Next, standard Deviation was employed to assess the spread of the responses around the mean. A low standard deviation indicates that students' perceptions are relatively consistent and homogeneous, suggesting shared learning experiences within the sample.

Ethical Considerations

Informed consent was obtained by informing participants in writing through the school head about the study, the length of the survey questionnaire, how any data gathered would be kept confidential, and that their participation was anonymous. All participants were informed that participation was voluntary, and they were free to withdraw at any time without providing a reason. All correspondence and communication about the research and its purpose were handled with the utmost transparency and honesty. To ensure the accuracy of the data gathered for this study, all sources, research instruments, and methods were fully disclosed.

Results and Discussion

This section presents and discusses the study's results on the extent to which experiential learning approaches were implemented to support learner-centered education. The analysis is structured around the research objectives and integrates descriptive and inferential statistical findings. The variables explored include (1) abstract conceptualization; (2) active experimentation; (3) concrete experiences; and (4) reflective observation. The results provide insights into learners' perceived strengths and areas for improvement in these domains.

Table 1 shows that the overall weighted mean for abstract conceptualization is 3.88, with a standard deviation of 0.58, and a confidence interval of 3.68 to 4.08. This means learners agree that they understand math by linking new lessons to prior concepts, explaining rules clearly, and understanding the reason behind methods rather than just memorizing. Among the indicators, the highest average score is 4.11 for the indicator, *"I understand the reason or logic behind math methods rather than just memorizing procedures."* ($M=4.11$, $SD=0.87$, $CI=3.82 - 4.41$). This suggests that learners are more familiarizing themselves rather than memorizing. The lowest average, 3.51, is *"I enjoy analyzing problems and figuring out general principles behind math topics."* ($M=3.51$, $SD=0.92$, $CI=3.20 - 3.83$).

Table 1. *Extent of Experiential Learning Approaches Implemented to Address Learner-Centered Education in terms of Abstract Conceptualization*

No.	Indicators	M	SD	Confidence Intervals		VI
				Lower Bound	Upper Bound	
1	I understand mathematical concepts by connecting new lessons to the theories I have learned before.	4.00	0.87	3.70	4.30	HE
2	I can explain mathematical rules or formulas clearly after learning them.	3.91	0.82	3.63	4.20	HE
3	I enjoy analyzing problems and figuring out general principles behind math topics.	3.51	0.92	3.20	3.83	HE
4	I try to make sense of my math experiences by thinking about how they relate to what I already know.	3.86	0.97	3.52	4.19	HE
5	I understand the reason or logic behind math methods rather than just memorizing procedures.	4.11	0.87	3.82	4.41	HE
Total		3.88	0.58	3.68	4.08	HE

Based on the results, abstract conceptualization is highly implemented, with logical understanding and linking to prior learning as strengths, while enjoying analysis is a relative weakness. The confidence intervals for all the items fall within the High Extent range. Mathematics teachers should continue emphasizing conceptual understanding over memorization while incorporating more activities that make problem analysis engaging. Students may benefit from structured reflection on problem-solving strategies to strengthen both comprehension and confidence (Kong, 2021; Felipe, 2025). Future researchers could investigate why students show less enthusiasm for problem analysis and explore strategies to foster deeper engagement in mathematical reasoning.

Table 2. *Extent of Experiential Learning Approaches Implemented to Address Learner-Centered Education in terms of Active Experimentation*

No.	Indicators	M	SD	Confidence Intervals		VI
				Lower Bound	Upper Bound	
1	I like to try different ways to solve math problems and see which method works best.	3.86	0.73	3.61	4.11	HE
2	I practice math problems actively during class or at home to improve my skills.	3.60	1.04	3.25	3.96	HE
3	When I don't understand a math topic, I try to solve similar problems to learn better.	4.20	0.96	3.87	4.53	HE
4	I use math tools or manipulatives (like calculators or models) to test and explore concepts.	4.11	0.90	3.81	4.42	HE
5	I often apply what I learned in math to real-life situations or projects.	4.11	0.76	3.85	4.38	HE
Total		3.98	0.55	3.79	4.17	HE

Table 2 shows active experimentation received a "High Extent" interpretation with a mean of 3.98 and a confidence interval of 3.79 to 4.17. This total mean is the highest among the four experiential learning dimensions. This result suggests learners are most engaged when trying different strategies, practicing problem solving, and applying math to real life. Looking at the indicators, the highest average score is 4.20 for the indicator, "When I don't understand a math topic, I try to solve similar problems to learn better." ($M=4.20$, $SD=0.96$, $CI=3.87 - 4.53$). This suggests that learners are putting more effort into learning better mathematical concepts. The lowest average, 3.60, is "I practice math problems actively during class or at home to improve my skills." ($M=3.60$, $SD=1.04$, $CI=3.25 - 3.96$). The result shows that active experimentation is strong in terms of problem-solving using mathematics tools and applying to real life. In contrast, regular practice during class or at home is less consistent. Active experimentation suggests that learners are very hands-on as they learn mathematics. Mathematics teachers should continue to incorporate real-world applications and hands-on tools into lessons, while providing more structured opportunities for varied problem-solving approaches and consistent practice. Students may benefit from guided experimentation with different methods to build flexibility in their mathematical thinking (Khadka et.al., 2022).

Table 3 indicates that concrete experience implemented has a high extent, with a mean of 3.79, a standard deviation of 0.90, and a confidence interval of 3.49 to 4.10. The highest average score is 4.14 for the indicator, "I learn math best when I can see and touch objects related to the lesson." ($M=4.14$, $SD=1.03$, $CI=3.79 - 4.50$). This suggests that students learn more with visible, tangible materials. The lowest average, 3.54, is shared by learner participation: "I enjoy participating in activities or experiments that help me understand math concepts better." ($M=3.54$, $SD=1.15$,

$CI=3.15 - 3.94$), and hands-on activities "*I feel more confident in math after doing group tasks or hands-on projects.*" ($M=3.54$, $SD=1.22$, $CI=3.12 - 3.96$).

Table 3. Extent of Experiential Learning Approaches Implemented to Address Learner-Centered Education in terms of Concrete Experiences

No.	Indicators	M	SD	Confidence Intervals		VI
				Lower Bound	Upper Bound	
1	I enjoy participating in activities or experiments that help me understand math concepts better.	3.54	1.15	3.15	3.94	HE
2	I use tools like rulers, protractors, or meter sticks to physically explore math ideas in class.	3.83	1.15	3.43	4.22	HE
3	I learn math best when I can see and touch objects related to the lesson.	4.14	1.03	3.79	4.50	HE
4	I feel more confident in math after doing group tasks or hands-on projects.	3.54	1.22	3.12	3.96	HE
5	I remember math lessons better when I experience them through activities rather than just listening.	3.91	1.07	3.55	4.28	HE
Total		3.79	0.90	3.49	4.10	HE

The total standard deviation of 0.90 shows that this experiential learning dimension is not uniformly experienced. While the overall assessment is High Extent, the standard deviation suggests that not all students benefit equally from concrete experiences. Mathematics teachers should maintain hands-on activities while developing more engaging tasks to boost student participation and confidence. Students would benefit from varied concrete experiences that cater to different learning preferences (Chesimet et al., 2013; Burns et al., 2014; Butler et al., 2019). Future research should investigate why some activities are less engaging and explore ways to optimize tactile learning methods for diverse learners, particularly in group settings.

Table 4. Extent of Experiential Learning Approaches Implemented to Address Learner-Centered Education in terms of Reflective Observation

No.	Indicators	M	SD	Confidence Intervals		VI
				Lower Bound	Upper Bound	
1	After solving math problems, I think about what worked and what I could do differently next time.	3.80	1.02	3.45	4.15	HE
2	I discuss my math experiences and difficulties with my classmates or teacher to understand better.	4.17	0.89	3.87	4.48	HE
3	I take time to review my mistakes in math assessments and learn from them.	4.09	0.85	3.79	4.38	HE
4	I consider different ways to approach a math problem after trying one method.	3.89	0.96	3.56	4.22	HE
5	I reflect on how math lessons relate to real-life situations to make learning meaningful.	3.97	0.99	3.63	4.31	HE
Total		3.98	0.67	3.75	4.21	HE

Table 4 shows the extent of reflective observation toward learner-centered education, with a weighted mean of 3.98, a standard deviation of 0.67, and a confidence interval of 3.75 to 4.21, indicating a strong result. The indicators in this dimension are properly aligned – thinking about what worked, discussing hardships, rechecking mistakes, considering different methods, and realizing real-life connections. Among the indicators, the highest average score is 4.17 for the indicator, "*I discuss my math experiences and difficulties with my classmates or teacher to understand better.*" ($M=4.17$, $SD=0.89$, $CI=3.87 - 4.48$). This suggests that learners share personal experiences to learn mathematics. The lowest average, 3.80, is "*After solving math problems, I think about what worked and what I could do differently next time.*" ($M=3.80$, $SD=1.02$, $CI=3.45 - 4.15$).

Reflective observation is highly implemented, with communication with others and reviewing errors as the strongest aspects. Personal reflection after problem-solving, while still high, is the weakest. Mathematics teachers should maintain collaborative reflection activities while implementing structured frameworks for individual self-assessment (Bui et al., 2022). Students would benefit from guided reflection protocols to deepen their analysis of problem-solving approaches. Future research should investigate effective strategies to develop students' metacognitive skills, particularly in independent reflection contexts, and examine how reflective practices impact long-term mathematical understanding.

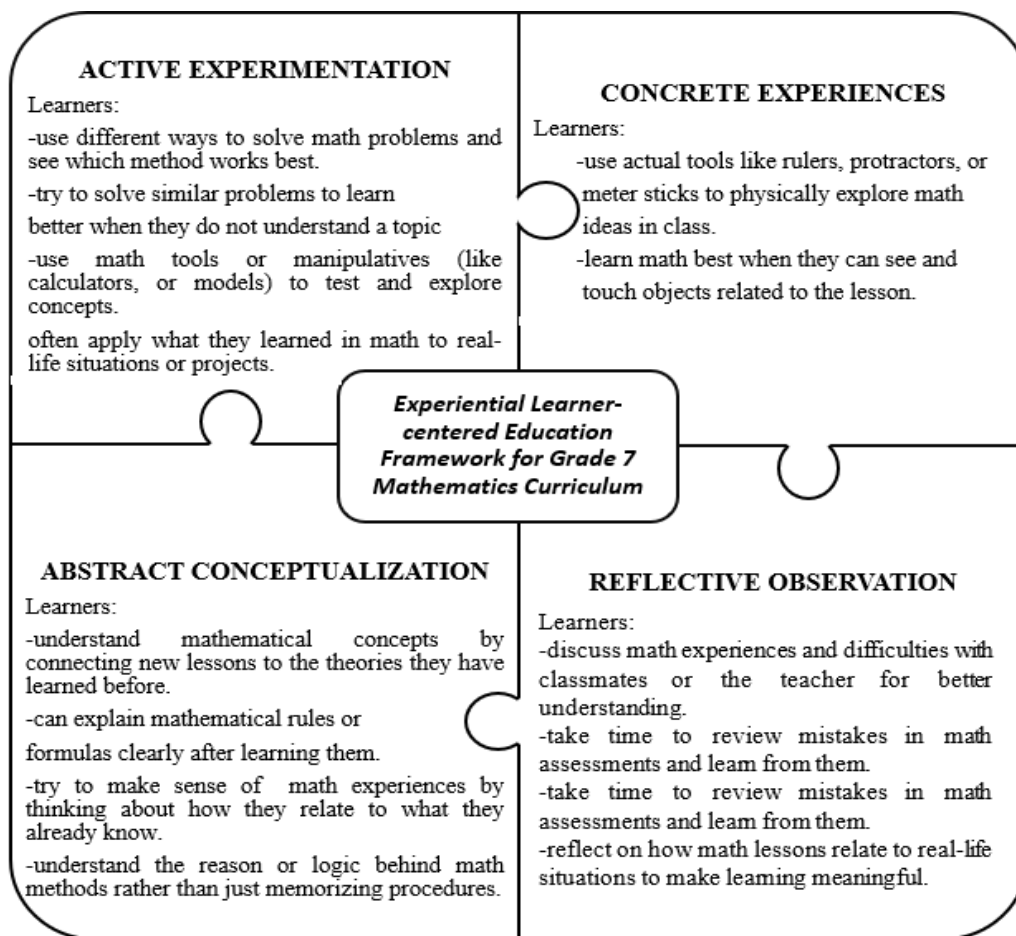


Figure 1. *Proposed Experiential Learner-Centered Education Framework for Grade Seven Mathematics Curriculum*

The proposed experiential learner-centered education framework presents a transformative approach to Grade 7 Mathematics instruction, merging hands-on learning with critical reflection to make mathematical concepts meaningful and enduring. By shifting from passive absorption to active engagement, this model not only deepens conceptual understanding but also cultivates essential problem-solving skills and a positive disposition toward Mathematics.

Conclusion

The study confirms that when students move from hands-on activities to abstract thinking, they understand math better and can solve new problems. Teachers should use guided questions and group discussions to help students make these connections. This makes math more meaningful and prepares students for real-world challenges. Secondly, active experimentation helps students apply math concepts to real situations, making learning more engaging and effective. Teachers should include more practical activities and group work in lessons. This approach builds both math skills and confidence for solving real-world problems. Moreover, physical materials help students grasp abstract concepts more effectively. Teachers should incorporate more manipulatives and real-world examples in lessons. However, schools need to address resource limitations to fully implement this approach. Lastly, Regular reflective practice helps students identify and correct misconceptions, though implementation requires adequate time and teacher guidance. These results confirm reflection's essential role in developing deeper mathematical understanding.

Math teachers should focus on deep conceptual learning rather than memorization and use engaging problem-solving activities. This approach helps students truly understand rather than just recall information. They should keep real-world examples and manipulatives central to math instruction, alongside structured practice with

different solution methods. These concrete connections make abstract concepts more meaningful for learners. Learners, on the other hand, should be supported by clear ways to reflect on how they solve problems and by encouragement to try different approaches. This builds both understanding and confidence in math. To meet their needs in mathematics, use varied hands-on activities and provide step-by-step reflection guides to help them think more deeply about their problem-solving. To improve engagement, future research should examine less engaging activities and explore ways to optimize hands-on learning methods for diverse learners, particularly in group settings. They could also identify factors that explain why students show less enthusiasm for problem analysis and explore strategies to foster deeper engagement in mathematical reasoning.

Contributions of Authors

Author: conceptualization, proposal writing, data gathering, data analysis

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Conflict of Interests

The author declares no conflict of interest.

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