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Learners' Perceptions of Gamification through Team-Based Learning in Terms of Enjoyment, Engagement, and Learning Experiences

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***Abstract*:** This study examined learners' perceptions of gamification through team-based learning in terms of learner experience, enjoyment, and engagement in mathematics within a floating school environment. A descriptive-evaluative research design was employed. Quantitative data were collected through pretest and posttest assessments, learner perception surveys, and expert evaluation rubrics using Likert scales. The study was conducted at Mambagongon Elementary School, a public floating school in Barangay Mambagongon, La Paz, Agusan del Sur, Philippines. Research instruments were aligned with the Most Essential Learning Competencies (MELCs) and validated using a rubric adapted from the Department of Education's Learning Resources Management and Development System (LRMDS). Data were analyzed using descriptive statistics, particularly the mean, frequency, and percentage. Data revealed that learners strongly perceived gamification through team-based learning as effective, relevant, and engaging. Learner experience obtained an overall weighted mean of 4.74 (Strongly Agree / Very Relevant), with clarity of instructions receiving the highest rating (WM = 5.00). Enjoyment and engagement yielded an overall weighted mean of 4.73 (Strongly Agree / Very Engaging), with enjoyment of games and challenges rated highest (WM = 4.93). Although some indicators received relatively lower ratings, all remained within the Strongly Agree range, indicating only minor variations in focus and anticipation. The results demonstrate that gamification integrated with team-based learning enhances learner experience, enjoyment, and engagement, supporting its use as an effective instructional approach for mathematics in floating school contexts.

Keywords: ***Engagement, Gamification, Mathematics Learning, Team-Based Learning***

INTRODUCTION

Gamification is the strategic use of game elements such as points, badges, quests, and leaderboards in non-game contexts, it has emerged as a powerful pedagogical tool to enhance student engagement, motivation, and learning outcomes (Papadopoulos et al., 2024). Rather than turning educational activities into games, gamification redesigns these activities to be more interactive, enjoyable, and meaningful. It can manifest in various forms, including products, processes, systems, and experiences, all aimed at solving non-game problems through game-based thinking (Lukman et al., 2024).

While gamification shares surface-level similarities with traditional games such as rules, objectives, and gameplay it differs fundamentally in purpose. Ordinary games are designed primarily for entertainment, whereas gamification is intended to deepen understanding and engagement with educational content (Nurtanto et al., 2021). By embedding game mechanics into learning tasks, learners are drawn into the material, increasing their willingness to participate and persist through challenges.

When gamification is integrated with team-based learning (TBL) a collaborative instructional strategy where learners work in permanent teams to solve problems, it amplifies the benefits of both approaches. TBL encourages peer accountability, shared responsibility, and cooperative problem-solving. Gamification enhances this by making teamwork more dynamic and rewarding. One of the rewarding experiences for the learners, it boosts collaboration and communication: Team-based challenges require learners to communicate effectively, support one another, and leverage each other's strengths. This builds trust and improves interpersonal skills (Ilhan, 2021). Russo et al. (2021) explain that team-based learning and gamification can be used as differentiated instruction in learning mathematics, as it will develop critical thinking and problem-solving. Gamified tasks often involve complex scenarios that teams must navigate together.

The Department of Education's partnership with Microsoft Philippines through the Minecraft Education Edition initiative further illustrates how

game-based learning can cultivate civic engagement and empathy among learners (DepEd, 2022). These initiatives demonstrate the national commitment to gamified learning, yet their reach in geographically isolated schools remains limited. Despite its promise, gamification in team-based learning is underutilized in marginalized communities, especially in floating

schools located in Mambagongon, Lapaz, Agusan del Sur, a flood-prone area. These schools often lack access to digital infrastructure, trained educators, and adaptive curricula. While DepEd's DM No. 563, s. 2023 promotes gamification as part of the National Learning Camp Strategy, its implementation in floating schools is not well-documented

This study addresses these gaps by examining how gamified TBL can be adapted to floating school learning communities. It investigates how teachers innovate with limited materials, and it aims to determine the efficacy of the gamification through team-based learning in a floating school environment. By documenting these practices, the study contributes to the broader discourse on inclusive education and supports DepEd's vision of equitable learning opportunities for all Filipino learners

Theoretical framework

This study is grounded on the Social Interdependence Theory (SIT), Morton Deutsch 1949). The core principles of this theory were first introduced by him and were expanded and applied the theory beginning in the 1970s by David W. Johnson Social Interdependence Theory (SIT) theorizes that the way goals are structured determines how individuals interact and, consequently, the outcomes they achieve. When individuals perceive their goals as positively interdependent, they view their success as linked to that of others, fostering cooperation. Conversely, negative interdependence produces competition, as one's success comes at the expense of another's.

According to this theory, effective cooperation depends on five essential elements: positive interdependence, individual accountability, promotive interaction, social skills, and group processing. These elements create conditions where individuals support one another's learning, resulting in higher achievement, stronger social relationships, and greater psychological well-being.

This theory provides the foundational framework for understanding how gamification through team-based learning (TBL) operates effectively within the floating school environment. It validates the premise that cooperative goal structures, when paired with engaging game mechanics, enhance both academic performance and motivation. Team-Based Learning inherently reflects the principles of SIT. It promotes positive interdependence by requiring learners to depend on one another for collective success while maintaining individual accountability through individual readiness in performing tasks for the success of the group. Each student's preparation contributes to the group's performance, ensuring that collaboration and mutual responsibility drive achievement.

Gamification strengthens SIT dynamics by adding structured competition among teams (a form of inter-group negative interdependence) that enhances intra-group cooperation. Elements such as leaderboards, badges, and points heighten motivation and engagement by linking rewards to collective performance. This design promotes outcome interdependence, where success and rewards are shared, further reinforcing teamwork and sustained engagement.

In a floating school environment where learners operate in close, community-based settings, social connectedness and cooperation are crucial. SIT-based TBL fosters promotive interaction and the development of social skills, enabling learners to collaborate effectively in resource-limited and physically dynamic learning contexts. By embedding gamified elements, this teaching strategy helps build the learners' enjoyment, engagement, and a sense of belonging, key factors in sustaining learning continuity in their floating school learning community.

The study hypothesizes that gamified TBL will enhance learners' engagement, motivation, and academic performance. This prediction is grounded in SIT's empirical assertion that cooperative goal structures yield superior cognitive and affective outcomes compared with purely individualistic or competitive arrangements. By connecting individual effort to a collective, gamified goal, the intervention operationalizes SIT principles, demonstrating how cooperative interdependence and strategic gamification can produce meaningful educational gains in a nontraditional, floating school setting.

Methodology

This study adopted a descriptive-evaluative research design to examine the effectiveness and quality of a gamified team-based learning intervention in a floating school environment. Quantitative data were collected through pretest and posttest assessments, learner perception surveys, and expert evaluation rubrics using Likert scales.The study was conducted at Mambagongon Elementary School, a public floating school in Barangay Mambagongon, La Paz, Agusan del Sur, Philippines. Research instruments were aligned with the Most Essential Learning Competencies (MELCs) and evaluated using a rubric adapted from the Department of Education's Learning Resources Management and Development System (LRMDS). Instrument validity was ensured through expert review, while reliability was established using Cronbach's alpha. . Descriptive statistics, particularly the mean, along with frequency, percentage, and standard deviation, were used to summarize learners' performance and perceptions, while a paired sample t-test was employed to determine significant differences between pretest and posttest scores.

Sampling Technique and Sample

The sample of the study consisted of 14 Grade 3 learners (2 males and 12 females) from one intact class at Mambagongon Elementary School, La Paz, Agusan del Sur. These learners participated in the implementation of the gamified team-based learning intervention. In

addition, a group of subject matter experts in education, instructional design, and gamification served as evaluators of the instructional materials. The study employed a purposive sampling technique. One intact Grade 3 class was selected based on its relevance to the research context. This non-probability sampling method was appropriate for classroom-based intervention research. Expert evaluators were likewise selected purposively to ensure that only individuals with demonstrated expertise in curriculum development, instructional design, and gamification were involved in the evaluation of the instructional materials.

Results and Discussions

Learners perceive the gamification through team-based learning

Table 1 presents the learners' perceptions of gamification through team-based learning in terms of their overall experience.

Table 1

Learners' Perceptions of Gamification through team-based learning in terms of learner experience

Indicators	*Wtd mean*	*Verbal Description*	*Interpretation*
1. I understood the instructions for each activity clearly.	5.00	Strongly agree	Very relevant
2. I followed the lesson easily because it was well-organized.	4.64	Strongly agree	Very relevant
3. I knew what my team needed to do during each part of the lesson.	4.64	Strongly agree	Very relevant
4. I found the team roles helpful in completing our tasks.	4.79	Strongly agree	Very relevant
5. I understood how the points, badges, and leaderboard worked.	4.64	Strongly agree	Very relevant
6. I found the materials easy to use and understand.	4.93	Strongly agree	Very relevant
7. I received enough guidance from my teacher during the activities.	4.86	Strongly agree	Very relevant
8. I was able to stay focused because the lesson had clear steps.	4.64	Strongly agree	Very relevant
9. I saw how the activities were connected to multiplication.	4.64	Strongly agree	Very relevant
10. I felt confident participating in the team-based learning tasks.	4.71	Strongly agree	Very relevant
Overall Weighted Mean	4.74	Strongly agree	Very relevant

Legend: 1.00-1.49-Strongly disagree/Very irrelevant; 1.50-2.49-Disagree/Irrelevant; 2.50-3.49-Neutral/Moderately relevant; 3.50-4.49-Agree/Relevant; 4.50-5.00-Strongly Agree/Very relevant

The overall weighted mean of 4.74, verbally interpreted as Strongly Agree and descriptively rated as Very Relevant, indicates that learners perceived gamification through team-based learning as highly effective in enhancing their learning experience. This result suggests that learners clearly understood the lesson structure, instructions, team roles, and game mechanics, which enabled them to participate confidently and meaningfully in the learning activities. The consistently high ratings across all indicators reflect a well-organized instructional design that supported clarity, focus, and learner confidence, key components of positive learner experience in collaborative learning environments.

The strong perception of learners supports existing research emphasizing the value of structured team-based learning in mathematics education. Sanders et al. (2025) argued that team-based learning fosters mathematical understanding by providing clear roles, structured collaboration, and guided interaction, all of which enhance learner confidence and engagement. As the study of Sosa-Moguel et al. (2025) found, well-organized team-based problem-solving activities improve learners' ability to follow tasks and actively participate in mathematical discussions. The findings of the present study imply that when gamification is integrated into a clearly structured team-based framework, it can significantly enhance learners' understanding, focus, and confidence in mathematics learning.

Indicator "I understood the instructions for each activity clearly."

This indicator obtained the highest weighted mean of 5.00, indicating unanimous agreement among learners that the instructions were clear and easy to understand. The highest rating implies that instructional clarity played a critical role in facilitating learner engagement and participation. Clear instructions likely minimized confusion, reduced cognitive overload, and allowed learners to focus on problem-solving and teamwork rather than procedural uncertainties. This clarity is especially important in gamified learning environments, where multiple elements such as rules, roles, and rewards must be understood simultaneously.

This finding aligns with the study of Darmayanti et al. (2025), who emphasized that clarity of instructions and task structure is a key factor in successful game-based learning, particularly in mathematics contexts that demand cognitive focus. Also, Al-Hassan et al. (2025) reported that learners in digital game-based mathematics environments demonstrated higher engagement and confidence when instructional guidance was explicit and well-scaffolded. The implication for practice and research is that clear instructional design is foundational to maximizing the benefits of gamified team-based learning, ensuring that learners can fully engage with mathematical concepts without unnecessary confusion.

Some indicators received the lowest weighted mean of 4.64, including ease of following the lesson, understanding of game mechanics, maintaining focus, and recognizing connections to multiplication. Despite being the lowest, these indicators were still rated as Strongly Agree and Very Relevant. The lower ratings suggest that while learners generally perceived

these aspects positively, some may have experienced minor challenges in consistently maintaining focus or fully recognizing conceptual connections during the activities. This may reflect individual differences in learning pace or familiarity with gamified instructional formats rather than deficiencies in lesson design. Sanders et al. (2025) noted that while team-based learning enhances engagement and understanding, learners may require repeated exposure and reflection to fully internalize conceptual connections, particularly in mathematics. According to Sosa-Moguel et al. (2025), the importance of explicit reflection phases in team-based problem-solving to strengthen conceptual linkage. The findings indicate that learners perceive gamification through team-based learning as a highly relevant and supportive instructional approach.

Table 2 presents the learners' perceptions of gamification through team-based learning in terms of enjoyment and engagement.

Table 2

Learners' Perceptions of Gamification through team-based learning in terms of enjoyment and engagement

	Indicators	*Wtd mean*	*Verbal Description*	*Interpretation*
1.	I enjoyed the games and challenges in the lesson.	4.93	Strongly agree	Very engaging
2.	I found multiplication more exciting because of the activities.	4.64	Strongly agree	Very engaging
3.	I felt motivated to earn points and badges.	4.57	Strongly agree	Very engaging
4.	I liked working with my teammates during the lesson.	4.86	Strongly agree	Very engaging
5.	I wanted to do better because of the leaderboard.	4.79	Strongly agree	Very engaging
6.	I felt proud when my team earned a badge.	4.64	Strongly agree	Very engaging
7.	I stayed interested in the lesson because of the games.	4.64	Strongly agree	Very engaging
8.	I looked forward to each part of the activity.	4.50	Strongly agree	Very engaging
9.	I had fun while learning math in this way.	4.86	Strongly agree	Very engaging
10.	I want to learn more math through games and teamwork.	4.86	Strongly agree	Very engaging
Overall Weighted Mean		4.73	Strongly agree	Very engaging

Legend: 1.00-1.49-Strongly disagree/Very unengaging; 1.50-2.49-Disagree/Unengaging; 2.50-3.49-Neutral/Moderately engaging; 3.50-4.49-Agree/Engaging; 4.50-5.00-Strongly Agree/Very engaging

As shown in Table 2, the overall weighted mean of 4.73, verbally interpreted as Strongly Agree and descriptively rated as Very Engaging, indicates that learners perceived gamification through team-based learning as highly enjoyable and engaging. This finding suggests that the integration of games, challenges, teamwork, and reward systems effectively enhanced learners' emotional involvement and sustained their interest in learning multiplication. The consistently high ratings across all indicators reflect that learners experienced enjoyment, motivation, and a positive disposition toward mathematics when instruction was delivered through a gamified and collaborative format.

The strong perception of enjoyment and engagement supports existing study of Debrenti (2024), which highlighted that team-based learning in primary mathematics fosters enjoyment and active participation, which are essential for sustaining learners' interest and reducing anxiety toward mathematical tasks. Team-based learning promotes engagement by encouraging social interaction, shared responsibility, and collective problem-solving Sanders et al. (2024)

Moreover, the "I enjoyed the games and challenges in the lesson." This indicator obtained the highest weighted mean of 4.93, indicating that learners overwhelmingly enjoyed the gamified activities and challenges presented during the lesson. The rating implies that the game elements were well-designed, age-appropriate, and aligned with learners' interests. Enjoyment appears to be a central factor in sustaining learner attention and willingness to engage in mathematical tasks. When learners perceive activities as enjoyable, they are more likely to participate actively and approach learning with a positive attitude.This finding aligns with Debrenti (2024), who emphasized that enjoyable game-based experiences significantly enhance learners' engagement and willingness to explore mathematical concepts.

Lowest Mean Indicator "I looked forward to each part of the activity." has a weighted mean of 4.50, although it remained within the Strongly Agree and Very

The lower rating means that while learners anticipated the activities positively, some components of the lesson may have been more engaging than others. This variation may be attributed to differences in task difficulty, individual learner preferences, or the pacing of activities. Nonetheless, the rating still reflects a high level of engagement and positive anticipation. Wahjusaputri et al. (2024) emphasized the importance of balancing challenge and enjoyment to maintain consistent engagement across all phases of an activity. These findings suggest that future implementations of gamified team-based learning may benefit from refining task sequencing and pacing to ensure that each activity segment is equally engaging and motivating for learners.

Conclusions

Based on the findings, gamification implemented through team-based learning is a highly effective

instructional approach in mathematics, particularly in teaching multiplication. Learners strongly perceived this strategy as enhancing their learning experience, increasing enjoyment and engagement, and improving perceived learning achievement. The consistently high ratings across all indicators indicate that clear instructional design, structured collaboration, and well-aligned game elements promote learner confidence, motivation, and active participation. Overall, the integration of gamification within a team-based framework supports meaningful learning and fosters a positive attitude toward mathematics, making it a valuable approach for improving both engagement and learning outcomes. Teachers may integrate gamification through team-based learning to improve learners' engagement, enjoyment, and understanding in mathematics by providing clear instructions, structured collaboration, and well-paced activities. Students may actively participate in gamified team tasks and collaborate with peers to enhance focus, confidence, and conceptual understanding. School principals may support this instructional approach by providing professional development, resources, and institutional encouragement for innovative teaching strategies. Future researchers may further investigate the effectiveness of gamified team-based learning across different grade levels, subject areas, and research designs, as well as examine its long-term impact on learners' academic performance and motivation.

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