International Journal of Multidisciplinary Research and Publications
ISSN (Online): 2581-6187

Effects of Mindfulness and Unplugged Game-Based Learning on the Cognitive and Affective Outcomes of Grade 10 Students in Mathematics

Jocelyn C. Camacho
Master of Science in Mathematics Education, Isabela State University, Echague, Philippines
Email address: jocelyncacayancamacho@gmail.com

Abstract*—This study investigated the effects of mindfulness and unplugged game-based learning on the cognitive and affective outcomes of Grade 10 students in Mathematics. A quasi-experimental pretest–posttest control group design was employed involving 70 students from Diffun National High School during the School Year 2025–2026. The experimental group (n=36) received instruction integrating mindfulness practices and unplugged game-based learning, while the control group (n=34) was taught using traditional methods. Data were collected using validated instruments measuring mathematics self-efficacy, mathematics anxiety, and learning motivation. Descriptive statistics and Analysis of Covariance (ANCOVA) were used to analyze the data. Results revealed that the experimental group demonstrated significantly higher mathematics self-efficacy ($F = 117.83$, $p < .001$), significantly lower mathematics anxiety ($F = 52.26$, $p < .001$), and significantly higher learning motivation ($F = 71.38$, $p < .001$) compared to the control group after controlling for pretest scores. These findings suggest that integrating mindfulness and unplugged game-based learning creates a supportive and engaging learning environment that enhances both cognitive and affective outcomes. The study recommends the adoption of these strategies in mathematics instruction to promote improved student performance and emotional well-being.*

***Keywords*—** *Mindfulness, game-based learning, mathematics achievement, affective outcomes, quasi-experimental design, ANCOVA.*

I. Introduction

Mathematics is widely regarded as one of the most challenging subjects for high school students due to its abstract nature and the anxiety it often evokes among learners (Ashcraft & Krause, 2007). Many students experience difficulty in understanding mathematical concepts, which negatively affects both their academic performance and emotional disposition toward the subject.

To address these challenges, innovative instructional strategies such as mindfulness and game-based learning have been introduced. Mindfulness practices help improve students' focus, attention, and emotional regulation (Kabat-Zinn, 2003). On the other hand, game-based learning enhances student engagement and motivation by creating interactive and meaningful learning experiences (Plass et al., 2015). Studies have shown that these approaches individually contribute to improved learning outcomes and student attitudes.

However, limited research has examined the combined effects of mindfulness and unplugged game-based learning in Mathematics instruction, particularly among Grade 10 students. This gap highlights the need to explore whether integrating these strategies can significantly improve both cognitive and affective outcomes.

Thus, this study aimed to determine the effects of mindfulness and unplugged game-based learning on the cognitive and affective outcomes of Grade 10 students in Mathematics.

Despite the growing body of literature supporting mindfulness and game-based learning, most existing studies have examined these approaches independently, with limited empirical evidence on their combined effects, particularly in the context of secondary mathematics education. In the Philippine setting, research focusing on the simultaneous improvement of cognitive and affective outcomes remains scarce. This gap highlights the need for integrated instructional approaches that address both students' academic performance and emotional well-being. Therefore, this study contributes to the existing literature by examining the combined impact of mindfulness and unplugged game-based learning on mathematics self-efficacy, mathematics anxiety, and learning motivation among Grade 10 students.

II. Methodology

Research Design

This study employed a quasi-experimental research design using a pretest–posttest control group.

Participants

The participants were Grade 10 students enrolled at Diffun National High School during the School Year 2025–2026. Two intact sections were purposively selected based on their availability and comparable academic characteristics. The study involved 70 students, with 36 in the experimental group and 34 in the control group.

Intervention

The experimental group received instruction integrating mindfulness practices and unplugged game-based learning. Mindfulness activities included mindful breathing, body scan, and affirmations. Game-based activities included Math Carousel, Four Corners, and Solve and Shoot.

The control group received traditional instruction consisting of lectures, seatwork, and written exercises.

Instruments

Jocelyn C. Camacho, "Effects of Mindfulness and Unplugged Game-Based Learning on the Cognitive and Affective Outcomes of Grade 10 Students in Mathematics," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 8, Issue 11, pp. 24-25, 2026.

Three validated instruments were used:

- Mathematics Self-Efficacy Scale (MaSS) – measured students' confidence in performing mathematical tasks.
- Modified Abbreviated Math Anxiety Scale (mAMAS) – measured students' anxiety levels in mathematics.
- Mathematics Motivation Questionnaire (MMQ) – measured students' level of motivation.

Data Analysis

Data were analyzed using mean and standard deviation to describe the performance of the students. Analysis of Covariance (ANCOVA) was used to determine significant differences between the experimental and control groups while controlling for pretest scores.

III. Results and Discussion

TABLE 1. Pretest Levels of Students

Variable	Group	Mean	Interpretation
Self-Efficacy	Experimental	4.12	Moderate
Self-Efficacy	Control	3.19	Low
Anxiety	Experimental	2.73	Moderate
Anxiety	Control	2.81	Moderate
Motivation	Experimental	2.91	Moderate
Motivation	Control	2.75	Moderate

The pretest results indicate that both groups started with comparable levels in anxiety and motivation, while slight differences were observed in self-efficacy.

TABLE 2. Posttest Levels of Experimental Group

Variable	Mean	Interpretation
Self-Efficacy	8.64	High
Anxiety	1.50	Low
Motivation	4.43	Very High

The experimental group showed significant improvement in all variables after the intervention.

TABLE 3. ANCOVA Results

Variable	F-value	p-value	Decision
Self-Efficacy	117.83	<.001	Significant
Anxiety	52.26	<.001	Significant
Motivation	71.38	<.001	Significant

The results indicate a statistically significant difference between the control and experimental groups, confirming the effectiveness of the intervention.

The findings of the study indicate that the integration of mindfulness and unplugged game-based learning produced significantly greater improvements in mathematics self-efficacy, anxiety reduction, and learning motivation compared to traditional instruction. These results suggest that addressing both the cognitive and affective domains of learning leads to more meaningful and sustained educational outcomes. The significant increase in mathematics self-efficacy among students in the experimental group may be attributed to the supportive and low-stress learning environment created by the intervention. Mindfulness practices likely enhanced students' emotional regulation and focus, allowing them to approach mathematical tasks with greater confidence. At the same time, unplugged game-based learning provided opportunities for active engagement, collaboration, and mastery experiences, which are essential in strengthening self-efficacy beliefs.

The reduction in mathematics anxiety can be explained by the role of mindfulness in helping students manage stress and negative emotions associated with mathematical tasks. By promoting calmness and present-moment awareness, students were able to engage in learning without excessive fear or tension. Furthermore, the interactive and enjoyable nature of game-based activities may have reduced pressure and transformed mathematics into a more positive experience.

The significant improvement in learning motivation supports the idea that engaging and student-centered instructional strategies enhance learners' interest and participation. The combination of mindfulness and game-based learning likely fulfilled students' psychological needs for competence, autonomy, and relatedness, thereby increasing intrinsic motivation. These findings confirm that integrating emotional support strategies with interactive learning approaches can significantly enhance both academic performance and students' attitudes toward mathematics.

IV. Conclusion

The study concluded that integrating mindfulness and unplugged game-based learning significantly improves the cognitive and affective outcomes of Grade 10 students in Mathematics. This study is limited to Grade 10 students from one school; future studies may involve larger samples and different contexts.

Recommendations

Teachers are encouraged to incorporate mindfulness practices and game-based learning strategies in Mathematics instruction. Future researchers may explore the long-term effects of these strategies.

References

[1]. Ashcraft, M. H., & Krause, J. A. (2007). Working memory, math performance, and math anxiety. Psychonomic Bulletin & Review, 14(2), 243–248.
[2]. Bandura, A. (1997). Self-efficacy: The exercise of control. W.H. Freeman.
[3]. Dichev, C., & Dicheva, D. (2017). Gamifying education: What is known, what is believed and what remains uncertain. International Journal of Educational Technology in Higher Education, 14(1), 1–36.
[4]. Hattie, J. (2009). Visible learning: A synthesis of over 800 meta-analyses relating to achievement. Routledge.
[5]. Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. Clinical Psychology: Science and Practice, 10(2), 144–156.
[6]. Plass, J. L., Homer, B. D., & Kinzer, C. K. (2015). Foundations of game-based learning. Educational Psychologist, 50(4), 258–283.
[7]. Prince, M. (2004). Does active learning work? A review of the research. Journal of Engineering Education, 93(3), 223–231.
[8]. Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. Theory Into Practice, 41(2), 64–70.

Jocelyn C. Camacho, "Effects of Mindfulness and Unplugged Game-Based Learning on the Cognitive and Affective Outcomes of Grade 10 Students in Mathematics," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 8, Issue 11, pp. 24-25, 2026.