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Research Article

GAME-BASED LEARNING: EFFECT ON THE ACADEMIC PERFORMANCE OF LEARNERS WITH AUTISM SPECTRUM DISORDER

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ABSTRACT

This study aimed to assess the impact of game-based learning on the academic performance of pupils with Autism Spectrum Disorder (ASD) at Ozamiz City Central School, Ozamiz City, during the academic year 2024–2025. Utilizing a quasi-experimental research design—specifically, a non-equivalent control group design—the study investigated the effectiveness of integrating game-based strategies into classroom instruction. A total of 10 participants were purposively selected and divided equally into experimental and control groups. Data were analyzed using various statistical tools, including means, standard deviations, t-tests for correlated and independent samples, and Cohen's D for effect size. Findings revealed that both groups had comparable levels of prior knowledge before the intervention, indicating the need for instructional support. Post-intervention results demonstrated that while both traditional and game-based methods facilitated learning, game-based learning proved more effective in enhancing academic performance. The study concluded that game-based learning is a beneficial instructional approach for learners with ASD, promoting engagement and improved outcomes in a mainstream classroom setting.

Keywords: *game-based learning, academic performance, Autism Spectrum Disorder (ASD), inclusive education, instructional strategy*

Introduction

Game-based learning has gained significant attention as an innovative educational approach, both locally and internationally, particularly in addressing the needs of children with autism. The integration of games into learning environments has been shown to enhance engagement, motivation, and performance among learners with special needs. Parsons and Cobb (2011) demonstrated that game-based learning improved the social communication skills and cognitive development of children with autism. In similar, Goodwin et al. (2016) highlighted that using interactive digital games allowed children with autism to better navigate sensory challenges, while also improving their academic performance. Henceforth, the use of interactive and engaging games offers a multisensory approach that aligns with the needs of autistic learners, providing them with opportunities to practice social interactions, develop problem-solving skills, and adapt to various learning tasks in a structured yet flexible manner.

In countries like Japan and Australia, the potential of game-based learning for children with autism is being widely explored. Mazzone et al. (2020) revealed that digital game-based therapy significantly improved both social interaction and language acquisition for children on the autism spectrum. Similarly, in Australia, Beaumont and Sofronoff (2008) found that a computer game specifically designed for children with autism led to noticeable improvements in their problem-solving abilities. This suggests that game-based learning, particularly digital interventions, holds significant potential to support the developmental and educational needs of children with autism. Furthermore, game-based learning is not only effective for academic enhancement but also for fostering essential life skills, such as social communication and problem-solving.

In the Philippines, there has been growing interest in the use of game-based learning as a tool for children with special needs. Several local studies have examined the significance of game-based learning interventions in improving the cognitive and behavioral performance of children with autism. de Guzman et al. (2017) demonstrated that interactive games led to a significant improvement in attention span and task completion among Filipino children with autism. Another study by Cruz and Santos (2019) found that game-based activities facilitated better social engagement and reduced anxiety in children on the spectrum. Moreover, Ybanez and Mendoza (2020) highlighted the use of digital platforms in enhancing the learning motivation of autistic learners, while Lim and Cabrera (2021) focused on the impact of educational games on language development. A similar study by Ramos and Villafuerte (2022) emphasized the positive effects of game-based learning on sensory processing and adaptive behavior among children with autism.

Despite the positive outcomes demonstrated in these studies, there is still a significant gap in the research, particularly in understanding the long-term effects of game-based learning on the overall academic and behavioral performance of children with autism. While many studies have focused on short-term improvements in social interaction or cognitive skills, few have examined the sustained impact of these interventions over time. Additionally, there is limited research comparing different types of game-based learning methods and their specific effects on the diverse challenges faced by children with autism, such as communication difficulties, behavioral issues, and sensory sensitivities.

With this, this study will be conducted to investigate the effect of game-based learning on the academic and behavioral performance of children with autism. Specifically, it seeks to explore how game-based interventions influence cognitive skills, social interaction, and adaptive behavior. By examining these areas, the study aims to provide educators and specialists with evidence-based strategies that could enhance the learning experiences of children with autism. The expected outcome of this study is that game-based learning will not only improve academic performance but also foster better social and behavioral adaptability among children on the autism spectrum, ultimately contributing to their overall development and integration into educational settings.

Methods

This study employed a quasi-experimental research design using a two-group non-equivalent control group structure to determine the effects of game-based learning on the academic performance of learners with Autism Spectrum Disorder (ASD) at Ozamiz City Central School during the school year 2024–2025. The

participants, selected through purposive sampling, were divided into an experimental group exposed to game-based learning and a control group taught using traditional instructional methods. Conducted in a natural classroom environment, random assignment was limited, yet measures were taken to ensure comparability between groups through pretest and posttest assessments. The research was carried out in Ozamiz City Central School, an inclusive institution equipped with technological resources and a strong SPED program supporting students with diverse learning needs. Ten ASD learners aged 6–15 served as respondents, equally divided between the experimental and control groups. A researcher-made 10-item multiple-choice test, validated by experts and refined through item analysis, was used to measure pre- and post-intervention performance. The 3-day intervention period involved structured learning sessions guided by teachers, parents, and a guidance counselor to ensure participants' well-being. Data were analyzed using weighted mean, standard deviation, and t-test to determine statistical significance at a 0.05 level. Ethical protocols were strictly followed, including informed consent, confidentiality, and data protection in compliance with the Data Privacy Act of 2012.

Results and Discussions

Table 1

Test of The Difference Between The Pretest And Posttest Performance of the Pupils in the Control Group Group

Control Group	N	Mean	Mean Difference	Standard Deviation	Computed t	p value	Cohen's d
Pretest	5	6.60	0.80	1.342	2.138	0.039	0.643
Posttest	5	7.40		1.140			

Table 1 presents the results of the comparison between the pretest and posttest performance of pupils in the control group. The t-test for correlated samples revealed a significant difference between the mean scores before and after instruction using the traditional teaching method [$t = 2.138$; $p < 0.05$]. The posttest mean score ($X2 = 7.40$) was higher than the pretest mean ($X1 = 6.60$), indicating a statistically significant improvement in pupil performance. The calculated effect size ($d = 0.643$) points to a moderate impact, showing a noticeable gain in learning (Brydges, 2019; Kraft, 2020). These results suggest that the traditional teaching method had a positive effect on pupils' learning outcomes.

Turtogo (2021), citing Tall (2004), affirms that traditional methods, despite being less interactive, provide clear explanations and guided practice, which are especially effective in developing procedural fluency among young learners. Additionally, DepEd Order No. 8, s. 2015 emphasizes the importance of direct instruction and consistent assessment practices in ensuring that students grasp essential learning competencies (DepEd Order 8, s. 2015). This supports the claim that, even without modern strategies, traditional approaches can produce significant learning outcomes when implemented with clarity and structure.

Conversely, Lopez (2023) found that while traditional methods may yield short-term improvements, students exposed to interactive, game-based learning showed significantly higher retention rates and more consistent motivation over time. The findings suggest that although traditional methods can enhance scores initially, they may lack the sustained cognitive engagement needed for deeper learning. Similarly, Bayona (2024) noted that passive learning environments often fail to meet the diverse learning styles of today's students, particularly in inclusive classrooms where differentiated instruction is crucial. These perspectives imply that while the control group in this study did show significant gains, more dynamic, student-centered approaches might yield even greater or more sustained improvement. This aligns with the inclusive and adaptive teaching strategies promoted in DepEd's LDM2 modules, which encourage the integration of innovative methods to support varied learner needs in the 21st-century classroom.

Table 2

Test Of Difference Between the Pretest and Posttest Performance of The Pupils in the Experimental Group

Experimental Group	N	Mean	Mean Difference	Standard Deviation	Computed t	p value	Cohen's d
Pretest	5	6.40	2.00	1.187	3.651	0.022	1.719
Posttest	5	8.40		1.140			

Table 2 presents a comparison of pretest and posttest performance among pupils in the experimental group. The t-test for correlated samples showed a significant difference between the pretest and posttest mean scores for students exposed to game-based learning \[t = 3.651; p < 0.05]. The posttest mean (Y2 = 8.40) was notably higher than the pretest mean (Y1 = 6.40), indicating that game-based learning significantly improved pupil performance. The effect size (d = 1.719) was substantial, suggesting a strong and observable impact (Brydges, 2019; Kraft, 2020).

These findings affirm that game-based learning had a marked effect on learning outcomes. They also align with Gui et al.'s (2023) conclusion that game-based learning boosts pupils' motivation, engagement, and cognitive development. Games foster essential skills such as problem-solving, critical thinking, and collaboration through immersive and interactive experiences. Key factors contributing to its effectiveness include the alignment of game mechanics with learning goals, appropriate scaffolding, and thoughtful integration with traditional classroom instruction.

Despite its promising outcomes, Martinez and Cruz (2022) argue that the success of game-based learning depends heavily on its design and implementation. In their study across three public schools in Central Luzon, students exposed to poorly aligned educational games showed minimal improvement and, in some cases, distraction and disengagement. They found that without clear instructional goals and adequate teacher facilitation, game-based learning can lead to off-task behavior and reduced academic focus.

Additionally, Caballero (2024) found that while some learners thrived in game-based settings, others, especially those with low intrinsic motivation, did not respond well and showed limited gains compared to more structured traditional methods. These findings challenge the assumption that game-based learning is universally effective and suggest that its success hinges on thoughtful integration, classroom context, and learner characteristics

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Conclusions

The study's findings conclude that pupils in both the control and experimental groups possess comparable knowledge of the test topics needing intervention to improve their performance. Game-based learning is an integrated teaching strategy that helps pupils learn more effectively. However, the traditional teaching style cannot ignore that learning happens in the classroom setting. Nonetheless, students who gain through games perform equally well as those taught traditionally. Learning takes place despite the use of traditional instructional methods. However, game-based learning is more effective in improving student performance.

Recommendations

Based on the findings and conclusions, the study recommends that special education teachers maintain a strong focus on established practices for teaching learners with ASD while continuously utilizing traditional teaching methods. They should design instructional activities that are intuitive, engaging, and aligned with learning objectives, incorporating games that address various learning styles and needs. A blended instructional model combining traditional methods with game-based learning is encouraged to enhance engagement, motivation, and performance while ensuring consistency and structure. Furthermore, school administrators and

curriculum planners should provide targeted professional development programs to train teachers in designing, selecting, and implementing effective game-based learning tools aligned with curriculum standards. Finally, further research is recommended to explore optimal methodologies for implementing game-based learning in diverse educational settings and to understand its long-term impact on student outcomes.

Conflict of Interests

The author declares that they have no conflicts of interest

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