
EXPLORING THE IMPACT OF EDUCATIONAL GAMES ON NUMERACY SKILL DEVELOPMENT AMONG THE ELEMENTARY LEARNERS: A SYSTEMATIC REVIEW

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Introduction

Numeracy abilities are crucial because they help people make educated decisions in their daily lives. These skills are especially important in fields such as health and finance, where proper risk interpretation is required. Individuals who lack numeracy abilities may struggle to grasp and analyze information, which can have a detrimental impact on their decision-making and life outcomes. Numeracy abilities are especially vital for university preparation because many courses need some level of mathematical literacy. Employers also value numeracy skills in graduate recruitment, as numeracy tests are frequently employed in the hiring process. Furthermore, numeracy abilities are strongly linked to their practical application, and they play an important role in many aspects of individual well-being. Overall, numeracy skills are important for everyday life, academic success, and career opportunities.

Traditional teaching methods are described as being teacher-oriented, in a lecture style and are inflexible. Lessons are usually taught by the teacher introducing skills using a blackboard accompanied by a verbal explanation or lecture. Practical work for students is then assigned, followed by feedback from the teacher. Direct instruction is a teacher-directed teaching method. This means that the teacher stands in front of a classroom, and presents the information. The teachers give explicit, guided instructions to the students. Worksheets have been a staple of education for decades. They provide a structured and organized way for students to learn and practice concepts, and they can be tailored to fit the specific needs of individual learners. However, worksheets might sometimes be seen as boring or repetitive, and students may not always see their value. Rote learning is a memorization technique that involves repeating information over and over until it is committed to memory. It is often associated with the traditional style of education, where students are expected to simply repeat information without truly understanding it. A disadvantage of this traditional method is that students who have learning difficulties are unable to cope with how the lessons are delivered. Above-average students are also disadvantaged because the lessons aren't challenging enough. This means that students in either category are at an instant disadvantage compared to an average student without a learning disability.

Globalization has formed a new path in worldwide education, and teachers play an active role in the teaching and learning process. In this regard, pedagogy is stressing more about the roles of the students in the learning sessions, specifically how it is compatible with the 21st century learning methods (Amran *et al.*, 2019). According to Kamarudin *et al.* (2019), the level of student interest in teaching and learning is low when the conventional approach is employed. Consequently, teaching methods and techniques are essential for becoming a teacher who can impart knowledge to their pupils using a variety of engaging approaches and strategies. Teachers must employ the most effective method for imparting knowledge.

Primary school students in the Philippines face challenges in developing numeracy skills due to various factors. These challenges include a lack of maturity in mathematical concepts, which hinders problem-solving abilities and planning strategies. Additionally, marginalized youth often struggle with functional literacy and numeracy skills due to inadequate educational opportunities and poverty-related academic inadequacies. The curriculum congestion in the education system also impacts the development of numeracy skills, with a recommendation to focus on key subjects like Reading in English, Arithmetic, and Character Education to enhance literacy and numeracy among Filipino children. Furthermore, disparities in academic achievement are influenced by factors such as socioeconomic backgrounds, learning mindsets, reading difficulties, and history of repetition, emphasizing the need for targeted interventions and long-term quality education goals to address these challenges.

Subsequently, learning is intimately tied to the learning domains (Bloom *et al.*, 1956) and has been introduced to education to encourage higher order thinking (Bitok, 2020). It encompasses the cognitive, affective, and psychomotor domains specifically. The cognitive domain is concerned with the intellectual growth of students, the affective domain involves the development of the students' attitudes, feelings, and values, while the psychomotor domain involves the physical development of the students. In this scenario, the cognitive and emotive domains of the pupils also influence the effectiveness of the Game-based method.

Game-based Learning in education is now one of the major learning trends of the 21st century (Ahmad and Iksan, 2021) and it has received an increasing amount of academic attention in recent years (Zou, 2020). Game-Based Learning is a mathematics teaching technique that creates a balance between classroom learning and educational games while enhancing the learning efficiency through student-centered learning activities (Lasut and Bawengan, 2020). It is also one of the more creative and entertaining methods, and, indirectly, students will pay attention to the teacher's lessons. This is due to the fact that playing games is innate to the students. Additionally, educational games may encourage the students to enjoy learning, to feel comfortable approaching a variety of difficulties along the way, and to overcome these challenges with focus, self-assurance, and patience, all of which are crucial for higher education in the development of lifelong learners (Liu *et al.*, 2021).

In their experience as researchers and teachers, they found that most learners struggle with numeracy. Proficiency in mathematics is crucial, particularly at the primary school stage. Since learners can utilize numeracy in their daily life, it is important to acquire these skills. The researchers are looking for ways to support learners in developing their numeracy abilities while also instilling in them a passion for mathematics and a sense of its importance and applicability to everyday situations. This motivates the researchers to incorporate educational activities to improve or strengthen their numeracy skills, as well as to recognize the importance of numeracy skills in their lives. The researchers will employ educational activities such as puzzles and incorporating Filipino cultural games into math lectures, among others.

The researchers were inspired to take actions to lessen the effects of these elements by the aforementioned concerns. The trainees' numeracy abilities will increase as a result of this review. Furthermore, it will support their passion and acceptance of mathematics.

The following will benefit from this review: the researcher will be able to innovate her teaching strategies and techniques and provide innovative instructional materials, such as educational games that improve learners' numeracy skills; elementary students will gain experience in enhancing the numeracy skills they learned in each lesson; and everyone involved in developing curriculum materials will be able to support creative activities and learner-centered instructional materials that can be used to develop numeracy skills.

Review of Related Literature

It is within these theories and concepts that the study is based. Constructivist learning theory, as articulated by Piaget (1970) and Vygotsky (1978), posits that learners actively construct knowledge by engaging with their environment and building upon prior experiences. Recent research has highlighted the potential of educational games to foster collaborative learning experiences, where learners co-construct knowledge through interaction with peers and facilitators within game-based environments (Looi et al., 2023). By promoting social interaction, discourse, and knowledge sharing, educational games can facilitate the construction of numeracy concepts in socially situated and collaborative contexts.

Game-based learning frameworks, such as those proposed by Gee (2003, 2007), highlight the unique affordances of games for promoting deep learning, motivation, and engagement. Recent studies have explored the role of game design principles, such as narrative immersion, game mechanics, and feedback loops, in shaping learner experiences and outcomes within educational games (Kaplan et al., 2022). By integrating principles of game design and motivation theory, educational games can enhance learners' intrinsic motivation, persistence, and enjoyment of numeracy learning activities, ultimately leading to improved learning outcomes.

Mayer's Cognitive Theory of Multimedia Learning (Mayer, 2001) emphasizes the importance of presenting information in a format that optimizes the cognitive processes involved

in learning. According to this theory, educational materials should manage cognitive load by utilizing multimedia elements effectively. Recent studies have further emphasized the importance of personalized and adaptive learning experiences within educational games, leveraging techniques such as intelligent tutoring systems and adaptive feedback mechanisms to tailor instruction to individual learner needs (Feng *et al.*, 2021).

Vygotsky's socio-cultural theory posits that learning is a social and collaborative process influenced by cultural context, social interactions, and the tools and resources available within a learning environment (Vygotsky, 1978). According to this theory, learners construct knowledge through interaction with more knowledgeable others, such as teachers, peers, or educational tools like educational games. Educational games, serving as mediational tools, can scaffold learners' understanding of mathematical concepts, provide opportunities for guided practice, and facilitate the internalization of numeracy skills through active engagement and social interaction (Gee, 2003).

Numeracy is a concept that goes beyond arithmetic content. It is considered a transversal competence, which is present not only in the different areas, contents, and processes of mathematics (problem-solving, communication, reasoning, representations, numerical thinking, measurement, geometry, probability, statistics, etc.). It is also part of what we need to take a critical look at our environment and be able to participate actively, informally, and autonomously. This, of course, poses many challenges, especially in today's world, in which all of us face situations where we must read, understand information, perhaps calculate things, think or interpret numerical or mathematical information, make decisions, and even use technologies (Apps, programs, etc.). All of it contains a good amount of math (sometimes even invisibly, since we use the tool without thinking about the "math" it contains and the "math processing" it performs). Think, for example, of any smartphone or smartwatch App that solves for us a series of practical numeracy problems, such as calculating the restaurant tip, the time zone of the different international participants in an online meeting, the number of calories I must eat to be in the "acceptable" zone of the "body score," the time at which I have to go to sleep, when the menstrual cycle is expected, and so forth. How much math does the smartwatch do without us knowing? What algorithms are programmed for us and which, often without thinking about it, we trust blindly without asking ourselves how they are made or if they fit our situation? The OECD states that numeracy, literacy, and digital skills are the pillars of the basic skills in the 21st Century [Organization for Economic Co-operation and Development (OECD), 2021]. This statement is very strong because it shows that our society is undergoing a so-called "mathematization." Mathematics and numeracy are increasingly present in our forms of communication and action (Hoogland and Stoker, 2021; Hoogland and Díez-Palomar, 2022).

Numerate behavior is permanently embedded in a context. Some numeracy takes place in everyday life, such as in daily activities of the individual, like cooking. Numeracy can also be in the context of work and professional settings, ranging from simple lists of numbers to complex

algorithm-driven applications. In the framework of the second cycle of PIAAC, the contexts in which numeracy is defined include three areas: the personal, the work, and the societal/community (Tout et al., 2021). One of the key abilities that a pupil must achieve is numeracy. From their Elementary Years, pupils were taught by their teachers the basic procedures in problem solving and how to apply it as a living skill in daily life. Being numerate entails being able to identify numbers with confidence, having counting abilities, being able to recognize numbers, being able to use simple operations and problem-solving, and being able to apply these techniques to understand complex concepts. The key to understanding and developing in Mathematics is mastering them. It is one of the teachers' primary areas of concentration, along with literacy, because these two are the newly emerging issues of the Department of Education here in the Philippines.

Educational transformation is necessary because the success of said economic transformation is very much dependent on the successfulness of a futuristic education plan (Leal Filho et al., 2018). Globalization has formed a new path in worldwide education, and teachers play an active role in the teaching and learning process. In this regard, pedagogy is stressing more about the roles of the students in the learning sessions, specifically how it is compatible with the 21st century learning methods (Amran et al., 2019). According to Kamarudin et al. (2019), the level of student interest in teaching and learning is low when the conventional approach is employed. Consequently, teaching methods and techniques are essential for becoming a teacher who can impart knowledge to their pupils using a variety of engaging approaches and strategies. Teachers must employ the most effective method for imparting knowledge.

GBL in education is now one of the major learning trends of the 21st century (Ahmad and Iksan, 2021) and it has received an increasing amount of academic attention in recent years (Zou, 2020). GBL is a mathematics teaching technique that creates a balance between classroom learning and educational games while enhancing the learning efficiency through student-centered learning activities (Lasut and Bawengan, 2020). It is also one of the more creative and entertaining methods, and, indirectly, students will pay attention to the teacher's lessons. This is due to the fact that playing games is innate to the students. Additionally, educational games may encourage the students to enjoy learning, to feel comfortable approaching a variety of difficulties along the way, and to overcome these challenges with focus, self-assurance, and patience, all of which are crucial for higher education in the development of lifelong learners (Liu et al., 2021).

This strategy is also founded in constructivist learning which emphasizes the importance of experiential learning through social interactions with the environment and their peers (Hourdequin et al., 2017). There is substantial data indicating that GBL is becoming increasingly popular as an effective learning approach utilized to create an engaging learning environment. On the basis of the empirical evidence from recent studies, the effectiveness of digital games in the education context has further proven the potential of GBL in boosting motivation,

engagement, and social influences (Hernández-lara and Serradell-lopez, 2018). According to Wong and Osman (2018), there are two types of game: digital and non-digital games. GBL, in the form of digital or non-digital games, aims to achieve the learning objectives set. According to Khairuddin and Mailok (2019), the GBL approach is used to stimulate and motivate the students to participate more actively in the learning process, to make the learning process more enjoyable, and to assist the students in comprehending the lessons more effectively. The GBL technique enables teachers to include active learning in their lessons, to increase the students' interest and engagement, and to receive instant feedback from the students' performance.

It should be noted that teachers should pay close attention to how gamification affects their student's interactions, emotionality, and cognitive activity—three aspects of the educational process. However, the acceptance and engagement of gamification in pedagogy remains challenging (Ding *et al.*, 2018). The implementation of the gamification techniques is less appropriate to be carried out when the pupils have special needs (Mohamed Rosly and Khalid, 2017). This is due to the fact that the competence level of the pupil will affect the effectiveness of the implementation of gamification. In a general sense, this systematic literature review (SLR) was conducted to identify the influence on the cognitive and affective domains due to T&L Mathematics utilizing a game-based learning (GBL) approach. Mathematics plays a crucial role in achieving the Sustainable Development Goals (SDGs) by providing the tools necessary for analysis, modeling, and problem-solving. It enables precise measurement and monitoring of progress towards goals like poverty reduction, quality education, and sustainable cities.

The impact of educational games on numeracy skill development among elementary learners in the Philippines is a significant factor in advancing the country's progress toward achieving the Sustainable Development Goals (SDGs) 2030, particularly SDG 4: Quality Education. Educational games help enhance numeracy by providing interactive and engaging learning experiences that make concepts like addition, subtraction, multiplication, and division more accessible and enjoyable. These games offer immediate feedback, allowing students to learn from their mistakes and reinforce concepts, which can improve retention and overall performance in mathematics. Moreover, educational games can foster SDG 4.7, which encourages learners to acquire knowledge and skills for sustainable development. By incorporating real-world issues into game mechanics, such as budgeting and resource management, students develop numeracy skills while gaining awareness of global and local sustainability challenges.

Additionally, educational games contribute to SDG 10: Reduced Inequalities by helping bridge the educational divide between urban and rural areas. In the Philippines, where access to educational resources can be uneven, digital games provide a low-cost, scalable way to support numeracy development across diverse regions. By offering personalized learning experiences, these games allow students to progress at their own pace, ensuring that those in underserved communities can also benefit from quality numeracy education. Furthermore, SDG 9: Industry,

Innovation, and Infrastructure is supported as educational technology continues to grow in the country. The integration of digital tools like games in classrooms not only advances numeracy but also fosters digital literacy, preparing students for a future where technology plays a central role in the economy.

Lastly, achieving these educational advancements requires strong SDG 17: Partnerships for the Goals between government, educators, and the private sector. Collaboration can lead to the creation of locally relevant and culturally appropriate educational games, ensuring that all students in the Philippines, regardless of background, can benefit from the learning opportunities they provide. In conclusion, educational games hold great potential to improve numeracy skills in elementary learners, aligning with the broader goals of SDG 4 and contributing to the Philippines' efforts toward sustainable development and educational equity.

Several studies highlight the key challenges contributing to the decreasing numeracy skills among learners in the Philippines. One significant issue is the lack of access to educational resources, particularly in rural areas, where students face limited access to learning materials and technology. Research by Manalo and Antonio (2017) underscores the disparity between urban and rural schools, with many rural students struggling to develop numeracy skills due to insufficient resources like textbooks, computers, and internet connectivity. Another major factor is inadequate teacher training in modern pedagogical strategies. A study by Silliman University's College of Education (2020) found that many teachers, particularly in remote regions, lack the training to effectively integrate technology and interactive methods into their teaching, which hinders their ability to engage students in numeracy lessons. This gap in professional development limits teachers' capacity to enhance students' mathematical understanding. Additionally, the current curriculum in the Philippines has been criticized for not emphasizing practical applications of numeracy in real life. The Philippine Business for Education (PBE) (2019) suggests that the existing focus on memorization and rote learning restricts students' ability to apply mathematical concepts in everyday scenarios, which results in a disconnect between academic learning and real-world skills. Language barriers also exacerbate numeracy difficulties, as many students in the Philippines are taught mathematics in English or Filipino, languages that may not align with their mother tongue. Chavez and De Guzman (2020) highlight how this linguistic challenge can impede students' understanding of mathematical terms and concepts, further hindering their numeracy development. Lastly, socioeconomic factors play a critical role, as children from low-income families often face additional barriers such as malnutrition and lack of parental support. Fajardo (2018) found that these factors significantly affect academic performance, including numeracy skills, as students in economically disadvantaged households are less likely to have access to educational support and resources. These studies collectively suggest that addressing the decreasing numeracy skills in the Philippines requires a comprehensive approach that includes improving access to resources, enhancing teacher training, revising the curriculum, addressing language barriers, and mitigating the effects of socioeconomic inequality.

The implications of the research on the decreasing numeracy skills among learners in the Philippines highlight the need for a comprehensive approach to address these issues and improve educational outcomes. First, the lack of access to educational resources, particularly in rural areas, suggests the need for targeted policy interventions to bridge the digital divide and ensure equitable access to learning materials. Without access to modern educational tools like textbooks, computers, and the internet, many students will continue to fall behind in developing essential numeracy skills. The findings from Manalo and Antonio (2017) call for increased investment in educational infrastructure, especially in underserved regions, to ensure all students have access to the resources necessary for learning.

The research by Silliman University (2020) on teacher training implies that professional development for educators is crucial for improving numeracy instruction. Teachers must be equipped with the knowledge and skills to integrate technology and interactive methods into their teaching practices. This will not only enhance engagement but also enable students to learn numeracy concepts more effectively. Teacher training programs should therefore be expanded to include training in the use of educational technology and innovative teaching strategies that can make learning more engaging and accessible.

The curriculum limitations identified by the Philippine Business for Education (PBE) (2019) highlight the need for curriculum reform. By focusing on real-world applications of numeracy, the curriculum could make math more relevant to students' daily lives and future careers. This approach would help students see the value of mathematics beyond the classroom and increase their motivation to engage with the subject. The curriculum could also be adapted to incorporate problem-solving and critical thinking skills, which are essential for applying mathematical concepts in various contexts.

The language barrier issue raised by Chavez and De Guzman (2020) suggests that instruction in mathematics should be better aligned with students' linguistic backgrounds. To address this, the education system could explore bilingual or mother-tongue-based instruction in mathematics, which would help ensure that all learners, regardless of their regional language, can fully understand mathematical concepts. This would also support more effective learning, particularly in diverse linguistic contexts like those in the Philippines.

Finally, the research on socioeconomic factors by Fajardo (2018) underscores the importance of addressing inequality in education. Learners from low-income backgrounds often face multiple disadvantages, including limited access to educational support and resources, malnutrition, and greater social challenges. This implies that interventions should not only focus on improving academic content and teaching methods but also address the broader social determinants of learning, such as providing nutritional support, financial assistance, and parental involvement programs. Policies aimed at reducing poverty and improving the overall socio-

economic conditions of families will have a direct impact on students' ability to succeed academically, including in numeracy.

Overall, these findings point to the need for a holistic approach to improving numeracy skills in the Philippines. Addressing issues of resource access, teacher preparation, curriculum relevance, language barriers, and socioeconomic inequality will be essential to improving educational outcomes and ensuring that all students, regardless of background, have the opportunity to develop strong numeracy skills. Research on the impact of educational games on numeracy development reveals several significant benefits for learners. Educational games have been shown to increase student engagement and motivation, making learning more enjoyable and interactive. Studies like those by Stewart and Thomas (2018) highlight that gamified learning environments captivate students' attention, fostering a positive attitude towards numeracy and improving retention. Furthermore, educational games often provide personalized learning experiences, adapting to individual progress and helping students learn at their own pace. Research by Kurtz and Lee (2019) suggests that this tailored approach enables learners to master foundational concepts before moving on to more advanced topics, making skill development more effective. Additionally, educational games offer immediate feedback, allowing students to correct mistakes in real time, which enhances learning outcomes. Harris and Arnold (2020) found that such feedback reinforces correct mathematical procedures and helps students retain concepts better. Educational games also promote cognitive skill development by encouraging problem-solving and critical thinking, as demonstrated by Vasquez and Gonzalez (2017). This not only improves numeracy skills but also prepares students to apply mathematical thinking in real-world situations. Moreover, Johnson et al. (2021) found that students engaging with game-based learning tend to perform better on standardized math tests, indicating a measurable improvement in numeracy. Finally, multiplayer games, as shown by Chang and Yao (2020), enhance social learning by encouraging collaboration and communication, which further deepens students' understanding of mathematical concepts. Overall, these studies suggest that educational games can significantly improve numeracy skills by making learning more engaging, personalized, and effective, while also fostering critical thinking and teamwork.

DISCUSSIONS

Advantages of the Strategy

This research topic offers several benefits. Firstly, it is highly engaging and relevant, as educational games are increasingly being integrated into classrooms, making the study aligned with modern teaching practices. It supports active learning by incorporating principles of constructivist and experiential learning theories, which emphasize active participation and hands-on experiences for learners. Furthermore, the study has wide audience appeal, as its findings could provide valuable insights for educators, curriculum developers, and policymakers in enhancing teaching strategies for numeracy skill development. The availability of rich data sources, such as teacher observations, learner performance, and game analytics, opens opportunities for robust mixed-method research. Additionally, the practical applications of the

study could lead to actionable recommendations for incorporating gamification into elementary education, which is becoming increasingly relevant with the rise of educational innovations. Overall, the topic aligns well with modern trends and ensures that the research remains forward-looking and impactful.

Challenges of the Study

Despite its benefits, this research topic poses several challenges. Measuring the direct impact of educational games on numeracy skills can be difficult due to the influence of external factors such as teaching styles, home environments, and individual learner motivation. The study may also be resource-intensive, as it involves the selection or development of educational games, teacher training, and consistent implementation across different classrooms. Additionally, biases could arise, especially if some learners are more familiar with games than others, potentially skewing the results. Resistance from traditional educators or stakeholders who view games as distractions rather than effective learning tools may also pose a challenge. Furthermore, the generalizability of the findings could be limited, as results may vary depending on the specific games used, the demographics of the learners, or the educational context. If the study focuses on digital games, access to technology might be a barrier, particularly in schools with limited resources, which could restrict the study's feasibility.

Perspectives from Other Countries on Educational Games and Numeracy Skill Development

Globally, the use of educational games for developing numeracy skills has gained significant traction, with various countries adopting strategies aligned with their educational priorities, technological advancements, and cultural contexts. In the United States, programs such as ST Math and Prodigy have demonstrated the effectiveness of gamification in enhancing student motivation, engagement, and learning outcomes (Clark & Mayer, 2016). Similarly, the United Kingdom values educational games for supporting differentiated instruction, ensuring alignment with national curriculum standards to address diverse learner needs (Papastergiou, 2009). Finland, renowned for its progressive education system, integrates games into play-based and inquiry-based learning, exemplified by initiatives like DragonBox, while prioritizing teacher training to maximize their effectiveness (Gee, 2007). In Singapore, a global leader in math performance, gamified platforms are employed to bolster problem-solving and collaborative learning outcomes, supported by the Ministry of Education's emphasis on technology-enhanced teaching (Mayer, 2001). Australia leverages gamified learning to address challenges in remote and indigenous communities, using platforms like Mathletics to reduce math anxiety and improve outcomes (Sailer et al., 2017). Meanwhile, South Africa utilizes low-cost, culturally relevant games like TouchTutor® to address numeracy gaps in underprivileged areas, emphasizing the importance of local language and cultural norms (Sriyanto, 2004).

These international perspectives underscore the potential of educational games to enhance engagement and numeracy skills, while highlighting contextual factors that influence their success. Advanced education systems, such as those in Finland and Singapore, focus on

systemic integration and teacher support, whereas nations like South Africa and Australia emphasize equitable access and community involvement (Papastergiou, 2009; Gee, 2007). Across these settings, cultural relevance, technological infrastructure, and alignment with educational goals are critical for effective implementation. For the Philippines, these global insights provide valuable guidance for adapting educational games to address local challenges, improve numeracy outcomes, and foster inclusive learning opportunities in alignment with national education goals (Department of Education, 2019).

In the Philippines, where classrooms are often characterized by diverse learners and large class sizes, educational games have emerged as a promising tool to enhance teaching and learning. The use of games in elementary education can be broadly categorized as either a strategy or an intervention. Both approaches offer unique advantages and challenges in addressing the learning needs of Filipino students.

Games as a Strategy in the Classroom

Educational games, when used as a strategy, serve as a supplementary teaching tool integrated into daily classroom instruction. This approach aligns with the Department of Education's (DepEd) goal of making learning more interactive and engaging, particularly in foundational subjects like mathematics and science (Department of Education, 2019). Games such as "Math Bingo" or "Number Puzzles" are frequently employed to reinforce concepts and maintain student interest.

The strategic use of games in the classroom fosters active learning, as students are more likely to participate enthusiastically in activities that gamify lessons. According to Lapinid *et al.* (2022), integrating playful elements into instruction has been effective in addressing the traditionally low performance of Filipino students in mathematics, as evidenced by the country's ranking in the Programme for International Student Assessment (PISA). Moreover, games encourage collaboration among learners, promoting social skills and teamwork, which are vital competencies in the Philippine setting. Despite their advantages, games as a strategy require careful alignment with learning objectives to ensure they are not merely entertainment but also contribute to achieving educational outcomes. Teachers must also manage time effectively, as gamified activities may consume substantial classroom hours, potentially limiting coverage of other lessons.

Games as an Intervention Tool

In contrast, games as an intervention are designed to address specific learning gaps or challenges faced by students. This approach is particularly relevant in the Philippines, where many learners struggle with foundational skills due to socioeconomic factors and resource limitations (Department of Education, 2019). Intervention games are often targeted at at-risk students or those with learning difficulties, such as dyscalculia or attention-deficit/hyperactivity disorder (ADHD).

Intervention programs leverage digital platforms like DreamBox or locally developed educational software tailored to Filipino students. These tools provide individualized instruction

and adaptive feedback, allowing learners to progress at their own pace. Papastergiou (2009) highlights that digital game-based interventions significantly enhance both motivation and academic achievement, making them an effective solution for struggling learners.

Furthermore, intervention games are typically more structured than those used as a strategy. They involve pre- and post-assessments to measure learning outcomes, which are crucial for determining their effectiveness. However, implementing games as interventions in Philippine classrooms presents challenges, such as the need for teacher training, limited access to technology, and funding constraints.

Interplay between Strategy and Intervention in the Philippine Context

Combining games as a strategy and intervention offers a balanced approach to addressing the learning needs of Filipino students. For instance, while games as a strategy can be used to introduce or reinforce lessons during class, intervention games can provide targeted support for learners who lag behind. This dual approach ensures inclusivity, as it caters to both the general classroom population and those with specific needs. A notable example of this interplay is the integration of gamified learning activities in the Department of Education's learning continuity plans during the COVID-19 pandemic. Teachers used games to keep students engaged during remote learning while also employing intervention programs for learners struggling to adapt to online modalities (DepEd, 2019).

In summary, the strategic and intervention-based use of educational games has proven to be a valuable asset in Philippine elementary education. While each approach has its distinct advantages, their combined application can significantly enhance both engagement and academic performance, ultimately contributing to the holistic development of Filipino learners.

CONCLUSIONS AND RECOMMENDATION

The integration of educational games into elementary education in the Philippines holds immense potential to address longstanding challenges in student engagement and academic performance. As a strategy, games effectively enhance classroom interaction, stimulate active learning, and promote collaboration among learners. Their engaging nature helps address the low motivation often observed in traditional teaching settings. On the other hand, when employed as an intervention, games serve as a targeted mechanism to close learning gaps, particularly for students struggling with foundational skills such as numeracy. These interventions, supported by technological advancements, offer individualized learning experiences that adapt to each student's needs. Despite the promising outcomes, challenges remain. Limited access to resources, inadequate teacher training, and time constraints hinder the full implementation of game-based learning strategies and interventions. However, the combined use of games as both strategy and intervention demonstrate an impactful synergy that fosters inclusivity and maximizes learning outcomes. This dual approach underscores the importance of designing programs that balance general classroom enrichment with targeted support for at-risk learners. The Philippine educational landscape, characterized by diverse learners and systemic challenges, requires innovative solutions like educational games to achieve its vision of quality education for

all. By leveraging these tools thoughtfully, educators can create an engaging, equitable, and effective learning environment that empowers Filipino students to succeed in an increasingly competitive global landscape.

To fully realize the potential of educational games in the Philippine elementary education system, it is recommended that the Department of Education (DepEd) integrate game-based learning into the curriculum while providing extensive teacher training to align games with learning objectives and classroom management strategies. Efforts must also focus on improving access to technological resources, such as devices and internet connectivity, especially in rural areas, through partnerships with government and private stakeholders. Continuous research and evaluation of game-based strategies should be prioritized to ensure their effectiveness in addressing the unique needs of Filipino learners, while fostering community and stakeholder engagement to build awareness and support for these innovations. Finally, policymakers should allocate dedicated funding to sustain these initiatives and promote the development of culturally relevant educational games that align with the country's educational goals and vision.

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