Investigating Teachers' and Students' Perspectives on Gamified Mathematics Instruction: Roles, Impacts and Challenges

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ABSTRACT

This study investigates the perspectives of teachers and students on the roles, impacts, and challenges of gamified mathematics instruction at Tugbongan National High School during the 2024–2025 school year. It aims to examine how gamification facilitates instruction, influences learning experiences, and presents challenges, as perceived by both groups. Using a descriptive-comparative design, structured questionnaires were administered to purposively selected participants, and statistical analyses—including the Mann-Whitney U test—were conducted to identify significant differences in perceptions. Findings revealed that teachers strongly support gamification, viewing it as highly effective for enhancing engagement, motivation, and instructional delivery, while students also recognized its benefits but expressed more reserved confidence, especially regarding long-term retention. Both groups acknowledged implementation challenges, with teachers citing more substantial barriers such as technical limitations, resource constraints, and the need for professional development. Statistically significant differences were observed across all indicators—role, influence, and challenges—with teachers consistently showing higher mean ranks; these differences were classified as large for role and influence, and medium for challenges, indicating meaningful gaps in perception. In response, an Action Plan was developed to guide the strategic and inclusive integration of gamified strategies in mathematics instruction, emphasizing gradual implementation, educator training, student-centered design, and resource support to maximize benefits while addressing limitations.

Keywords: Mathematics Education, Gamified Instruction, Teachers' and Students Perspectives, Descriptive-Comparative Research Design, Consolacion, Cebu, Philippines

The Problem And Its Scope

INTRODUCTION

Rationale of the Study

Gamification has transformed math learning by converting abstract ideas into engaging, relatable experiences. By incorporating elements like points, badges, and leaderboards, teachers can foster a motivating and competitive environment that encourages students to actively engage and remain committed to their learning. This method not only makes math more enjoyable but also enhances students' critical thinking and problem-solving abilities through immediate feedback and tailored challenges. Interactive environments that utilize gamification accommodate various learning styles, allowing students to make progress at their own pace and receive customized support. Consequently, students are more likely to develop a positive attitude toward math, which can lead to better academic performance and a lasting interest in the subject.

Gamification has significantly impacted math education by transforming conventional teaching methods through the integration of game-like elements. Features such as points, levels, and rewards infuse the learning experience with fun and competition, making math more engaging and enjoyable for students. This strategy motivates learners by offering immediate feedback and setting clear objectives, which helps sustain their interest and encourages them to persist. Additionally, gamification accommodates diverse learning styles by allowing students to advance at their own pace and customize their learning experience. Consequently, this approach not only boosts students' engagement with mathematical concepts but also promotes a deeper understanding and retention of the material, leading to better academic outcomes and a more positive perspective on math.

Navigating the challenges of engaging students in interactive environments requires careful consideration to achieve effective learning. Teachers see gamification as a potential tool to increase student engagement and motivation. Students are often excited about game-based learning but concerns about balance with traditional methods arise. Parents generally support innovative teaching approaches that enhance learning but may have questions about its effectiveness. It's tough for teachers to find the time to create and use gamified activities. Plus, if you need technology for them, some students might not have the access or skills to participate.

They see it as a way to make learning more engaging and fun for students. Students, on the other hand, are often initially hesitant, but once they get into the games, they really seem to enjoy them. Parents have also expressed positive feedback, especially when they see their kids actually wanting to do math homework because it's part of a game. It's clear that gamification has the potential to be a really powerful tool for improving math education. When it comes to using gamification in math classes, there are factors that we need to consider and mixed feelings from everyone involved. Teachers are often hesitant and at the same time excited about the idea, seeing it as a way to make math more fun and interactive, which can help students develop a more positive attitude towards the subject.

Students usually find gamified lessons more enjoyable and less scary, feeling proud as they move up levels and earn rewards. Parents and guardians generally are supportive with the innovative approach, appreciating how it can encourage their kids to practice math more often. However, some worry about too much screen time and want to make sure that educational goals are still being met without relying too heavily on digital tools.

The implementation of gamification in Philippine mathematics education faces notable challenges despite its potential benefits. While gamification is recognized for enhancing student engagement and learning, research on its long-term effectiveness and adaptability across diverse contexts is limited. Teachers encounter obstacles such as a lack of evidence-based research, time constraints, insufficient resources, and inadequate infrastructure, which hinder their willingness to adopt gamified strategies. Students also face challenges, including mathematical anxiety and the need for effective engagement methods. Addressing these issues through targeted research and practical solutions is crucial for successfully integrating gamification into Philippine mathematics classrooms and enhancing educational outcomes.

With the foregoing, thus, this study aims to probe the teachers and student’s perspective on the role, influence, and challenges of gamified mathematics instruction from the selected public high schools within the Department of Education (DepEd) Cebu Province and Cebu City Divisions, respectively, during the school year 2024-2025 as basic for an Action Plan.

THEORETICAL BACKGROUND

The integration of gamification into education is supported by key learning theories such as constructivism, cognitive load, and behaviorism, all of which highlight its potential to enhance the learning experience. According to Piaget, learners actively build their understanding of the world through interaction with their environment, forming mental frameworks—called schemas—by absorbing new information and adjusting what they already

know. In a mathematics classroom that incorporates gamification, students take part in engaging and often self-directed activities that reflect these principles, encouraging deeper learning through meaningful exploration (Lesh, 2020). Rooted in constructivist thinking, game-based math instruction offers an engaging way for learners to test strategies, experiment with concepts, and make sense of ideas at their own pace. In this setup, teachers play a crucial role as facilitators, guiding students through the process and creating space for dialogue and reflection.

Piaget's perspective on learning centers around two key mechanisms: assimilation and accommodation. Assimilation takes place when individuals absorb new information and fit it into what they already understand, while accommodation occurs when they adjust their mental frameworks or form new ones in response to unfamiliar experiences. This continuous give-and-take between the two helps shape cognitive growth, enabling learners to adapt to changing situations and tackle increasingly complex challenges. At the heart of Piaget's theory is the belief that learners are not passive recipients of knowledge, they're active participants. That's why educational practices that encourage curiosity, hands-on experiences, and meaningful exploration are so valuable.

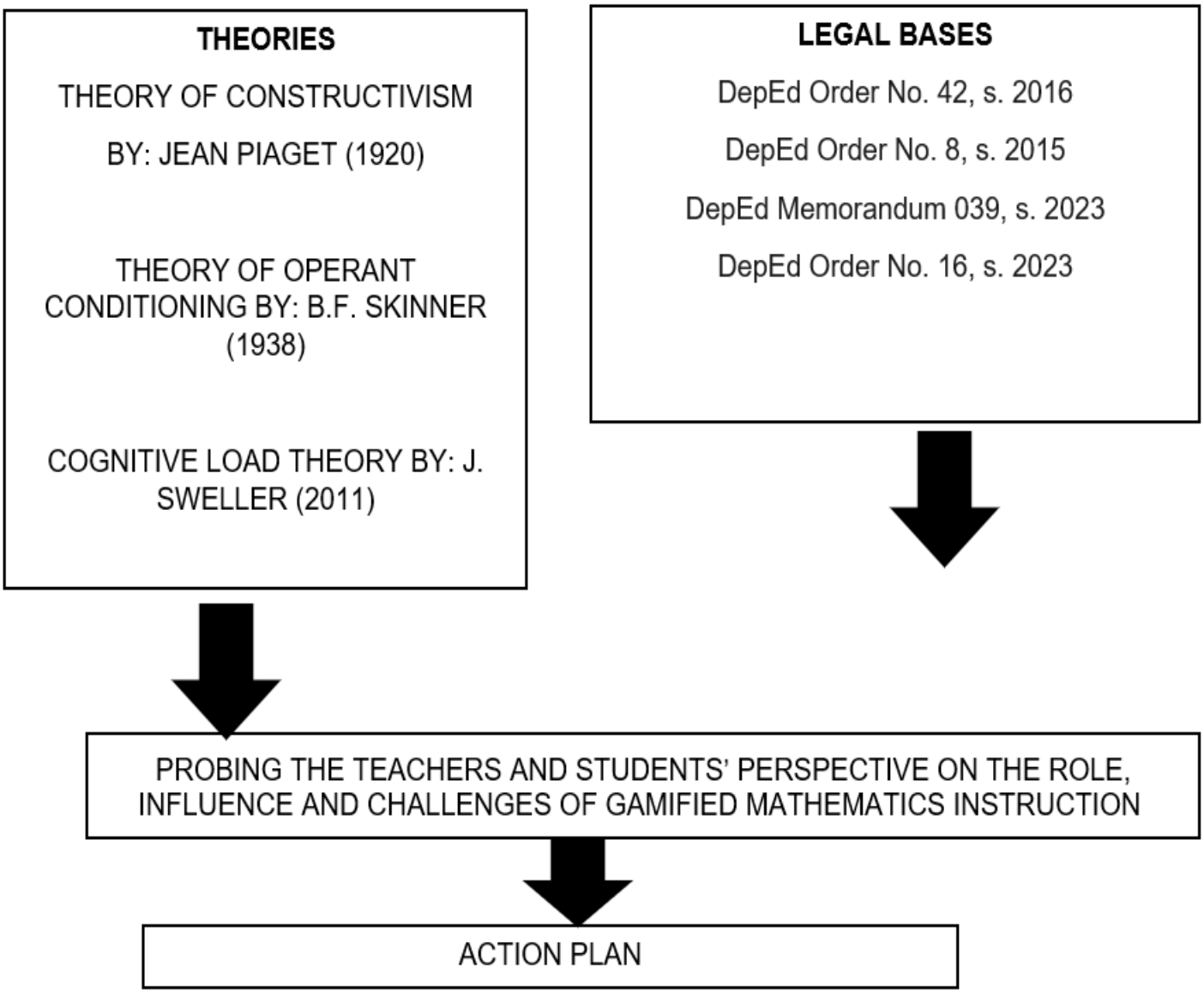

Figure 1 Theoretical-Conceptual Framework of the Study

Educational approaches inspired by Piagetian constructivism emphasize the importance of designing learning environments where students can actively explore, experiment, and solve problems. Teachers are encouraged to tailor these experiences to the developmental stages of their learners, making sure the tasks are both age-appropriate and cognitively engaging (Cade, 2022). For younger students, this might mean using tangible tools and playful activities to make abstract concepts more accessible. As learners mature, they can begin to tackle more complex ideas through reasoning and reflection. In this framework, the teacher's role shifts from delivering information to guiding learning—creating space for curiosity, discovery, and meaningful connections to take shape.

Implementing Piagetian constructivism in the classroom comes with its own set of challenges. One key concern is making sure that learning activities truly match where students are in their cognitive development and take into account their unique needs. If the tasks are either too difficult or too easy, students can lose interest or miss out on valuable learning opportunities. While Piaget's theory gives educators a strong foundation for understanding how students think and learn, it doesn't fully capture the cultural and social influences that also shape how learning takes place.

Jean Piaget's constructivist theory has left a lasting mark on how education is understood and practiced, especially through its focus on learners as active participants in the process of building knowledge. It offers powerful guidance for shaping instruction and understanding how students think and grow. However, putting it into practice calls for thoughtful planning—teachers need to make sure learning experiences match students' developmental stages and account for the varied ways each learner engages with content.

B.F. Skinner's operant conditioning theory suggests that people are more likely to repeat behaviors that lead to positive outcomes, and less likely to continue those that result in negative consequences. Applied to gamified math instruction, this means game features like points, badges, and leaderboards can serve as powerful motivators. These elements act as rewards, encouraging students to stay engaged with math activities and practice drills. For educators, they offer a practical way to reinforce desired behaviors and provide instant feedback on student performance (Sanchez, 2020).

Skinner's theory of reinforcement breaks things down into two main types: positive and negative. Positive reinforcement happens when a reward is given after a desired action—making it more likely that the behavior will happen again. Negative reinforcement, on the other hand, works by removing something unpleasant once the right behavior shows up, which also helps reinforce that behavior. These ideas have been widely used in schools, where educators apply them to encourage good habits, guide student behavior, and keep motivation high in the classroom.

In many classrooms, behaviorist strategies show up through structured systems designed to guide student behavior and boost motivation. One common technique is the token economy, where students earn tokens for positive actions—like staying focused or participating—and later trade them in for rewards. Quick feedback and steady reinforcement help students understand what's expected and stay engaged with the lesson. The goal is to build a consistent environment where good habits are encouraged, and disruptive behaviors are gradually reduced.

While behaviorism offers useful strategies for encouraging and shaping behavior, it's often criticized for putting too much focus on what can be seen—like actions and reactions—while ignoring what's happening inside the mind. Critics point out that it may miss the deeper cognitive processes involved in learning, as well as the importance of building internal drive or intrinsic motivation. So, even though behaviorist techniques can be helpful in keeping students on track and engaged, they don't always capture the full picture when it comes to the thinking and emotional experiences that shape how people learn.

Overall, B.F. Skinner's behaviorist theory offers straightforward, effective tools for shaping behavior—mainly through systems of rewards and consequences (Sidin, 2021). These strategies have proven useful in helping

educators manage classrooms and keep students motivated. That said, relying solely on behaviorism may not be enough. To truly support learning and growth, it's important to also consider how students think and what drives them internally. Blending behaviorist techniques with an understanding of cognitive and motivational processes can lead to a more well-rounded approach to education.

Cognitive Load Theory, or CLT, looks at how our working memory can only handle so much information at once—and how smart instructional design can help make learning more effective. According to (Sweller, 2023) the researcher behind CLT, emphasizes the importance of cutting out unnecessary mental strain—things that distract or confuse rather than help. At the same time, he advocates for boosting the kind of mental effort that's actually useful for understanding the lesson. The goal is to create learning experiences that are thoughtfully designed so students can stay focused and build real understanding without feeling overwhelmed.

In the context of gamified math instruction, Cognitive Load Theory (CLT) emphasizes the importance of keeping students focused by reducing distractions and unnecessary mental effort (Cutting, 2022). To help learners concentrate on key mathematical ideas, teachers can take practical steps—like giving clear directions, breaking complex problems into manageable parts, and using visuals to support understanding. These strategies make the learning process smoother and more effective by lessening the cognitive burden that doesn't directly support learning.

Cognitive load theory breaks learning down into three types of mental effort. Intrinsic cognitive load stems from how complex a topic is and how much a student already knows about it (Chen, 2023). In other words, it's about the challenge built into the material itself. Extraneous load, on the other hand, comes from how that information is presented. If materials are messy or confusing, it can make learning harder than it needs to be—but with clear and well-structured resources, this kind of load can be minimized. Lastly, germane cognitive load refers to the brainpower students use to make sense of new ideas and connect them to what they already know. It's the kind of mental effort that helps build deeper understanding and lasting knowledge.

When it comes to using Cognitive Load Theory (CLT) in real classroom settings, the goal is to create learning experiences that are thoughtfully designed to avoid overwhelming students. That means cutting down on things that distract from the lesson or add unnecessary mental effort—like cluttered slides or confusing instructions. Teachers can make learning smoother by breaking information into chunks, using multimedia in smart ways, and sharing step-by-step examples. These strategies help balance the mental demands of the lesson, so students can focus better, grasp tough concepts, and build meaningful understanding more efficiently.

One of the real challenges in applying Cognitive Load Theory (CLT) is making sure learning materials are thoughtfully matched to what students can handle—taking into account how much they already know and how complex the topic is. If the content doesn't strike the right balance, it can quickly become overwhelming instead of helpful. That's why it's important for educators to keep refining their materials and teaching strategies based on student feedback and performance. This need becomes even more critical in flipped classrooms, where students explore lessons on their own before coming to class, and the design of those materials plays a big role in how well they learn (Fischer, 2023).

Overall, Cognitive Load Theory provides valuable guidance for educators aiming to improve how students learn. By carefully managing different types of mental effort—whether it's the complexity of the content (intrinsic load), unnecessary distractions (extraneous load), or opportunities for deep understanding (germane load)—teachers can create lessons that are both engaging and effective. When instructional design strikes the right balance, learners are more likely to grasp concepts fully and retain information for the long haul.

Role of Gamification in Teacher Delivery of Math Instruction. Gamification—bringing game-like features into learning—has become a powerful tool for boosting student interest and motivation in math. When teachers use things like points, badges, leaderboards, and fun challenges, math lessons can shift from routine drills to something students actually enjoy. It's more than just making learning fun, though. Gamification can also support teaching strategies, help with managing classroom dynamics, and even shape how teachers assess student progress.

Research by (Afrianto et al., 2022) revealed a clear boost in student engagement when gamified instruction was used in math lessons. Their study highlights how mobile learning apps with game-like features—such as rewards and challenges—can make a big difference. Students showed a 35% increase in interest, a 33% jump in motivation, and a 42% improvement in comprehension. These numbers speak volumes about how gamification not only makes math more enjoyable but also deepens understanding. As the findings suggest, using gamified m-learning tools could be a powerful alternative to more traditional approaches to teaching mathematics.

Firstly, gamification gives teachers powerful tools to make math class more exciting and hands-on. By weaving in game elements like challenges, rewards, and interactive tasks, they can spark curiosity and grab students' attention. This kind of approach helps learners become more involved, turning passive listening into active participation. And when students are fully engaged like this, they're much more likely to understand concepts deeply and remember them long after the lesson ends.

Secondly, gamification gives teachers a fresh and exciting way to check in on student learning. Using game mechanics—like points, levels, or progress bars—they can keep track of how students are doing in real time. It helps teachers spot when someone's getting stuck and step in with support right when it's needed. And because the feedback is built into the game experience, it feels more meaningful and less intimidating for students. This kind of smart, data-driven approach helps teachers fine-tune their lessons so everyone keeps moving forward.

In conclusion, gamification is changing the way math is taught, making lessons more dynamic and tailored to each student. When teachers bring in game-like features—like challenges, levels, and rewards—they turn traditional instruction into something students actually want to dive into. It sparks motivation, keeps learners engaged, and helps them connect with the material in a more meaningful way. The result? Students aren't just memorizing formulas—they're understanding concepts at a deeper level and building real confidence in math.

On the other hand, Math education is evolving with fresh strategies like Flipped Learning, Project-Based Learning, and Gamification. In a study involving 73 teachers from Melilla, (Hossein-Mohand et al., 2021) explored what influences educators when choosing these kinds of instructional models. Their findings showed a strong and positive link between the use of these innovative methods and factors such as teaching style, professional development, and how well teachers use ICT tools. It's a clear sign that these approaches are not only becoming more popular but are also being shaped by practical elements in today's classrooms.

Influence of Gamification in Student Mathematical Engagement. Gamification has a powerful impact on how students engage with math. By tapping into their natural love for challenge, friendly competition, and rewards, teachers can turn traditional lessons into vibrant, interactive experiences. This shift encourages students to take a more active role in their learning, which can lead to stronger understanding and better outcomes. According to (Bouchrika et al., 2021), the use of gamified strategies really does inspire students to participate more and connect deeply with educational systems, boosting both interactivity and engagement in the classroom.

Firstly, gamification helps spark that inner drive in students to keep learning. When teachers add game elements like earning points, collecting badges, or climbing leaderboards, students start to feel a real sense of progress and achievement. That feeling boosts their motivation—not because they're told to do the work, but because they genuinely want to push forward. This kind of motivation is key for keeping students engaged in the long run. It

pushes them to look for new challenges and explore learning beyond just ticking off assignments. As (Xu et al., 2021) pointed out, this approach can really deepen engagement and support meaningful, lasting learning.

Secondly, gamification can be a real game-changer when it comes to easing math anxiety and building up student confidence. When teachers create a safe, supportive space using game elements, students feel more comfortable exploring math concepts and practicing their skills without fear of failure. This kind of environment helps take the pressure off and makes learning feel more fun and approachable. As their confidence grows, students become more willing to take chances, try out new problem-solving strategies, and keep going even when things get tough.

In spite of that, according to (Bouzid et al., 2021), students who took part in the edutainment game showed higher levels of engagement in math and felt less anxious about the subject. The way the game was designed helped create a more welcoming and encouraging space for learning, which made students feel more at ease when working through numerical and arithmetic tasks.

In conclusion, gamification is proving to be a powerful tool for boosting student engagement in math. When teachers bring in game-inspired elements—like challenges, rewards, and teamwork—they build a learning space that feels more motivating, interactive, and supportive. This kind of environment helps students feel more confident, work together more effectively, and take a deeper interest in their learning. As a result, math becomes less intimidating and more inviting, which leads to stronger participation and better learning outcomes.

Challenges Experienced by Teachers in Using Gamified Instruction. While gamification brings plenty of advantages to teaching math—like boosting engagement and motivation—it's not always easy to put into practice. Teachers may face real-world hurdles, from limited time and resources to figuring out how to blend game elements with core learning goals. It takes thoughtful planning and a flexible mindset to make sure gamified activities truly support student learning and fit smoothly into everyday classroom routines.

Firstly, one big challenge teachers face with gamification is simply finding the right resources. High-quality, curriculum-aligned games aren't always easy to come by, which often means educators have to spend extra time searching for, tweaking, or even creating materials themselves. This can feel especially overwhelming for those who aren't familiar with game design or don't have easy access to tech tools. (Brooks et al., 2019) pointed out that many teachers struggle with a knowledge gap when it comes to using games and gamification tools in the classroom. Participants in their study shared that they lacked the know-how and information needed to use these tools effectively in their teaching.

Secondly, teachers often face real challenges when it comes to managing classroom dynamics and making sure every student gets a fair shot at engaging with gamified learning. Because students come with different learning styles, skill levels, and access to technology, some may need extra support or tailored instruction to fully benefit from these approaches. (Safapour et al., 2019) addressed this by developing practical guidelines to help educators boost student outcomes. Their advice encourages teachers to choose teaching strategies that match course goals and learners' needs, tapping into innovative methods like flipped classrooms, gamification, case studies, self-paced learning, and social media to reach and support all students effectively.

In the end, while gamification brings a lot of exciting possibilities to math instruction—like boosting motivation and making learning more fun—it's not always simple to implement. Teachers may face hurdles along the way, from figuring out how to fit game elements into their lessons to making sure every student can participate meaningfully. Tackling these challenges calls for thoughtful planning, continuous learning, and a flexible mindset. It's all about finding ways to adapt and grow so that every student can benefit from a more engaging and supportive learning experience.

Issues and Concerns Faced by Students While Engaging in Gamified Instruction. While, gamification can be a powerful way to boost student interest and participation in math, making lessons livelier and more interactive. But for all its benefits, it's not without a few bumps in the road. Students might run into technical glitches or find certain game-based strategies confusing or overwhelming. That's why it's important to think through these challenges carefully and make thoughtful adjustments, so the experience remains positive, accessible, and truly helpful for every learner.

To start, it's worth noting that some gamified math activities may not always align with the cultural background or everyday experiences of Filipino students. Games designed in other parts of the world might include themes, language, or references that feel unfamiliar or out of place, making it harder for students to fully engage. That's why it's essential to be mindful of cultural differences and consider using local languages and relatable content. When gamified learning reflects students' own world, it becomes far more meaningful and effective.

Moreover, as gamification continues to show strong potential for boosting motivation and engagement in learning, researchers and educators alike have been exploring how it plays out in real-world classrooms. While much of the focus has been on customizing game features based on personal traits—like a student's age or behavior—there's still limited research on how cultural background impacts the effectiveness of gamified learning. Recognizing how deeply culture influences how we learn and interact, (Toda et al., 2020) introduced the Gamification for Cultural Studies Model (GamiCSM). This model aims to unpack the connection between cultural factors and gamification, helping us better understand how to make gamified education truly inclusive and relevant.

Another concern students may have is the pressure that can come from competition in gamified learning settings. Not every learner thrives in competitive environments—some might feel discouraged or anxious, especially if they're still grappling with key concepts or simply aren't naturally competitive. These feelings can take away from the joy and value of learning. That's why it's so important for teachers to build a classroom culture that centers on support, teamwork, and individual growth. By shifting the focus toward effort and personal progress, gamified activities can become more inclusive and empowering for everyone involved.

Furthermore, gamification is becoming a popular way to help keep students interested in learning. It uses fun parts of games—like points, rankings, and rewards—to make lessons more exciting. But while these rewards can help, they can also quietly affect how students think or act, sometimes in ways that aren't so helpful. Because of this, it's important to think about the right and fair ways to use gamification. O'Sullivan et al. (2021) suggested a new way of planning lessons that includes checking for ethical concerns at every step. This helps teachers use gamification in smart and respectful ways that don't take away students' freedom to learn in their own way.

In conclusion, although gamification presents significant advantages in promoting student engagement and enhancing learning in mathematics, it is not without its challenges. Students may encounter various concerns throughout the process, which need to be carefully addressed to ensure the approach remains effective and inclusive. This calls for thoughtful planning, ongoing communication, and a firm commitment to fostering a learning environment that is both supportive and welcoming. When educators prioritize these elements, gamification can truly become a powerful tool in creating meaningful and positive learning experiences for all students.

DepEd Order No. 42, s. 2016 emphasizes the vital role of media and technology in preparing daily lessons under the K to 12 Basic Education Program. It encourages teachers to enrich the learning experience by using a variety of instructional materials, especially those that involve technology. As part of the Daily Lesson Log (DLL) or Detailed Lesson Plan (DLP), educators are expected to identify and include the learning resources they will utilize, such as digital content, multimedia tools, online platforms, and other technology-based materials.

The order highlights the importance of making sure teachers use media and technology in a way that fits their lesson goals and content. It supports the development of 21st-century skills, which naturally involve the use of modern tools and digital resources. While it doesn't spell out specific technologies, it gives teachers room to be flexible and creative in how they bring tech into their lessons. This helps students gain real-world skills by offering varied and meaningful learning experiences made richer through thoughtful use of technology (https://bitly.cx/357M).

DepEd Order No. 8, s. 2015 recognizes the role that technology can play in classroom assessment within the K to 12 Basic Education Program in the Philippines. Although it doesn't provide an in-depth focus on technology, the order acknowledges that various assessment tools—including those using digital platforms—can be used to evaluate student learning. It underscores the importance of applying diverse assessment strategies to gain a fuller picture of student progress, which can include technology-based methods when suitable and accessible.

The order encourages teachers to try different ways of assessing students, which can include tech-based options like online quizzes, digital portfolios, and computer-based tests. It also points to tools for tracking and analyzing student performance, such as digital systems for reporting grades and progress. Still, the policy recognizes that not all schools have the same level of access to technology. That's why it offers flexibility, allowing teachers to choose the methods that work best for their classroom—whether traditional or tech-driven—as long as they support the learning goals of the K to 12 curriculum (https://bitly.cx/ifwP).

DepEd Memorandum 039, s. 2023 highlights the administration and use of digital arts and multimedia tools within the Department of Education in the Philippines. It acknowledges the value of these tools in improving both the quality of teaching materials and the flow of communication across the department. The memorandum provides guidelines to ensure the responsible and effective use of such resources, with a focus on creating engaging and well-designed educational content that follows DepEd's branding and communication standards.

The memorandum also highlights the importance of helping DepEd personnel build the skills they need to use digital tools confidently and effectively. It encourages training in areas like graphic design, video editing, and multimedia production to support creative and engaging content creation. The goal is to make it easier to produce and share high-quality digital materials across DepEd platforms, with consistent visuals and clear communication. By embracing digital arts and multimedia tools, DepEd aims to modernize how educational materials are developed and strengthen its online presence in line with today's teaching methods and tech trends (https://bitly.cx/RaHvn).

DepEd Order No. 16, s. 2023 sets forth the updated guidelines for carrying out the Department of Education Computerization Program (DCP) in the Philippines. Its main goal is to equip public schools with suitable technologies that can enrich classroom instruction and elevate the quality of basic education. The order includes the distribution of different ICT packages—such as computer laboratory setups, multimedia resources, and laptops—for both teachers and students.

The order lays out clear roles and responsibilities for different DepEd offices and staff in carrying out the Computerization Program (DCP). It highlights how important it is to manage, maintain, and sustain the ICT tools provided to schools. The guidelines also touch on key areas like getting school sites ready, training teachers and school leaders, and weaving ICT into everyday teaching and learning. It even covers practical steps for accepting, recording, and reporting the DCP packages, along with measures to keep technology safe and ensure it's used properly in schools (https://bitly.cx/LwhJK).

Bringing together the key elements of this study—its variables, theoretical foundations, legal frameworks, and supporting literature—paints a clearer picture of how gamified instruction can reshape mathematics education. At its core, this research set out to understand how gamification plays a role in teaching, how it affects learning, and what challenges come with it, especially from the perspectives of both teachers and students.

The theories that ground this study offer valuable insights into how students learn and how teachers teach. Piaget's constructivism reminds us that students build knowledge through active exploration, and that learning should match their developmental stage. Skinner's behaviorism, on the other hand, shows how rewards and feedback can shape behavior—something we see clearly in gamified systems that use points, badges, and leaderboards. Then there's Cognitive Load Theory, which helps us think about how to design lessons that don't overwhelm students, but instead guide them toward deeper understanding.

These theories aren't just academic—they connect directly to the variables explored in this study: the roles, impacts, and challenges of gamified instruction. Teachers generally saw gamification as a powerful tool for engagement and delivery, while students appreciated its motivational aspects but were more cautious about its long-term effects. The differences in perception were statistically significant, showing that while both groups value gamification, they experience it in distinct ways.

Government policies from the Department of Education (DepEd) also support the integration of technology in teaching. Orders like DepEd No. 42, s. 2016 and No. 8, s. 2015 encourage the use of digital tools in lesson planning and assessment. More recent directives—Memorandum 039, s. 2023 and Order No. 16, s. 2023—push for the responsible use of multimedia and the rollout of ICT resources in public schools. These policies show that the Philippine education system is actively working to modernize classrooms and support innovative teaching strategies like gamification.

The literature reviewed adds depth to these findings. Studies by Afrianto et al., Bouchrika et al., and Xu et al. highlight how gamification boosts engagement and comprehension. At the same time, researchers like Brooks et al. and Safapour et al. point out the practical hurdles teachers face—like limited resources and the need for training. Cultural relevance also emerged as a key concern, with Toda et al. introducing models that help tailor gamified learning to students' backgrounds.

In response to these insights, this study proposes an Action Plan that focuses on gradual implementation, teacher capacity-building, student-centered design, and resource support. By addressing both the strengths and limitations of gamified instruction, the plan aims to create a more inclusive and effective learning environment.

Ultimately, this research highlights the potential of gamification not just as a teaching tool, but as a catalyst for meaningful change in how math is taught and learned. When guided by sound theory, supported by policy, and informed by real classroom experiences, gamified instruction can help students move beyond memorization—toward deeper understanding, greater confidence, and a genuine love for learning.

THE PROBLEM

Statement of the Problem

This study aims to probe the teachers and students' perspective on the role, influence, and challenges of gamified mathematics instruction at Tugbongan National High School, respectively, during the school year 2024-2025 as basis for an Action Plan.

It specifically seeks to answer the following sub-problems:

1. To what extent does gamification play a role in facilitating mathematics instruction, as to the perspectives of the teachers and students?
2. To what extent does gamified mathematics instruction influence the learning experience, as perceived between teachers and students?
3. To what extent do challenges arise from gamified mathematics instruction, based on the views of teachers and students?

4. Is there a significant difference in the perspective between the teachers and students as to the following comparisons on the:

4.1 role of gamification in facilitating mathematics instruction,
4.2 influence of gamified mathematics instruction, and
4.3 challenges of gamified mathematics instruction?

5. Based on the findings of the study, what specific action plan shall be formulated?

Statement of hypothesis:

Ho1: There is no significant difference in the perspective between the teachers and students as to the role of gamification in facilitating mathematics instruction.

Ho2: There is no significant difference in the perspectives between the teachers and students as to the influence of gamified mathematics instruction.

Ho3: There is no significant difference in the perspectives between the teachers and students as to the challenges of gamified mathematics instruction.

Significance of the Study

This study underscores the significance of understanding teacher and student perspectives on gamification in mathematics. Its findings contribute to the development of effective gamification strategies, enhancing student engagement and learning outcomes while addressing identified challenges. A deeper understanding of this scientific investigation aid educators in the development of effective techniques to address the mathematical needs of high school students, the study would be of essence to the following units, agencies and individuals, namely:

Department of Education (DepED). This scientific study may be able to shed some light on one or more likely causes of the typical problem presented by the National Achievement Test results, which show that the majority of children performed poorly in science and mathematics, respectively.

School Administrators. This will provide them with useful perception towards better management of school.

Teachers. This study will undoubtedly play a part in meeting the goal of the research, which is to remind teachers of the necessity to address students' academic needs in mathematics.

Other stakeholders. The community, industries, or other government units may be enlightened of the issues and problems surrounding the inaptness of several young learners in dealing worded problems in Mathematics and may carry out an action plan to support DepEd’s grand design to enhance the contemporary state.

Parents. As the primary educators in the home, this research may assist them in devising strategies to strengthen the use of technology in math problems so they may better teach their own children how to handle similar situations.

High School students. Students stand to gain the most from the study because of the usage of gamification, which will enhance and increase their appreciation of mathematics' beauty.

Researchers. This current study will be of great use for the researchers since it will provide her the necessitated information, issues in problem solving in mathematics and approach on how to intervene the same among the high school students who were/are under her scholastic instruction.

Future Researchers. This study will provide the baseline data which other studies may be conducted will emphasis on improving the performance in school specifically in the field of mathematics.

RESEARCH METHODOLOGY

This section addressed the research design that was taken into consideration, the characteristics used to purposively select the location, the method employed to choose the respondents, the source and contents of the instrument, the procedures that were followed during data collection, the statistical analysis, and the scoring methods that were used to infer the information that was gathered.

Design

This study employed a descriptive-comparative research design to explore how gamified mathematics instruction is perceived by two distinct groups—teachers and students. This design was chosen because it allows for a meaningful comparison of perspectives without altering the natural classroom environment. Quantitative data were gathered through structured questionnaires, which captured participants' attitudes, beliefs, and experiences related to the roles, impacts, and challenges of gamification. By analyzing these responses, the study was able to identify patterns and differences that reflect how each group engages with and interprets game-based strategies in math instruction.

To support this approach, the study drew from the work of (Arnold, 2019), who used a similar design to examine emotional intelligence across workplace settings. Her research demonstrated how descriptive-comparative methods can uncover valuable insights by comparing naturally occurring groups through statistical analysis. Following this model, the present study applied the Mann-Whitney U test to determine whether significant differences existed between teacher and student responses. This design provided a clear and practical framework for understanding how gamification is experienced differently by each group, helping to inform the development of a more inclusive and responsive action plan.

Flow of the Study

This section provided a structured overview of the study, outlining its sequential progression from problem identification to conclusion. It encompassed research design, data collection, and analysis methodologies.

The study begins by examining several foundational elements related to gamified mathematics instruction. It explores how gamification contributes to the teaching and learning of mathematics and assesses the degree to which this approach influences instructional outcomes. Attention is also given to the challenges encountered by both educators and learners when implementing gamified strategies. Furthermore, the research investigates whether there are statistically significant differences between teachers' and students' perspectives regarding the role of gamification, its perceived impact, and the extent of difficulties they face in applying it within the classroom setting.

To carry out the study, a series of methodical steps were followed. Initial preparations involved submitting formal transmittal letters to relevant authorities. Participants were then provided with informed consent or assent forms to ensure ethical compliance. Following this, questionnaires were distributed to gather data from both teachers and students. The collected responses underwent statistical analysis to identify patterns, relationships, and significant findings. Finally, the results were organized, interpreted, and presented in a comprehensive manner to support the study's conclusions.

The culmination of the research process is the development of a targeted action plan. This plan is designed to address the insights gained from the study, particularly those concerning the effectiveness, challenges, and perceptions of gamified mathematics instruction. It serves as a strategic framework for enhancing teaching practices and supporting both educators and learners in integrating gamification more effectively into mathematics education.

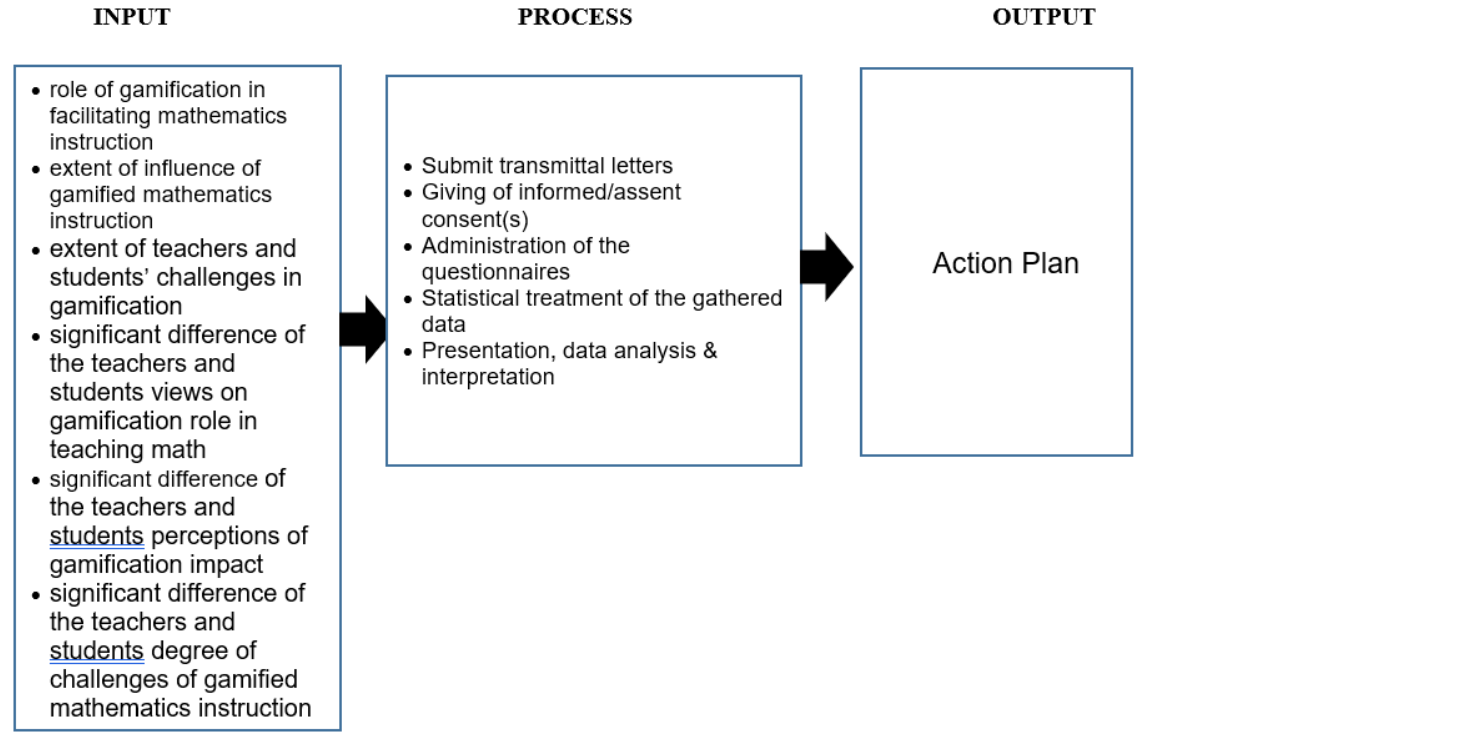

Figure 2 Flow of the Study

Environment

The research was conducted in three public secondary schools in suburban areas of Consolacion. These schools were chosen based on three key criteria: (1) their suburban setting with limited access to advanced teaching tools, offering insight into gamified instruction under challenging conditions; (2) their prior experience with gamification strategies, making them relevant for examining its effectiveness; and (3) their willingness to participate, ensuring access to teachers and students familiar with gamified learning.

School A was established in 1995, is located in Barangay Tugbongan, Consolacion, Cebu. It began as a satellite school of Consolacion National High School, operating from a nipa-and-bamboo classroom within Tugbongan Elementary School. Spearheaded by Barangay Captain Hon. Ember V. Alinsug, its goal was to provide accessible secondary education to the growing community. Despite limited facilities, the school prioritized literacy, numeracy, and life skills. In 1996, with the help of local officials like Atty. Victor A. Maambong, the school relocated and expanded to serve more students from nearby barangays. Its founding staff included Mrs. Clara Rebecca Falconi, who served as principal. School A is committed to excellence, aiming to produce responsible and values-driven learners through quality education. Continuous growth in enrollment led to new facilities, including a two-story building built by the Department of Education. The school's progress has been made possible by the strong support of local stakeholders, who have played a vital role in transforming it into a key educational institution in the area.

School B was established in 1974 by Mayor Hilarion H. Pepito, initially operating within the Puericulture building and managed by Mrs. Paz S. Heyrosa. It began with four classes and four pioneering teachers. In 1975, School B became an extension of Naga National High School under Principal Lorenzo Tanza, later led by Mrs. Teresita D. Lauron. As enrollment grew in the 1980s, Evening Classes were introduced to accommodate more students. Upon Lauron's retirement, Mrs. Leah Manatad took over, followed by Mrs. Adelina P. Semblante as principal of the Evening Class in 1995. After Mrs. Manatad, leadership passed to Mrs. Fedelina C. Entero, and eventually back to

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Mrs. Semblante for both Day and Evening Classes. In 2005, Mrs. Elisa Escutin led the Evening Class, succeeded in 2010 by Mr. Raul Jumao-as, who improved lighting facilities and academic performance. By 2012, the school was implementing both Tech-Voc and Special Science curricula. Mr. Jumao-as became the principal in 2015 and now oversees all secondary schools in Consolacion.

School C located in Barangay Nangka, Consolacion, Cebu, was originally established as the Laray Extension of Consolacion National High School to provide accessible secondary education to local students. In recognition of the growing educational needs of the community, it was formally separated and became an independent institution through Republic Act No. 9216. This legislation officially converted the extension into a full-fledged national high school. Following its separation, the school underwent a transition period, during which its personnel, assets, and records were transferred to support its independent operations. The creation of School C marked a vital step in improving educational services for the people of Barangay Nangka and its neighboring areas. The school aims to provide quality basic education, develop students' academic and technical skills, and instill responsible and humane values.

A map of is shown in Figure 3 for a better view of the place where the study is conducted.

Figure 3. Map of the Research Environment

Respondents

The study involved both students and teachers as respondents. Using Slovin's formula, a total of 270 Junior High School (JHS) students from School A were selected through random sampling. This particular school was chosen because it was accessible, closely aligned with the research topic, and conveniently located—making the data collection process more practical and focused. By selecting participants from a single school, the study was able to maintain consistency in the data while still generating valuable insights into gamified math instruction.

Due to the limited number of Math teachers in a single institution, the researcher selected 30 Math teachers from three public secondary schools. Selection was based on the criteria that they teach Math and hold a major in Mathematics. Including teachers from various schools ensured a sufficient number of respondents and offered a wider perspective on Math instruction across different educational environments.

Selecting teachers from multiple schools while choosing students from a single school was a deliberate strategy. This allowed the study to gather diverse insights from educators across different institutions, while maintaining a concentrated focus on the experiences of 270 Junior High School students. Furthermore, examining the implementation of gamified instruction within suburban, resource-limited schools is essential, as it impacts student perceptions, influences learning outcomes, and highlights distinct educational challenges.

To ensure a diverse and representative group of educators, the study employed purposive sampling in selecting teachers. In contrast, random sampling was used for student selection to maintain impartiality in the process. Additionally, purposive sampling enabled the researchers to include a subgroup with varied learning needs, thereby enhancing the depth and quality of the data collected (Palinkas et al., 2020).

Table 1 Distribution of Respondents

Junior High School Students	Population	Sample Size of Students	
	N	n	%
Grade 7	250	69	25.56
Grade 8	164	67	24.81
Grade 9	201	67	24.81
Grade 10	215	67	24.81
Sub-total	830	270	100

Table 2 Distribution of Respondents (Math Teachers)

Schools	Population	Sample Size of Math Teachers	
	N	n	%
School A	20	19	63.33

School B	6	5	20
School C	6	6	16.67
Sub-total	32	30	100

Instrument

The primary data collection instrument for this study was a structured questionnaire designed by the researcher to elicit teachers' and students' perceptions of gamification in mathematics education. The instrument comprises three distinct scales designed to evaluate teachers' and students' perspectives on the role, impact, and challenges of gamified mathematics instruction. These include the following sections: (A) The extent to which gamification plays a role in facilitating mathematics instruction, (B) The extent to which gamified mathematics instruction impacts the learning experience, and (C) The extent to which challenges arise from gamified mathematics instruction. These scales utilize a 4-point Likert scale for assessment. To ensure reliability, an item analysis was conducted for each scale, with the corresponding Cronbach's alpha calculated to assess internal consistency and measurement accuracy.

To ensure the reliability of the research instrument, pilot testing was conducted for each individual scale. The resulting data underwent statistical analysis, which demonstrated a high degree of internal consistency across the key areas assessed. These findings affirm the instrument's suitability for capturing both educators' and learners' perspectives regarding the role, impact, and challenges associated with gamified mathematics instruction. Accordingly, the survey questionnaire was deemed reliable and appropriate for full implementation. Detailed statistical results are presented in the appendix.

The validity of the research instrument is firmly established by the process it underwent prior to administration. The questionnaire was researcher-made, ensuring that its content was directly aligned with the objectives and scope of the study. Furthermore, the instrument was reviewed and formally signed by Head Teacher I and Math Teacher III of Tolotolo National High School, which signifies expert evaluation and approval from qualified professionals. Their endorsement confirms that the questionnaire is both appropriate and reliable for the intended academic context, thereby strengthening the credibility and trustworthiness of the research findings.

Data Gathering Procedure

The success of any research study depends on the strength of its data-gathering procedures. In this study, a systematic approach was used to ensure accurate and reliable data collection, beginning with permission from the school administration. This step ensured that the research complied with ethical standards and school policies.

Preliminary Stage. Before collecting any data, the researcher first prepared a transmittal letter to request permission from the Schools Division Superintendent of DepEd Cebu Province Division. This letter also included a request for approval from the school head to allow the administration of the survey questionnaires to students and teachers. Informed consent was also obtained from all participants before they answered the questionnaire to ensure that they fully understood the purpose of the study, their rights as participants, and that their involvement was voluntary and confidential.

Data-Gathering Stage. Once all the needed permissions were given, the researcher explained to the participants how to answer the questionnaire. This was done in person to make sure everything was clear. After the instructions

were given, the questionnaires were handed out to the teachers and students. When everyone finished, the researcher collected the questionnaires right away to keep the answers safe and organized.

Post-Gathering Stage. After all the questionnaires were collected, the researchers began checking and recording the data. They organized the answers and grouped them to make the results easier to understand. A statistician was asked to help with analyzing the data using appropriate statistical tools. After this, the results were written down and used to answer the research questions. By carefully following each step and working with a statistician, the researchers made sure that the study was accurate, clear, and reliable.

Statistical Treatment of Data

To properly interpret the collected data and confirm the results, several statistical methods were used based on the goals of the study. These included counting frequencies, calculating simple percentages, analyzing responses using a Likert scale, determining the weighted average, and applying the Mann-Whitney U-test for further analysis.

Simple Percentage. This approach was employed to assess the distribution of responses reflecting students' and teachers' views on gamified instruction in Mathematics, thereby providing a clearer insight into their perceptions and levels of engagement with this teaching method.

Weighted Mean. This tool was utilized to determine the average responses to specific survey items based on the 4-point Likert scale, thereby capturing the views of students and teachers regarding the effectiveness of gamified instruction in Mathematics.

Mann-Whitney U Test. This non-parametric method was applied to compare two independent groups—students and teachers—in order to determine whether notable differences existed in their views on gamified instruction in Mathematics. Given the potential deviation from a normal distribution, this test provided a more dependable evaluation of response variations using ordinal data derived from the Likert scale.

Scoring Procedure

A Likert scale was utilized for data collection, assigning numerical values to response options. Data was analyzed using descriptive and inferential statistics to determine the frequency, distribution, and significance of responses.

PART 1 Extent does gamification play a role in facilitating mathematics instruction, as to the perspectives of the teachers and students

Scale	Numerical Rating	Descriptive Rating	Verbal Interpretation
4	3.25 - 4.00	Very High	The teachers and students are fully convinced that gamification significantly enhances mathematics instruction and supports effective teaching and learning.
3	2.50 - 3.24	High	The teachers and students believe that gamification contributes positively to mathematics instruction and helps improve teaching and learning experiences.
2	1.75 – 2.49	Low	The teachers and students feel that gamification has a minimal impact on mathematics instruction and do not notably support teaching and learning.
1	1.00 -1.74	Very Low	The teachers and students are firm with their opinion that gamification does not facilitate mathematics instruction and does not support effective teaching and learning.

PART 2

Extent does gamified mathematics instruction influence the learning experience, as perceived between teachers and students

Scale	Numerical Rating	Descriptive Rating	Verbal Interpretation
4	3.25 - 4.00	Very Influential	Gamified instruction has a strong positive impact on learning, significantly improving engagement, understanding, and overall experience.
3	2.50 - 3.24	Influential	Gamified instruction has a noticeable positive effect, making learning more engaging and enhancing comprehension.
2	1.75 - 249	Fairly Influential	Gamified instruction has some positive impact, adding interest but not significantly changing the learning experience.
1	1.00 -1.74	Not Influential	Gamified instruction has little to no impact, making minimal difference in learning or student engagement.

PART 3 Extent do challenges arise from gamified mathematics instruction,based on the views of teachers and students

Scale	Numerical Rating	Descriptive Rating	Verbal Interpretation
4	3.25 - 4.00	Very Challenging	Gamified instruction presents significant difficulties, making the learning or teaching process much harder and requiring considerable effort to overcome obstacles.
3	2.50 - 3.24	Challenging	Gamified instruction creates noticeable difficulties that require effort and adaptation, though they are manageable with some adjustments.
2	1.75 - 249	Fairly Challenging	Gamified instruction introduces some challenges, but they are relatively minor and do not significantly hinder the learning or teaching experience.
1	1.00 -1.74	Not Challenging	Gamified instruction presents little to no challenges, making it easy to implement and adapt without significant difficulties.

Definition Of Terms

Integrating this part is central as it ensures clarity and precision, establishes a common understanding of key concepts, and aligns the reader's interpretation with the researcher's intended meaning, thus enhancing the overall coherence and validity of the study. Hence, the following terms are operationally-defined.

Action Plan: This is a strategic framework outlining specific steps and interventions to address identified challenges, enhance the implementation of gamified mathematics instruction, and improve both teaching and learning outcomes.

Degree of Challenges of Gamified Mathematics Instruction: It refers to the level of difficulties and obstacles encountered in implementing and integrating game-based methods in mathematics instruction, including technical issues, curriculum alignment, and student adaptability.

Extent of Impact of Gamified Mathematics Instruction: This pertains to the degree to which game-based methods impact student engagement, learning outcomes, and attitudes towards mathematics, as perceived by both students and teachers.

Gamification: It refers to the integration of game elements—such as points, levels, rewards, and competition—into non-game contexts like education. In this study, gamification is used as a strategy to enhance student engagement, motivation, and enjoyment in mathematics learning.

Gamified Mathematics Instruction: This pertains to the use of gamification strategies specifically applied in teaching mathematics. It includes the use of digital tools or classroom-based games that aim to make math instruction more interactive, engaging, and effective for students.

Investigating: In the context of this study, investigating refers to the systematic process of exploring and examining the perceptions, insights, and experiences of teachers and students regarding gamified mathematics instruction. It aims to gain a deeper understanding of their views on its role, impact, and challenges within the learning environment.

Role of Gamified Mathematics Instruction: It refers to the specific functions and contributions of using game-based strategies in teaching mathematics, including how it engages students and supports learning objectives.

Teachers and Students Perspective: This refers to the viewpoints and experiences of teachers and students regarding the effectiveness, engagement, and practicality of gamified mathematics instruction, including perceived benefits and drawbacks.

Presentation, Data Analysis, And Interpretation

This chapter organizes and examines the data collected during the study. It presents the findings using tables and summaries, followed by an analysis to identify patterns and relationships. The interpretation connects these findings to the research questions, offering insights and drawing conclusions that inform the study's implications.

Extent Does Gamification Play A Role In Facilitating Mathematics Instruction As To The Perspectives Between The Teachers And Students

Table 3 provides an organized presentation of the perspectives of teachers and students regarding the role of gamification in the facilitation of mathematics instruction. This table serves as a synthesis of their responses to carefully selected survey indicators, which were designed to capture the perceived value and influence of gamified approaches in the teaching and learning process. By consolidating these perspectives, the table offers a clear overview of how both groups view the integration of game-based strategies in mathematics, particularly in terms of their potential to enhance classroom dynamics and learning experiences. It highlights the central themes of effectiveness, engagement, and motivation, thereby establishing a foundation for understanding the broader implications of gamification in educational practice.

Table 3 Extent Does Gamification Play A Role In Facilitating Mathematics Instruction As To The Perspectives Between The Teachers And Students

No	Group	Survey Indicators	$\bar{x}$	VD
1	Teacher	Gamified mathematics activities are more engaging than traditional methods.	3.80	SA
	Student		3.09	A
2	Teacher	Gamified elements increase my motivation to participate in mathematics lessons.	3.80	SA
	Student		3.14	A
3	Teacher	Gamification is effective in improving my understanding of mathematical concepts.	3.53	SA
	Student		3.23	A
4	Teacher	I find gamified mathematics instruction more enjoyable than traditional methods.	3.80	SA
	Student		3.10	A
5	Teacher	The feedback provided through gamified activities helps improve my performance.	3.73	SA
	Student		3.34	SA
6	Teacher	Gamification helps in developing my mathematical skills and problem-solving abilities.	3.50	SA
	Student		3.19	A
7	Teacher	I retain mathematical concepts learned through gamified instruction better than those learned through traditional methods.	3.43	SA
	Student		2.85	A
8	Teacher	Gamification positively affects the interaction between teachers and students during mathematics instruction.	3.60	SA
	Student		3.12	A
9	Teacher	It is easy to integrate gamification into the existing mathematics curriculum.	3.47	SA
	Student		2.96	A
10	Teacher	Gamification is effective in enhancing mathematics instruction.	3.63	SA
	Student		3.11	A
Teacher		**OVERALL WEIGHTED MEAN**	3.63	SA
Student			3.11	A

Note: 3.26-4.00- Strongly Agree, 2.51-3.25-Agree, 1.76-2.50- Disagree**,** 1.00-1.75-Strongly Disagree

In Table 3, both teachers and students express notably positive perceptions about the role of gamification in facilitating mathematics instruction. Teachers, with an impressive overall weighted mean of 3.63, fall under the Strongly Agree (SA) category, reflecting a high level of confidence in gamified strategies. They believe that gamification enhances engagement, improves understanding, and creates a more enjoyable learning environment for their students. Teachers also see value in how gamification supports skill development and retention, promotes more meaningful interaction, and fits well with curriculum standards. This level of agreement suggests that educators, grounded in daily classroom realities, have witnessed firsthand how playful, structured elements can bring mathematics to life for learners who might otherwise disengage.

Students also showed appreciation for gamified instruction, though with a slightly more reserved perspective. Their overall weighted mean of 3.11 places them in the Agree (A) category, indicating that while they find gamification beneficial, their enthusiasm is measured. They recognize how gamified activities make math more accessible and enjoyable, helping to reduce anxiety and encourage participation. However, their “A” ratings suggest a desire for even more relevance or variety in how these tools are integrated. Taken together, the responses humanize a shared

experience: teachers see the big-picture value, and students reflect the personal impact. These insights support the continued exploration and thoughtful application of gamification—where joy and learning go hand in hand, and mathematical growth becomes a collaborative, engaging journey.

The findings in Table 3 are supported by (Meylani, 2024), who emphasized that gamification enhances student engagement and comprehension in mathematics when game elements are thoughtfully applied. Teachers in her review reported improved retention and classroom interaction, aligning with the strong agreement shown by educators in this study. Meanwhile, (Roble, et al., 2024) found that while gamification boosts performance, its effect on student attitudes and anxiety is more nuanced—mirroring the moderate agreement among students in this research. These studies affirm that gamified instruction holds promise but must be tailored to meet both pedagogical goals and learner needs.

Extent Of The Impact Of Gamified Instruction As Perceived Between Teachers And Students

Table 4 presents the perceived impact of gamified mathematics instruction based on survey responses from both teachers and students. The indicators reflect various aspects of the learning experience, with results showing a consistently "Very Influential" rating across all items, highlighting strong support for gamification in enhancing engagement, motivation, understanding, and teaching effectiveness.

Table 4 Extent Of The Impact Of Gamified Instruction As Perceived Between Teachers And Students

No	Group	Survey Indicators	$\bar{x}$	VD
1	Teacher	Gamified mathematics instruction significantly enhances student engagement compared to traditional methods	3.73	VI
	Student		3.06	I
2	Teacher	Gamified elements greatly increase student motivation to participate in mathematics lessons.	3.73	VI
	Student		3.19	I
3	Teacher	Gamification significantly improves students' understanding of mathematical concepts.	3.60	VI
	Student		3.21	I
4	Teacher	Gamified mathematics instruction is much more enjoyable for students than traditional methods.	3.70	VI
	Student		3.07	I
5	Teacher	Gamified mathematics instruction helps reduce students' anxiety or fear towards learning math compared to traditional methods.	3.50	VI
	Student		3.16	I
6	Teacher	Gamification greatly aids in the development of students' mathematical skills and problem-solving abilities.	3.57	VI
	Student		3.16	I
7	Teacher	Students retain mathematical concepts learned through gamified instruction better than those learned through traditional methods.	3.60	VI
	Student		2.92	I
8	Teacher	Gamification positively enhances the interaction between teachers and students during mathematics instruction.	3.67	VI
	Student		3.15	I
9	Teacher	Gamification is relatively easy for teachers to integrate into their existing mathematics curriculum.	3.57	VI
	Student		3.00	I

10	Teacher	Gamified mathematics instruction is highly effective in improving the overall learning experience for students.	3.57	VI
	Student		3.17	I
Teacher		**OVERALL WEIGHTED MEAN**	3.62	VI
Student			3.11	I

Note: 3.26-4.00-Very Influential, 2.51-3.25-Influential, 1.76-2.50-Fairly Influential**,** 1.00-1.75-Not Influential

In Table 4, the data shows that both teachers and students perceive gamified mathematics instruction as influential in enhancing the learning experience, though with varying degrees of intensity. Teachers rated its overall impact with a weighted mean of 3.62, placing it firmly within the Very Influential (VI) category. This high rating reflects strong agreement that gamification significantly boosts student engagement, motivation, enjoyment, and understanding of mathematical concepts. The consistent VI markings across indicators—especially in areas such as reducing math anxiety and fostering active participation—suggest that teachers not only recognize the pedagogical value of gamified learning but also view it as a promising strategy for addressing traditional classroom challenges.

Students, on the other hand, assigned an overall weighted mean of 3.11, which falls under the Influential (I) category. Their ratings indicate a generally positive outlook on gamified instruction, with perceived benefits in making math more enjoyable, accessible, and less intimidating. However, compared to teachers, students were slightly more reserved in their assessments, perhaps because they experience these strategies from a more subjective, day-to-day perspective. This difference highlights the need to balance innovation with practicality, ensuring that gamified elements remain relevant, inclusive, and supportive of learners' diverse needs. The data underscores that while gamification is broadly embraced, tailoring its implementation to address both educator insights and student experiences is essential for maximizing its impact in mathematics education.

The results in Table 4 are supported by (Jutin et al., 2024), who found that gamification significantly improves student engagement, motivation, and understanding in mathematics, especially when aligned with clear instructional goals. This affirms the strong impact perceived by teachers in this study. Meanwhile, (Lomibao et al., 2024) noted that while students benefit from gamified learning, its influence on emotional factors like anxiety and attitude is more modest reflecting the more reserved student ratings observed here. Together, these studies highlight the importance of tailoring gamified instruction to meet both pedagogical aims and learner needs.

EXTENT OF CHALLENGES OF GAMIFIED MATHEMATICS INSTRUCTION BASED ON THE VIEWS OF TEACHERS AND STUDENTS

Table 5 presents the extent to which challenges arise from gamified mathematics instruction, based on the perceptions of teachers and students. Using a four-point scale, the data highlights key instructional, technological, and pedagogical concerns, with an overall rating indicating that such challenges are generally perceived as "Challenging."

Table 5 Extent Of Challenges Of Gamified Mathematics Instruction Based On The Views Of Teachers And Students

No	Group	Survey Indicators	$\bar{x}$	VD
1	Teacher	Technical issues frequently arise during gamified mathematics instruction, causing disruptions.	3.20	C
	Student		2.95	C
2	Teacher	There is a lack of adequate resources for implementing gamified mathematics instruction effectively.	3.20	C
	Student		2.98	C

3	Teacher	Teachers require extensive training to effectively use gamification in mathematics instruction.	3.33	VC
	Student		3.07	C
4	Teacher	Gamified activities often distract students from the primary learning objectives.	3.13	C
	Student		2.80	C
5	Teacher	The complexity of gamification tools can make them challenging for both teachers and students to use.	3.43	VC
	Student		3.04	C
6	Teacher	Not all students have equal access to the necessary technology for gamified mathematics instruction.	3.40	VC
	Student		3.05	C
7	Teacher	Assessing student performance in gamified mathematics instruction presents significant challenges.	3.23	C
	Student		3.05	C
8	Teacher	Implementing gamification in mathematics instruction requires more time than traditional methods.	3.17	C
	Student		3.06	C
9	Teacher	Students may become overly reliant on gamified elements, impacting their ability to learn independently.	3.43	VC
	Student		3.07	C
10	Teacher	The costs associated with gamified mathematics instruction are a significant challenge.	3.43	VC
	Student		3.10	C
Teacher		**OVERALL WEIGHTED MEAN**	3.30	VC
Student			3.02	C

Note: 3.26-4.00-Very Challenging, 2.51-3.25-Challenging, 1.76-2.50-Fairly Challenging**,** 1.00-1.75-Not Challenging

In Table 5, the challenges perceived by teachers in implementing gamified mathematics instruction were rated as Very Challenging (VC), reflected by a notably high weighted mean of 3.30. This suggests a strong consensus that gamification introduces significant hurdles in the teaching process. Key concerns include the lack of professional development opportunities, overwhelming time requirements, and difficulties in designing meaningful assessments within gamified frameworks. The consistent “VC” ratings point to a deep-rooted need for systemic solutions—such as dedicated training and tech support—to empower teachers to integrate game-based strategies without compromising instructional quality or equity.

Students, on the other hand, rated the challenges as slightly less severe, with a weighted mean of 3.02, corresponding to the Challenging (C) category. While they did recognize obstacles like technical issues, limited access to devices, and potential distractions, their responses suggest that these challenges are more tolerable or less disruptive from their point of view. This contrast may stem from students' enthusiasm for interactive learning experiences, which can overshadow their awareness of the underlying complexities. The data reveals a perceptual gap: teachers experience implementation difficulties more intensely, while students feel the pinch more lightly. Bridging this divide requires not only infrastructure improvements but also stronger coordination between educators and learners to ensure gamification enhances mathematical learning without introducing excessive strain.

The challenges identified in Table 5 are echoed by (Meylani, 2024), who emphasized that while gamification enhances engagement, teachers often face barriers such as limited training, time constraints, and difficulty aligning game elements with curriculum goals. These concerns reflect the "Very Challenging" rating from teachers in this study. Similarly, (Cabanilla et al., 2023) found that students enjoy gamified learning but still encounter issues like device access, technical glitches, and distractions—supporting the "Challenging" rating from students. These studies highlight the need for stronger support systems to ensure gamification is both effective and equitable.

Tests Of Significance Of Difference In The Perspective Between The Teachers And Students As To The Role, Influence And Challenges Of Gamified Mathematics Instruction

Table 6 presents the results of a Mann-Whitney U test comparing the perspectives of teachers and students on the role, influence, and challenges of gamified mathematics instruction. The analysis highlights significant differences in perceived role and influence, while views on challenges show no statistical disparity. Effect sizes are interpreted using Cohen's (1988) guidelines.

Table 6 Tests Of Significance Of Difference In The Perspective Between The Teachers And Students As To The Role, Influence And Challenges Of Gamified Mathematics Instruction

	Indicator	Group	Mean Rank	U	p-value	Interpretation	Effect Size *r*
1.	Role of gamification in facilitating mathematics instruction	Teachers	252.93	977	<0.001	There is a significant difference	0.759
		Students	139.12				
2.	Influence of gamified mathematics instruction	Teachers	243.40	1263	<0.001	There is a significant difference	0.688
		Students	140.18				
3.	Challenges of gamified mathematics instruction	Teachers	195.82	2691	0.002	There is a significant difference	0.336
		Students	145.46				

Note. Effect sizes are based on rank biserial correlation. Interpretation follows Cohen's (1988) guidelines: 0.10–0.29 = small, 0.30–0.49 = medium, ≥ 0.50 = large.

The Mann–Whitney U tests revealed statistically significant differences between teachers and students across all three indicators of gamified mathematics instruction. **For Indicator 1**, which assessed the role of gamification in facilitating instruction, a significant difference was found ($U = 977$, $p < .001$), with teachers demonstrating a higher mean rank (252.93) compared to students (139.12). This suggests that teachers perceived the role of gamification more positively and prominently than students. The effect size was $r = 0.759$, which is considered large, indicating a substantial and practically significant difference between the two groups. Since the p-value (.001) is less than the significance level of 0.05, the null hypothesis is rejected, indicating a statistically significant difference in perceptions between teachers and students regarding the role of gamified instruction. This result is supported by (Maat et al., 2024), who found that teachers tend to view gamification as a more impactful instructional strategy than students, due to their broader understanding of its pedagogical benefits. Similarly, (Smith, 2018) observed that

while students enjoy gamified activities, they may not fully grasp its instructional purpose, leading to more moderate evaluations. These findings reinforce the substantial gap revealed by the Mann–Whitney U test.

For Indicator 2, regarding the influence of gamified instruction on learning, the results also showed a significant difference ($U = 1263$, $p < .001$). Again, teachers had a higher mean rank (243.40) than students (140.18), implying that teachers were more likely to believe that gamification has a positive impact on student learning outcomes. The effect size of $r = 0.688$ also represents a large effect, reinforcing that this difference is not only statistically significant but educationally meaningful. Since the p-value (.001) is less than the significance level of 0.05, the null hypothesis is rejected, indicating a statistically significant difference in how teachers and students perceive the influence of gamified instruction on learning. This result is supported by (Vankúš, 2019), who found that teachers consistently recognize gamification's positive impact on motivation and learning outcomes more than students do. Likewise, (Holmes, et al., 2020) emphasized that educators value technology-mediated gamified strategies for improving engagement and achievement, while students may focus more on enjoyment and usability. These findings reinforce the large effect size (r = 0.688) and validate the stronger teacher perceptions observed in your study.

Lastly**, for Indicator 3**, which measured the extent to which challenges arise from gamified instruction, a significant difference was identified ($U = 2691$, $p = .002$). Teachers had a higher mean rank (195.82) compared to students (145.46), indicating that teachers were more likely to acknowledge or experience challenges in implementing gamification. The effect size was $r = 0.336$, which falls in the medium range, suggesting a meaningful, though less pronounced, difference in perceptions of challenges compared to the previous two indicators. Since the p-value (.002) is less than the significance level of 0.05, the null hypothesis is rejected—indicating a statistically significant difference in how teachers and students perceive the challenges of gamified instruction. This result is supported by (Meylani, 2024), who emphasized that while gamification enhances engagement and achievement, teachers face barriers such as limited training, time constraints, and difficulty aligning game elements with curriculum goals. Likewise, (Cabanilla et al., 2023) found that although students enjoy gamified learning, challenges such as technical issues, access limitations, and distraction risks persist—though perceived less intensely than by teachers. These findings align with the medium effect size (r = 0.336), confirming that teachers experience implementation hurdles more acutely.

SUMMARY, FINDINGS, CONCLUSION AND RECOMMENDATIONS

This chapter presents a comprehensive summary of the survey data collected from the respondents. Through meticulous analysis and interpretation, key findings have been uncovered, serving as a foundation for the conclusions reached in this empirical study.

SUMMARY

This study aimed to explore the perspectives of teachers and students at School A regarding the role, impact, and challenges of gamified mathematics instruction during the 2024-2025 school year, serving as a foundation for an Action Plan.

Specifically, the research sought to determine the extent to which gamification contributes to the facilitation of mathematics instruction, influences students' learning experiences, and presents challenges from the viewpoints of both teachers and students.

Furthermore, this empirical investigation aimed to analyze whether there is a significant difference between teachers' and students' perspectives in relation to the role of gamification in mathematics instruction, the degree of its influence, and the challenges associated with its implementation.

FINDINGS

Based on the statistical analysis of the data gathered in relation to the identified research problems, the study yielded the following findings:

Extent to which Gamification plays a Role in Facilitating Mathematics Instruction. The data reflects that teachers strongly believe gamification enhances the teaching of mathematics. Students appear generally supportive of this method, though with less enthusiasm than their teachers. Overall, both groups recognize its potential, with educators showing particularly high confidence in its effectiveness.

Extent of Impact of Gamified Mathematics Instruction. The findings show that teachers view gamified mathematics instruction as very influential, citing strong benefits in engagement, motivation, and understanding. Students also find it influential, noting improved enjoyment and interaction, though with moderate confidence in long-term retention. Both groups agree that gamification supports skill development and curriculum integration, making it a promising instructional strategy.

Degree of Challenges of Gamified Instruction. The findings reveal that teachers perceive gamified mathematics instruction as more challenging than students do. Key challenges include technical issues, lack of resources, and the need for extensive training. Both groups also highlight concerns about time demands, assessment difficulties, and unequal access to technology, suggesting the need for strategic support in implementation.

Test of Significant Difference in the perspective between the teachers and students as to the role of gamification in facilitating mathematics instruction. A statistically significant difference was observed between teachers' and students' perspectives on the role of gamification in facilitating mathematics instruction. Teachers exhibited a higher mean rank compared to students, suggesting that they held a more favorable perception of gamification in instruction. The effect size is classified as large, indicating a substantial and practically meaningful difference between the two groups.

Test of significant difference in the perspective between the teachers and students' extent of influence of gamified mathematics instruction. A significant difference was observed, with teachers exhibiting a higher mean rank compared to students**.** This suggests that teachers were more inclined to perceive gamification as having a positive effect on student learning outcomes. The effect size is classified as large, emphasizing that this difference is both statistically significant and educationally meaningful.

Test of significant difference in the perspective between the teachers and students' degree of challenges of gamified mathematics instruction. The Mann-Whitney U test identified a statistically significant difference**,** with teachers showing a higher mean rank than students. This suggests that teachers were more likely to recognize or encounter challenges in implementing gamification. The effect size falls within the medium range, indicating a notable but less pronounced difference in perceptions of challenges compared to the previous two indicators.

CONCLUSION

The study shows that teachers and students have different views on gamified math instruction. Teachers see it as very helpful and effective, while students recognize its benefits but are less certain. Both groups agree that gamification comes with challenges, though teachers find them more significant. The results suggest that proper planning and support are needed to make gamification work well while addressing any difficulties. Overall, gamification is recognized as an effective yet challenging method for teaching mathematics.

In response to these findings, an action plan has been developed to address the challenges and enhance the effectiveness of gamified instruction. The plan includes provision of appropriate resources, and structured

monitoring to ensure proper integration of gamification strategies in mathematics classes. Implementation will be carried out in collaboration with school administrators and faculty, with clear timelines and evaluation measures to assess progress. This ensures that the recommendations of the study are not only theoretical but are translated into practical steps that directly benefit teaching and learning at Tugbongan National High School.

RECOMMENDATIONS

This study examined teachers' and students' perspectives on the integration of gamification in mathematics instruction, emphasizing its role, benefits, and challenges. Based on the findings, the following recommendations are presented:

Balanced Integration of Gamification. While teachers strongly support gamification, students show some hesitation. To bridge this gap, educators should gradually introduce gamified elements, ensuring they align with students' preferences and learning needs.

Training and Support for Educators. Since teachers perceive gamification as both highly beneficial and challenging, professional development programs should be implemented to equip them with effective strategies for overcoming difficulties in gamified instruction.

Student-Centered Approach. Given students' more reserved stance on gamification, it is essential to gather direct feedback from them to tailor gamified activities in ways that enhance engagement and effectiveness.

Addressing Challenges in Implementation. With both groups acknowledging difficulties in gamification, schools should provide adequate resources, support, and structured planning to minimize obstacles and maximize its benefits.

Further Research on Long-Term Impact. To strengthen the study’s conclusions, future research could examine the long-term effects of gamification on student learning outcomes and engagement, as well as explore additional ways to optimize its implementation in mathematics instruction.

Output Of The Study

Rationale

Gamification is a modern pedagogical approach that incorporates game mechanics—such as points, badges, leaderboards, and challenges—into instructional design, with the aim of enhancing both teaching efficacy and student learning outcomes. In mathematics education, this approach has demonstrated promising potential to reduce student anxiety, boost motivation, and improve engagement—especially among learners who struggle with abstract reasoning or exhibit math avoidance behaviors.

As classroom instruction increasingly integrates technology, gamification resonates with the digital learning preferences of Generation Z, who thrive in interactive, goal-oriented environments. However, while theoretical benefits abound, practical application demands careful planning and evidence-based implementation. This study recognizes that without a clear, validated framework, educators may struggle to apply gamification consistently and sustainably across diverse classroom settings.

Therefore, the output of this research is the development of a Gamification-Enhanced Instructional Plan tailored specifically for mathematics instruction in rural schools. This framework will provide educators with a structured, practical, and adaptable blueprint for integrating gamified strategies that align with curriculum standards. It seeks to bridge the gap between conceptual understanding and experiential learning through game-based pedagogy.

The instructional plan will be subject to expert validation to ensure relevance, clarity, and effectiveness. It will also undergo refinement based on teacher and stakeholder feedback, ensuring that the final output is not only theoretically grounded but also contextually responsive and scalable. Ultimately, the plan aims to empower educators, enhance student learning, and contribute to educational innovation within rural mathematics classrooms.

Objectives

1. To develop a Gamification-Enhanced Action Plan specifically designed for teaching mathematics in a rural educational context.
2. To validate the instructional plan through expert evaluation in terms of relevance, effectiveness, clarity, and applicability.
3. To refine the instructional plan based on feedback from educational stakeholders, including teachers, curriculum developers, and school administrators.
4. To present a finalized framework that can be adopted and sustained across similar learning environments to improve student engagement and performance in mathematics.

Scheme of Implementation

Before carrying out the implementation, formal approval must be secured from the DepEd Division Officials and School Heads. No activities should proceed without explicit authorization from the appropriate authorities. Once approved, collaboration with key stakeholders such as teachers, academic coordinators, and PTA representatives will be crucial to ensuring gamification is smoothly integrated into the school's existing structure.

To track effectiveness, regular monitoring and evaluation must take place, allowing adjustments to improve the outcomes. Additionally, proper documentation and reporting will be vital in maintaining sustainability and supporting future research efforts.

APPROVAL SHEET

This Thesis entitled "**INVESTIGATING TEACHERS' AND STUDENTS' PERSPECTIVES ON GAMIFIED MATHEMATICS INSTRUCTION: ROLES, IMPACTS AND CHALLENGES"** was prepared and submitted by **Shiela Mae B. Dimpas** in partial fulfillment of the requirements for the degree **Master of Arts in Education (M.A.Ed.) Major in Teaching Mathematics** has been examined and is recommended for **Oral Examination.**

THESIS ADVISORY COMMITTEE

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APPROVED by the Oral Examination Committee with the grade of **PASSED.**

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Member	Member
JOHN V. DE VERA, Dev. Ed. D.	REGINA E. SITOY, Dev. Ed. D.
Member	Censor

ACCEPTED AND APPROVED In partial fulfillment of the requirements for the Degree of **Master of Arts in Education (M.A.Ed.) Major in Teaching Mathematics.**

Comprehensive Examination**: PASSED**

Date of Oral Examination**: August 23, 2025**

RAYMOND C. ESPINA, Ph. D., Dev. Ed. D.
College Dean

Gamification-Enhanced Action Plan

Areas of Concern	Objectives	Strategies	Persons Involved	Budget	Source of Budget	Time Frame	Expected Outcome	Actual Accomplishment	Remarks
Cognitive Impact & Retention Part 1 Q6, Q7 & Part 2 Q7	-Improve retention of math concepts. -Enhance problem-solving skills.	-Implement points, badges, and leaderboards to reinforce positive learning behavior. -Use interactive quizzes and problem-solving challenges. (Kahoot! Quizizz and Blooket)	Math Teachers, Students, Academic Coordinators	₱2,500 per teacher for materials and subscriptions	School MOOE, PTA, LGU support (if applicable)	Whole School Year	-Greater retention rates. -Improved mathematical reasoning. -Higher student participation. -Improved interest in Mathematics. -More engaged and proactive learners.		
Curriculum Integration Part 1 Q9 & Part 2 Q9	-Ensure smooth integration into existing curriculum.	-Align gamified lessons with curriculum guides. -Offer lesson templates for gamification	Math Department Heads, Teachers	₱1,000 for resource development.	DepEd allocation, External sponsors	Whole School Year	-Streamlined lesson planning. -Better teacher adaptability.		
Emotional & Psychological Part 2 Q1	-Reduce math-related anxiety. -Foster enjoyment in learning.	-Create low-pressure competitive games. -Use positive reinforcement mechanics (points, badges).	Guidance Counselors, Teachers	₱1,500 for materials	School MOOE, Private sponsorship	Whole School Year	-Less fear of math. -Improved student mindset toward the subject.		

Gamification-Enhanced Action Plan

Technical & Resource Barriers Part 3 Q1, Q2	-Minimize class disruptions. -Ensure availability of tools & support .	-Upgrade internet and hardware. -Provide training on troubleshooting. -Access free or low-cost platforms.	IT Personnel, Teachers, Admin	₱3,000 per classroom	School MOOE, LGU, tech support	Whole School Year	-Smooth instructional flow. -Teachers equipped to handle issues independentl y.		
Instructional Effectiveness & Focus Part 3 Q4	-Maintain alignment with learning goals. -Enhance educational value of gamified activities.	-Set clear objectives per game. -Debrief lessons to reinforce concept understanding.	Curriculum Planners, Teachers	₱500 for instructional materials	Internal Budget	Whole School Year	-Better focus during activities. -Reduced distraction. -Higher relevance to curriculum standards.		

Prepared by:

Shiela Mae B. Dimpas

ACKNOWLEDGEMENT

First and foremost, I offer my deepest gratitude to God Almighty for granting me the strength, wisdom, skills, and opportunity to undertake, persevere through, and complete this research study. This accomplishment would not have been possible without His divine guidance and grace.

I extend my heartfelt appreciation to all those who contributed in any way to the success of this research—through shared knowledge, effort, and unwavering support. I am profoundly thankful to Cebu Technological University for providing me the platform and opportunity to pursue and complete this academic endeavor.

My sincere thanks go to **Dr. Joseph C. Pepito**, OIC-University President of Cebu Technological University, for his generous support throughout my thesis journey.

I am equally grateful to **Dr. Raymond C. Espina**, Dean of the College of Education, Main Campus, for his favorable endorsement of my study to the Thesis Advisory Committee and Panel of Examiners.

To the members of the Advisory Committee and Panel of Examiners—**Dr. Joseph C. Pepito, Dr. Reylan G. Capuno, Marilou G. Martinez, Dr. John V. de Vera, Dr. Mary Anne Villaganas, and Dr. Regina E. Sitoy**—thank you for your insightful feedback, encouragement, and the lasting impression you've made on me. Your support and understanding over the years have meant so much.

A special note of gratitude goes to **Dr. Porferio M. Almerino, Jr.,** my Thesis Adviser, for his unwavering guidance, patience, motivation, and profound knowledge that enriched this study.

My love and appreciation for all of you are beyond measure. Thank you and may God bless you always.

To **God** be all the glory!

- **Shiela Mae B. Dimpas**

DEDICATION

To **God**, my refuge and strength—thank You for never letting go of me, especially in the moments when I was ready to give up. You saw the tears I didn't show, heard the prayers I couldn't speak, and carried me through every storm with grace I didn't think I deserved. This journey is a testament to Your faithfulness, and I offer this work as a humble reflection of the love and mercy You've poured into my life.

To my beloved parents, **Fely B. Dimpas** and **Pedro J. Dimpas**, whose love and sacrifices shaped the person I am today. Especially to my mother, whose memory continues to inspire me from heaven, this work is a tribute to you. To my siblings, for their wholehearted support and encouragement throughout this academic pursuit.

To my fiancé, **Michael P. Arcenal**, thank you for being my unwavering support through every storm and silence. Your love, patience, and belief in me gave me the strength to keep going when I felt like giving up, and this achievement is as much yours as it is mine.

To my witty and wonderful best friends, **Bridget M. Rosales**, **Clent S. Branzuela**, and **Cindy Grace J. Gomez**, thank you for being the kind of friends who never let me face life alone. You've seen me at my worst, lifted me with laughter, and reminded me of my worth when I forgot it myself. Your friendship is one of the greatest gifts I've ever received, and this achievement carries pieces of all the love, support, and memories we've built together.

To my best friends **Mary Grace Sta. Maria** and **Jenny Marie J. Español**—thank you for being my concert buddies, travel companions, and the ones who always listen when I need someone to talk. Your friendship brings adventure, comfort, and reliable companionship into my life.

To the dedicated faculty and staff of the College of Education, Cebu Technological University – Main Campus, as well as the school principals and General Mathematics teachers from the identified Junior High Schools in Consolacion District I, Division of Cebu Province, Department of Education, thank you for your unwavering commitment to nurturing academic excellence and inspiring others to pursue it with passion and purpose.

I may never find the perfect words to express just how deeply I care for each one of you. Your love, support, and presence have meant more to me than I could ever fully explain. From the bottom of my heart, thank you for walking this journey with me—may God bless you always with the same kindness and strength you've given me.

- **Shiela Mae B. Dimpas**

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APPENDICES

Appendix A

December 2, 2024

Senen Priscilo P. Paulin, CESO V
Schools Division Superintendent
DepEd Cebu Province Division
Sudlon, Lahug, City of Cebu

Dear **Dr. Paulin**:

The undersigned researchers seek your approval for the conduct of our thesis entitled **"Probing the Teachers and Students' Perspective on the Role, Influences, and Challenges of Gamified Mathematics Instruction"** in the identified public high schools within the DepEd Cebu Province division, namely: Pilipog Night High School, Tolotolo National High School and Tugbongan National High School.

This study aims to probe the role, influence and challenges of gamified mathematics instruction from both teachers' and students' perspectives. The research is expected to provide valuable insights that could enhance instructional strategies and improve student engagement and learning outcomes in mathematics.

Rest assure that the research will adhere to all ethical protocols, including obtaining informed consent from participants, ensuring their anonymity, and maintaining the confidentiality of all data collected. Furthermore, the study poses no risks to the participants and is designed to be minimally invasive, focusing solely on gathering opinions and experiences related to the educational approach being studied.

We would greatly appreciate your approval to proceed with this research. Should you require any additional information or wish to discuss the study further, we certainly shall comply to such requisite.

Thank you for considering this request. We look forward to your positive response.

Sincerely yours,

Gladys Carmel B. Munez
Researcher

Mayleng M. Pitogo
Researcher

Clent S. Branzuela
Researcher

Shiela Mae Dimpas
Researcher

Bridget M. Rosales
Researcher

Noted by:

Porferio M. Almerino, Jr., Ph. D.
Thesis Adviser

Raymond C. Espina, Ph. D., Dev. Ed. D.
Dean, College of Education

Approved:

Senen Priscilo P. Paulin, CESO V
Schools Division Superintendent

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Letter To The Schools Division Superintendent

Republic of the Philippines
Department of Education
REGION VII – CENTRAL VISAYAS
Schools Division of Cebu Province

December 17, 2024

GLADYS CARMEL B. MUNEZ, Et. Al
Researchers
Cebu Technological University – Main Campus

Dear Ms. Munez,

This is to acknowledge receipt of your Letter Request to conduct a Research Study/Survey as academic requirement of your graduate school studies, Master of Arts in Education Major in Teaching Mathematics.

Anent to your request, this Office allows you to conduct your Research Study/Survey entitled "***Probing the Teachers and Students' Perspective on the Role, Influences, and Challenges of Gamified Mathematics Instruction***" where select teachers and students of **Pilipog Night High School, Tolotolo National High School and Tugbongan National High School** are the target respondents, with the following condition precedents:

a. Participation of the respondents shall be voluntary;
b. Researcher shall secure Letter of Concurrence of the target teacher-respondents signifying their voluntary support and participation prior to the conduct of the study;
c. Researcher shall secure Parental Consent of the target student-respondents prior to the conduct of the study;
d. Restriction on any Class Disruptions or any legal school activities;
e. No DepEd Funds shall be used for the said study; and
f. Results of the said study shall not be used that is prejudicial to the Department of Education.

Furthermore, utmost confidentiality of the responses and personal information of the respondents shall be upheld.

This letter, together with the **Division-issued Permit to Study,** shall be presented to the concern School Heads of the target school-respondents prior to the conduct of the study/survey.

Thank you very much.

Respectfully yours,

SENEN PRISCILO P. PAULIN, CESO V
Schools Division Superintendent

DepED MATATAG
BAGONG PILIPINAS

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Appendix B

INFORMED CONSENT

Title of Study: Teachers and Students' Perspective on the Role, Influences, and Challenges of Gamified Mathematics Instruction

Introduction:

You are being invited to participate in a research study that aims to explore the role, influences, and challenges of gamified mathematics instruction from the perspectives of teachers and students. Your participation will help in understanding how this instructional approach affects learning and engagement in mathematics.

Purpose of the Study:

The purpose of this study is to gather insights on the effectiveness of gamified mathematics instruction and to identify any challenges faced by both teachers and students.

Procedures:

If you agree to participate, you will be asked to complete a survey consisting of questions about your experiences and opinions regarding gamified mathematics instruction. The survey will take approximately [estimated time] minutes to complete.

Voluntary Participation:

Your participation is entirely voluntary. You may choose not to participate or withdraw from the study at any time without any negative consequences.

Confidentiality:

All responses will be kept confidential and used only for the purposes of this research. Data will be anonymized and securely stored to protect your privacy.

Risks and Benefits:

There are no foreseeable risks associated with participating in this survey. Your input will contribute to a better understanding of gamified mathematics instruction, which may benefit future educational practices and outcomes.

Contact Information:

If you have any questions about the study or your participation, please contact [Your Full Name] at [Your Email Address] or [Your Phone Number].

Consent:

By signing below, you indicate that you have read and understood the information provided, and you agree to participate in this study.

Participant's Signature: _____

Date: _____

Printed Name: _____

Appendix C

Survey Questionnaire

SURVEY QUESTIONNAIRE

PART 1

Extent does gamification play a role in facilitating mathematics instruction, as to the perspectives of the teachers and students

Legend: 4-Very High; 3-High; 2-Low; 1-Very Low

No	Survey Indicators	4	3	2	1
1	Gamified mathematics activities are more engaging than traditional methods.				
2	Gamified elements increase my motivation to participate in mathematics lessons.				
3	Gamification is effective in improving my understanding of mathematical concepts.				
4	I find gamified mathematics instruction more enjoyable than traditional methods.				
5	The feedback provided through gamified activities helps improve my performance.				
6	Gamification helps in developing my mathematical skills and problem-solving abilities.				
7	I retain mathematical concepts learned through gamified instruction better than those learned through traditional methods.				
8	Gamification positively affects the interaction between teachers and students during mathematics instruction.				
9	It is easy to integrate gamification into the existing mathematics curriculum.				
10	Gamification is effective in enhancing mathematics instruction.				

PART 2

Extent does gamified mathematics instruction influence the learning experience, as perceived between teachers and students

Legend: 4-Very Influential; 3-Influential; 2-Fairly Influential; 1-Not Influential

No	Survey Indicators	4	3	2	1
1	Gamified mathematics instruction significantly enhances student engagement compared to traditional methods				
2	Gamified elements greatly increase student motivation to participate in mathematics lessons.				
3	Gamification significantly improves students' understanding of mathematical concepts.				
4	Gamified mathematics instruction is much more enjoyable for students than traditional methods.				
5	Gamified mathematics instruction helps reduce students' anxiety or fear towards learning math compared to traditional methods.				
6	Gamification greatly aids in the development of students' mathematical skills and problem-solving abilities.				
7	Students retain mathematical concepts learned through gamified instruction better than those learned through traditional methods.				

8	Gamification positively enhances the interaction between teachers and students during mathematics instruction.				
9	Gamification is relatively easy for teachers to integrate into their existing mathematics curriculum.				
10	Gamified mathematics instruction is highly effective in improving the overall learning experience for students.				

PART 3
Extent do challenges arise from gamified mathematics instruction, based on the views of teachers and students

Legend: 4-Very Challenging; 3-Challenging; 2-Fairly Challenging; 1-Not Challenging

No	Survey Indicators	4	3	2	1
1	Technical issues frequently arise during gamified mathematics instruction, causing disruptions.				
2	There is a lack of adequate resources for implementing gamified mathematics instruction effectively.				
3	Teachers require extensive training to effectively use gamification in mathematics instruction.				
4	Gamified activities often distract students from the primary learning objectives.				
5	The complexity of gamification tools can make them challenging for both teachers and students to use.				
6	Not all students have equal access to the necessary technology for gamified mathematics instruction.				
7	Assessing student performance in gamified mathematics instruction presents significant challenges.				
8	Implementing gamification in mathematics instruction requires more time than traditional methods.				
9	Students may become overly reliant on gamified elements, impacting their ability to learn independently.				
10	The costs associated with gamified mathematics instruction are a significant challenge.				

Validated by:

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Appendix D

STATISTICAL RESULTS

This appendix presents the statistical results obtained using Jamovi (v2.6.17) and SPSS, in line with the study's objectives. The analyses include internal consistency testing for survey questionnaire, descriptive statistics, frequency distributions, test of normality, and test of significant difference between teachers and students.

1. Internal Consistency Testing for Survey Questionnaire

The instrument comprises three distinct scales designed to evaluate teachers' and students' perspectives on the role, influence, and challenges of gamified mathematics instruction. These include the following sections: (A) The extent to which gamification play a role in facilitating mathematics instruction (B) The extent to which gamified mathematics instruction influence the learning experience, and (C) The extent to which challenges arise from gamified mathematics instruction. These scales utilize a 4-point Likert scale for assessment. To ensure reliability, an item analysis was conducted for each scale, with the corresponding Cronbach's alpha calculated to assess internal consistency and measurement accuracy.

1.1 The extent to which gamification play a role in facilitating mathematics instruction

Item Reliability Statistics			
			If item dropped
	Mean	**SD**	**Cronbach's α**
I-1	3.40	0.563	0.876
I-2	3.50	0.630	0.884
I-3	3.23	0.817	0.870
I-4	3.43	0.728	0.878
I-5	3.37	0.669	0.876
I-6	3.30	0.750	0.883
I-7	3.23	0.679	0.893
I-8	3.30	0.794	0.886
I-9	3.00	0.788	0.889
I-10	3.43	0.626	0.878

Scale Reliability Statistics			
	Mean	**SD**	**Cronbach's α**
scale	3.32	0.505	0.892

The first scale demonstrates strong internal consistency, with a Cronbach's alpha of 0.892, mean of 3.32, and standard deviation of 0.505 across 10 items, indicating good reliability.

The extent to which gamified mathematics instruction influence the learning experience

Item Reliability Statistics			
			If item dropped
	Mean	**SD**	**Cronbach's α**
II-1	3.40	0.621	0.860
II-2	3.37	0.718	0.848
II-3	3.30	0.596	0.872
II-4	3.13	0.860	0.843
II-5	3.37	0.669	0.856
II-6	3.17	0.747	0.858
II-7	3.27	0.785	0.854
II-8	3.30	0.702	0.857
II-9	3.37	0.718	0.848
II-10	3.43	0.774	0.848

Scale Reliability Statistics			
	Mean	**SD**	**Cronbach's α**
scale	3.31	0.488	0.867

The second scale with 10 items also reflects a good internal consistency, with a Cronbach's alpha of 0.867, mean of 3.21, and standard deviation of 0.488, indicating reliable measurement of the perceived influence of gamified instruction.

The extent to which challenges arise from gamified mathematics instruction

Item Reliability Statistics			
			If item dropped
	Mean	**SD**	**Cronbach's α**
III-1	3.07	0.868	0.852
III-2	3.10	0.845	0.831
III-3	3.10	0.712	0.839
III-4	3.00	0.947	0.843

III-5	2.83	0.834	0.844
III-6	3.03	0.964	0.829
III-7	2.87	0.860	0.838
III-8	2.87	0.819	0.829
III-9	3.07	0.785	0.850
III-10	2.97	1.033	0.845

Scale Reliability Statistics			
	Mean	**SD**	**Cronbach's α**
scale	2.99	0.573	0.854

Lastly, the third scale with 10 items focusing on the challenges of gamified mathematics instruction, also shows good internal consistency with a Cronbach's alpha of 0.854, mean of 2.99, and standard deviation of 0.573.

Summary

Variables	**Reliability Statistics**		**Interpretation**
	Cronbach's Alpha	N of Items	
A. The extent to which gamification play a role in facilitating mathematics instruction	0.892	10	Good
B. The extent to which gamified mathematics instruction influence the learning experience	0.867	10	Good
C. The extent to which challenges arise from gamified mathematics instruction	0.854	10	Good

Note: Cronbach's alpha is interpreted as follows: ≥ 0.90 – Excellent reliability, 0.80 – 0.89 – Good reliability, 0.70 – 0.79 – Acceptable reliability, 0.60 – 0.69 – Questionable reliability, 0.50 – 0.59 – Poor reliability, and < 0.50 – Unacceptable reliability

CONCLUSION

The results of the reliability analysis confirm that the instrument used in this study is highly reliable, making it suitable for evaluating the teachers and students' perspective on the role, influence and challenges of gamified mathematics instruction. The Cronbach's alpha coefficients ranging from 0.854 to 0.892 also indicate strong internal consistency, ensuring that the responses gathered from participants will be stable and consistent, thereby enhancing the validity of the findings. Based on these results, it is recommended to proceed with the administration of the survey questionnaire to collect data for further analysis.

Descriptive Statistics

Descriptive statistics, including the mean, median, standard deviation (SD), and standard error (SE), were computed to summarize the responses of teachers and students across the three core constructs: the role of gamification (*Scale 1*), its influence on learning (*Scale 2*), and the challenges encountered in implementing gamified instruction (*Scale 3*).

Table 2.1 Descriptive Statistics of Teachers and Students by Scale

	Group	N	Mean	Median	SD	SE
Scale 1	Student	270	3.11	3.10	0.410	0.0249
	Teacher	30	3.60	3.60	0.168	0.0308
Scale 2	Student	270	3.11	3.05	0.447	0.0272
	Teacher	30	3.62	3.65	0.185	0.0338
Scale 3	Student	270	3.02	3.00	0.432	0.0263
	Teacher	30	3.30	3.45	0.428	0.0781

Note. SE = Standard Error; SD = Standard Deviation.

The descriptive statistics indicate that both teachers and students generally agree on the positive role of gamification and its influence on learning. However, teachers consistently reported higher mean scores across all three scales—Scale 1 (M = 3.63), Scale 2 (M = 3.62), and Scale 3 (M = 3.30) as compared to students, whose means remained around M = 3.11 for Scales 1 and 2, and M = 3.02 for Scale 3. This suggests that teachers perceived gamified instruction more favorably, particularly in terms of its role and impact. In contrast, students rated the role and influence slightly lower and perceived fewer challenges, as reflected in their lower mean on Scale 3.

Frequency Distributions

To further support the descriptive statistics, the frequency and percentage distributions were analyzed to illustrate how teachers and students responded across various agreement levels on the three constructs: the role of gamification (*Scale 1*), its influence on learning (*Scale 2*), and the challenges encountered (*Scale 3*).

Table 3.1 Frequency Distribution of Teacher Responses by Scale

Response Category	Scale 1 (Role)	Scale 2 (Influence)	Scale 3 (Challenges)
Strongly Agree	29 (96.7%)	–	–
Agree	1 (3.3%)	–	–
Very Influential	–	30 (100.0%)	–
Influential	–	–	–
Very Challenging	–	–	17 (56.7%)
Challenging	–	–	13 (43.3%)

Table 3.2 Frequency Distribution of Student Responses by Scale

Response Category	Scale 1 (Role)	Scale 2 (Influence)	Scale 3 (Challenges)
Strongly Agree	95 (35.2%)	–	–
Agree	157 (58.1%)	–	–
Disagree	16 (5.9%)	–	–
Strongly Disagree	2 (0.7%)	–	–
Very Influential	–	101 (37.4%)	–
Influential	–	148 (54.8%)	–
Fairly Influential	–	20 (7.4%)	–
Not Influential		1 (0.4%)	–
Very Challenging	–	–	74 (27.4%)
Challenging	–	–	163 (60.4%)
Fairly Challenging	–	–	32 (11.9%)
Not Challenging	–	–	1 (0.4%)

Descriptive Statistics of Teachers' and Students' Responses per item

This section presents the item-level descriptive statistics, including response frequencies, weighted means, standard deviations, and their corresponding interpretative categories. The data are grouped under three major constructs: the role of gamification in facilitating mathematics instruction, its influence on learning, and the challenges encountered during implementation.

Table 4.1 Role of Gamification in Facilitating Mathematics Instruction

Category												
Item	**Group**	**Strongly Agree**		**Agree**		**Disagree**		**Strongly Disagree**		**Weighted Mean**	**sd**	**Category**
		f	%	f	%	f	%	f	%			
I-1	Teacher	24	80.0	6	20.0	0	0.0	0	0.0	3.80	0.41	Strongly Agree
	Student	61	22.6	173	64.1	34	12.6	2	0.7	3.09	0.61	Agree
I-2	Teacher	24	80.0	6	20.0	0	0.0	0	0.0	3.80	0.41	Strongly Agree

	Student	75	27.8	162	60.0	29	10.7	4	1.5	3.14	0.65	Agree
I-3	Teacher	18	60.0	10	33.3	2	6.7	0	0.0	3.53	0.63	Strongly Agree
	Student	95	35.2	146	54.1	24	8.9	5	1.9	3.23	0.68	Agree
I-4	Teacher	24	80.0	6	20.0	0	0.0	0	0.0	3.80	0.41	Strongly Agree
	Student	83	30.7	137	50.7	45	16.7	5	1.9	3.10	0.73	Agree
I-5	Teacher	22	73.3	8	26.7	0	0.0	0	0.0	3.73	0.45	Strongly Agree
	Student	107	39.6	147	54.4	16	5.9	0	0.0	3.34	0.59	Strongly Agree
I-6	Teacher	20	66.7	6	20.0	3	10.0	1	3.3	3.50	0.82	Strongly Agree
	Student	92	34.1	145	53.7	26	9.6	7	2.6	3.19	0.71	Agree
I-7	Teacher	13	43.3	17	56.7	0	0.0	0	0.0	3.43	0.50	Strongly Agree
	Student	51	18.9	142	52.6	62	23.0	15	5.6	2.85	0.79	Agree
I-8	Teacher	18	60.0	12	40.0	0	0.0	0	0.0	3.60	0.50	Strongly Agree
	Student	77	28.5	157	58.1	28	10.4	8	3.0	3.12	0.70	Agree
I-9	Teacher	14	46.7	16	53.3	0	0	0	0.0	3.47	0.51	Strongly Agree
	Student	52	19.3	167	61.9	38	14.1	13	4.8	2.96	0.73	Agree
I-10	Teacher	19	63.3	11	36.7	0	0.0	0	0.0	3.63	0.49	Strongly Agree
	Student	85	31.5	139	51.5	37	13.7	9	3.3	3.11	0.76	Agree

Note: 3.26-4.00- Strongly Agree, 2.51-3.25-Agree, 1.76-2.50- Disagree**,** 1.00-1.75-Strongly Disagree

Table 4.2 Influence of Gamified mathematics instruction

Category												
Item	**Group**	**Very Influential**		**Influential**		**Fairly Influential**		**Not Influential**		**Weighted Mean**	**sd**	**Category**
		f	%	f	%	f	%	f	%			
II-1	Teacher	22	73.3	8	26.7	0	0.0	0	0.0	3.73	0.45	Very Influential
	Student	70	25.9	153	56.7	40	14.8	7	2.6	3.06	0.71	Influential
II-2	Teacher	22	73.3	8	26.7	0	0.0	0	0.0	3.73	0.45	Very Influential
	Student	93	34.4	139	51.5	33	12.2	5	1.9	3.19	0.71	Influential
II-3	Teacher	18	60.0	12	40.0	0	0.0	0	0.0	3.60	0.50	Very Influential

	Student	95	35.2	141	52.2	30	11.1	4	1.5	3.21	0.69	Influential
II-4	Teacher	21	70.0	9	30.0	0	0.0	0	0.0	3.70	0.47	Very Influential
	Student	95	35.2	116	43.0	43	15.9	16	5.9	3.07	0.86	Influential
II-5	Teacher	15	50.0	15	50.0	0	0.0	0	0.0	3.50	0.51	Very Influential
	Student	98	36.3	125	46.3	40	14.8	7	2.6	3.16	0.77	Influential
II-6	Teacher	17	56.7	13	43.3	0	0.0	0	0.0	3.57	0.50	Very Influential
	Student	90	33.3	140	51.9	34	12.6	6	2.2	3.16	0.72	Influential
II-7	Teacher	18	60.0	12	40.0	0	0.0	0	0.0	3.60	0.50	Very Influential
	Student	61	22.6	138	51.1	59	21.9	12	4.4	2.92	0.79	Influential
II-8	Teacher	20	66.7	10	33.3	0	0.0	0	0.0	3.67	0.48	Very Influential
	Student	102	37.8	115	42.6	45	16.7	8	3.0	3.15	0.80	Influential
II-9	Teacher	17	56.7	13	43.3	0	0.0	0	0.0	3.57	0.50	Very Influential
	Student	64	23.7	154	57.0	40	14.8	12	4.4	3.00	0.75	Influential
II-10	Teacher	17	56.7	13	43.3	0	0.0	0	0.0	3.57	0.50	Very Influential
	Student	97	35.9	133	49.3	28	10.4	12	4.4	3.17	0.78	Influential

Note*: 3.26-4.00-Very Influential, 2.51-3.25-Influential, 1.76-2.50-Fairly Influential***,** *1.00-1.75-Not Influential*

Table 4.3 Challenges of Gamified mathematics instruction

Category												
Item	**Group**	**Very Challenging**		**Challenging**		**Fairly Challenging**		**Not Challenging**		**Weighted Mean**	**sd**	**Category**
		f	%	f	%	f	%	f	%			
III-1	Teacher	13	43.3	10	33.3	7	23.3	0	0.0	3.20	0.81	Challenging
	Student	69	25.6	127	47.0	65	24.1	9	3.3	2.95	0.79	Challenging
III-2	Teacher	12	40.0	14	46.7	2	6.7	2	6.7	3.20	0.85	Challenging
	Student	58	21.5	156	57.8	48	17.8	8	3.0	2.98	0.72	Challenging
III-3	Teacher	14	46.7	12	40.0	4	13.3	0	0.0	3.33	0.71	Very Challenging
	Student	84	31.1	130	48.1	48	17.8	8	3.0	3.07	0.78	Challenging
III-4	Teacher	13	43.3	10	33.3	5	16.7	2	6.7	3.13	0.94	Challenging
	Student	69	25.6	101	37.4	78	28.9	22	8.1	2.80	0.91	Challenging
III-5	Teacher	15	50.0	13	43.3	2	6.7	0	0.0	3.43	0.63	Very Challenging
	Student	76	28.1	140	51.9	42	15.6	12	4.4	3.04	0.78	Challenging
III-6	Teacher	17	56.7	9	30.0	3	10.0	1	3.3	3.40	0.81	Very Challenging

	Student	81	30.0	131	48.5	49	18.1	9	3.3	3.05	0.78	Challenging
III-7	Teacher	12	40.0	13	43.3	5	16.7	0	0.0	3.23	0.73	Challenging
	Student	69	25.6	152	56.3	42	15.6	7	2.6	3.05	0.72	Challenging
III-8	Teacher	13	43.3	9	30.0	8	26.7	0	0.0	3.17	0.83	Challenging
	Student	84	31.1	132	48.9	41	15.2	13	4.8	3.06	0.81	Challenging
III-9	Teacher	14	46.7	15	50.0	1	3.3	0	0.0	3.43	0.57	Very Challenging
	Student	86	31.9	130	48.1	40	14.8	14	5.2	3.07	0.82	Challenging
III-10	Teacher	18	60.0	9	30.0	1	3.3	2	6.7	3.43	0.86	Very Challenging
	Student	90	33.3	127	47.0	43	15.9	10	3.7	3.10	0.80	Challenging

Note: *3.26-4.00-Very Challenging, 2.51-3.25-Challenging, 1.76-2.50-Fairly Challenging, 1.00-1.75-Not Challenging*

Test for Normality

To assess whether the data distributions for each construct met the assumptions of normality, the Shapiro-Wilk test was applied to the scores of both teachers and students. A p-value less than 0.05 indicates a significant deviation from normality, justifying the use of non-parametric statistical tests such as the Mann-Whitney U test.

Variables	**Group**	**Shapiro-Wilk**	
		W	**p-value**
1. The extent to which gamification play a role in facilitating mathematics instruction	Teachers	0.937	0.076*
	Students	0.967	< 0.001
2. The extent to which gamified mathematics instruction influence the learning experience	Teachers	0.952	0.196*
	Students	0.982	0.002
3. The extent to which challenges arise from gamified mathematics instruction	Teachers	0.928	0.043
	Students	0.990	0.066*

Table 5.1 Shapiro-Wilk Test of Normality

Note. *p > 0.05 indicates no significant deviation from normality.

Results indicated that for Scale (1) the extent to which gamification plays a role in facilitating mathematics instruction, the distribution was approximately normal for teachers (p = .076) but not for students (p < .001). For Scale 2, which is on the influence of gamified instruction on the learning experience, the teachers' scores were normally distributed (p = .196), while the students' scores deviated significantly from normality (p = .002). For Scale 3 which is on the extent to which challenges arise from gamified instruction, teachers' responses violated normality (p = .043), whereas students' responses did not (p = .066).

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Given that at least one group per variable showed significant deviation from normality, the assumption of normality for parametric tests was not fully met. Consequently, the Mann–Whitney U test, a nonparametric alternative to the independent samples t-test, was selected as the appropriate statistical method to compare teachers and students across all three variables.

Test of Significant Difference

To compare the perceptions of teachers and students regarding gamified mathematics instruction, the Mann-Whitney U test was employed. This non-parametric test was used due to violations of normality assumptions. The results below include U values, significance levels, mean ranks for each group, and effect sizes based on rank biserial correlation.

	Indicator	**Group**	**Mean Rank**	**U**	**p-value**	**Interpretation**	**Effect Size r**
1.	Role of gamification in facilitating mathematics instruction	Teachers	252.93	977	<0.001	There is a significant difference	0.759
		Students	139.12				
2.	Influence of gamified mathematics instruction	Teachers	243.40	1263	<0.001	There is a significant difference	0.688
		Students	140.18				
3.	Challenges of gamified mathematics instruction	Teachers	195.82	2691	0.002	There is a significant difference	0.336
		Students	145.46				

Table 6.1 Mann-Whitney U Test Results and Effect Sizes on the Role, Influence, and Challenges of Gamified Mathematics Instruction

Note. *Effect sizes are based on rank biserial correlation. Interpretation follows Cohen's (1988) guidelines: 0.10–0.29 = small, 0.30–0.49 = medium, ≥ 0.50 = large.*

The Mann-Whitney U tests revealed statistically significant differences between teachers and students across all three scales: role, influence, and challenges of gamified mathematics instruction. Teachers had consistently higher mean ranks in all cases, indicating more favorable or intense responses. Effect sizes ranged from 0.336 to 0.759, falling within the moderate to large range based on Cohen's guidelines. These findings confirm the existence of notable perceptual gaps between the two groups, particularly in their views on the role and influence of gamification in teaching mathematics.

Sample Size Determination (Slovin's Formula)

In selecting the student respondents, Slovin's formula was used to determine the sample size. Since there were 830 students in school C, the following is the computation

$$n = \frac{N}{1 + Ne^2}$$

where:

- n = sample size

- N = population size
- e = acceptable margin of error

$$n = \frac{830}{1 + 830(0.05^2)}$$

$$n = \frac{830}{1 + 830(0.0025)}$$

$$n = \frac{830}{1 + 2.075}$$

$$n = \frac{830}{3.075}$$

$$\boldsymbol{n = 269.92}$$

Therefore, a sample size of 270 is valid using a 5% margin of error.

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Appendix E

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INVESTIGATING TEACHERS' AND STUDENTS' PERSPECTIVES ON GAMIFIED MATHEMATICS INSTRUCTION: ROLES, IMPACTS AND CHALLENGES

by Shiela Mae B. Dimpas

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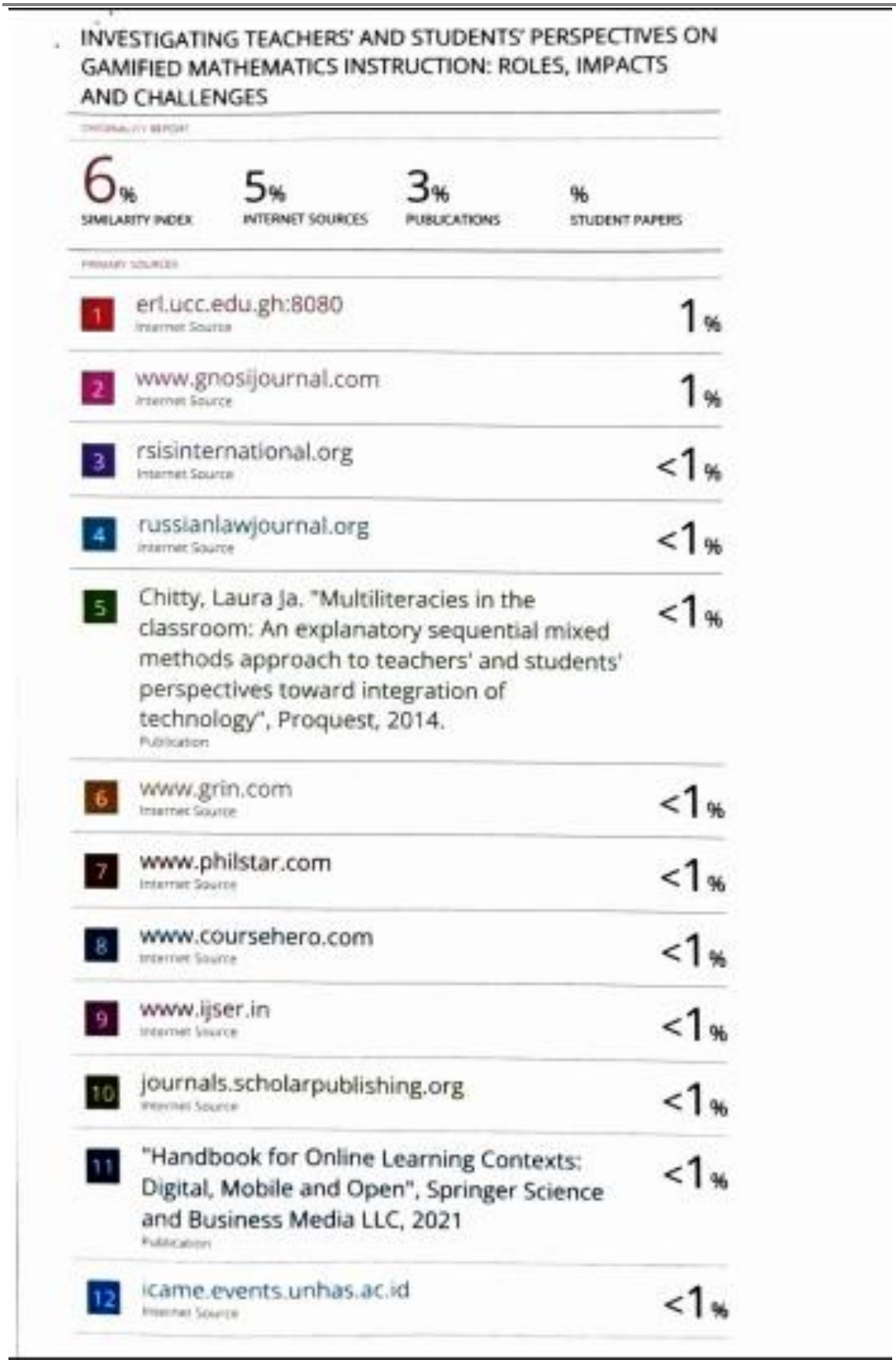

INVESTIGATING TEACHERS' AND STUDENTS' PERSPECTIVES ON GAMIFIED MATHEMATICS INSTRUCTION: ROLES, IMPACTS AND CHALLENGES

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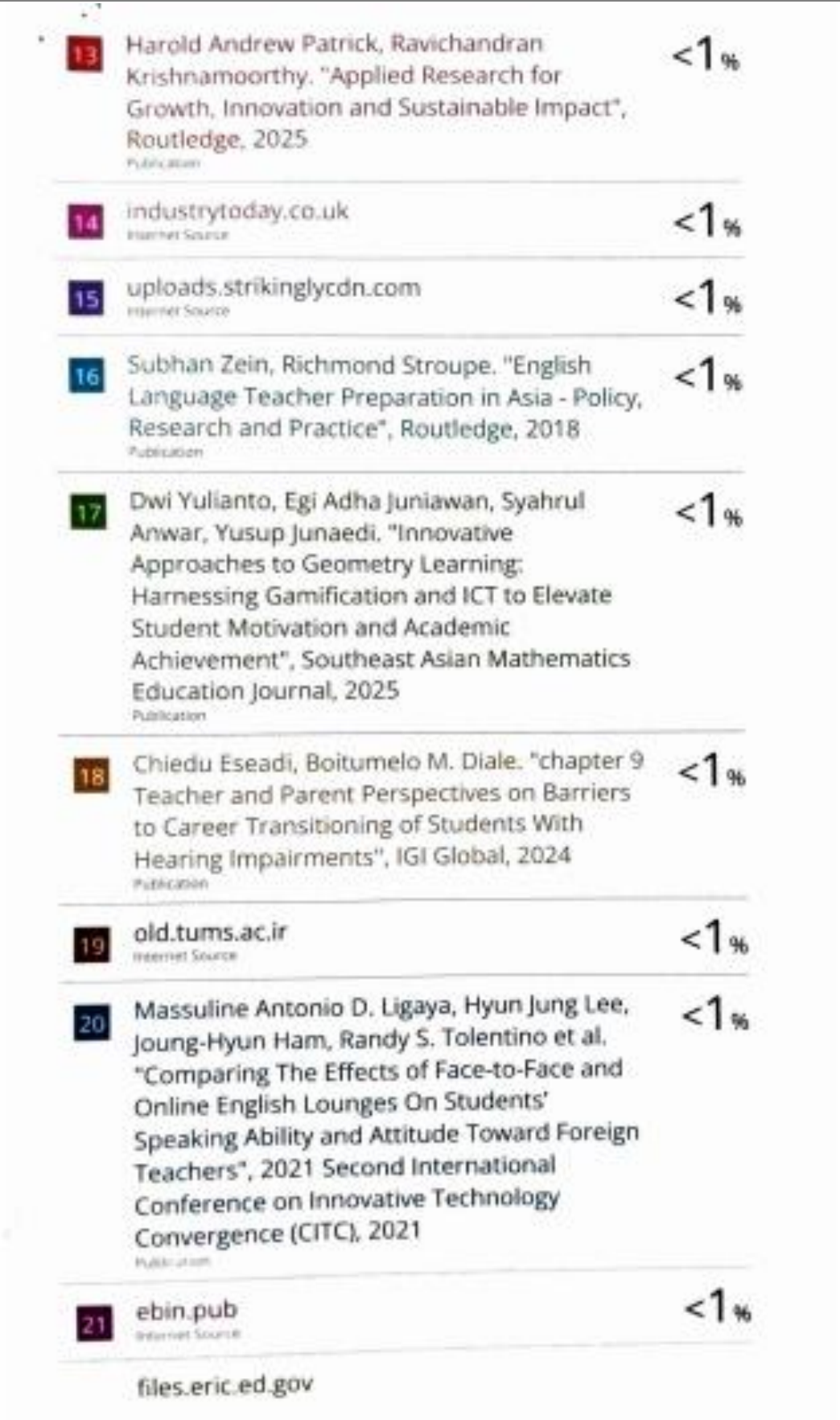

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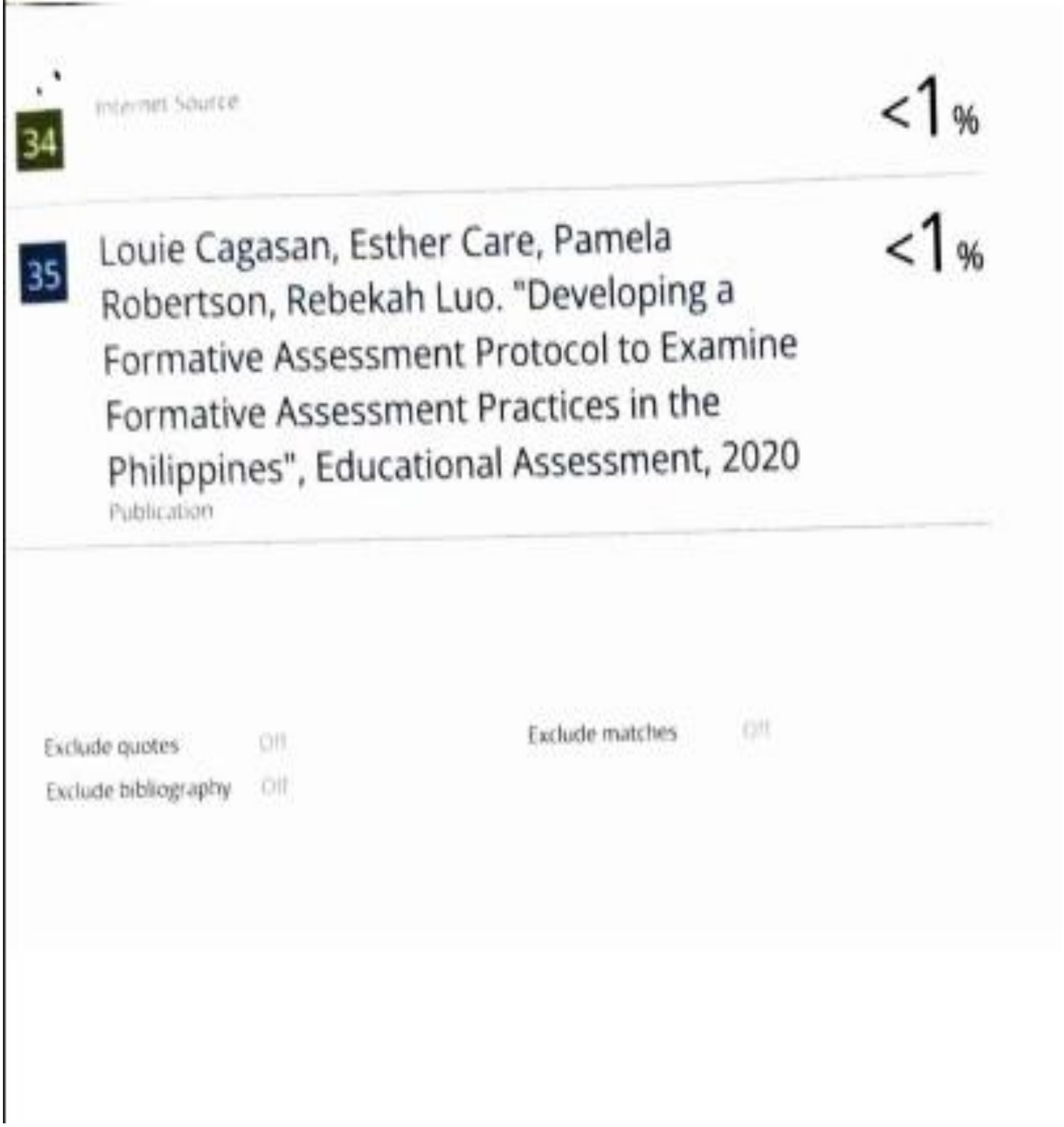

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CURRICULUM VITAE

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PERSONAL INFORMATION

Date of Birth : November 23, 1998

Place of Birth : Tugbongan, Consolacion, Cebu

Civil Status : Single

Citizenship : Filipino

Religion : Roman Catholic

Father's Name: Pedro J. Dimpas

Mother's Name : Fely B. Dimpas

EDUCATIONAL BACKGROUND

Graduate Studies : **Master of Arts in Education**

Major in Mathematics

Cebu Technological University, Main Campus

M.J. Cuenco Ave., Cebu City, Philippines

Tertiary Level : **Bachelor of Secondary Education**

Major in Mathematics

Cebu Technological University, Main Campus

M.J. Cuenco Ave., Cebu City, Philippines

2018 – 2019

Secondary Level : **Tugbongan National High School**

Brgy. Tugbongan, Consolacion, Cebu

2014 - 2015

Primary Level : **Tugbongan Elementary School**

Brgy. Tugbongan, Consolacion, Cebu

2010 - 2011

PROFESSIONAL CAREER ELIGIBILITY

- **Licensed Professional Teacher-Mathematics**

September 2021

Passed

WORK EXPERIENCE

- **Teacher I (SG 11)**

Junior High School-Department of Education

Cebu Province Division, Consolacion I

June 2023 – Present

- **Homebased ESL Teacher**

Native Camp

January 2022 – October 2023

- **Administrative Assistant II (JO)**

Vicente Sotto Memorial Medical Center

B. Rodriguez St., Cebu City, 6000, Cebu

January 2022 – December 2022

- **Homebased ESL Teacher**

Native Camp

June 2020 – January 2022

- **ESL Teacher**

Golden Great Peak English Incorporated

Unit 3 ABC 3/F JDN Square, P. Remedio St., Banilad, Mandaue City, Cebu

August 2019 – May 2020

TRAININGS AND SEMINARS ATTENDED

- **School-based Training of Teachers on MATATAG Curriculum**

Consolacion Central School
May 13 – 17, 2024

- **Mid-Year Performance Review and Evaluation School-Based INSET for Teachers**

Consolacion National High School

January 24-26 & 29-30, 2024