

Gamified Technology-Based Learning Materials and the Reading Proficiency of Grade 5 Pupils of Dangdangla Elementary School: A Descriptive-Experimental One-Group Pretest-Posttest Research

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Abstract

The goal of this study is to investigate the effectiveness of Gamified Technology-Based Learning Materials on vocabulary skills of Grade 5 pupils at Dangdangla Elementary School. Utilizing an experimental research design, the study involved 35 pupils who underwent an 18-session intervention using gamified learning strategies. A questionnaire, validated by experts, was employed to assess vocabulary proficiency before and after the intervention. Pre-intervention results indicated a satisfactory level of vocabulary skills, with notable weaknesses in configuration clues. Post-intervention analysis revealed significant improvements across all vocabulary domains, particularly in synonyms and context clues, with an overall mean score reflecting a very satisfactory level of vocabulary proficiency. Furthermore, statistical treatment using t-tests confirmed the effectiveness of the gamified materials, demonstrating highly significant differences in vocabulary skills before and after the intervention. Findings underscored the importance of incorporating engaging, technology-based resources in language instruction to enhance vocabulary acquisition. In the end, the study concluded that using game-based learning materials helped Grade 5 pupils improved their vocabulary. These materials have been checked by experts and meet school standards. Students enjoyed learning with games and showed better vocabulary skills across all areas. Recommendations included integrating gamified technology-based learning materials into regular classroom instruction, especially in vocabulary lessons to assess the effectiveness in enhancing the learners' engagement and learning outcomes, continue using gamification and consider expanding it to other learning areas.

Keywords: *Gamified Technology-Based Learning, Vocabulary Skills, Experimental Research Design, Intervention, Language Instructions*



I. INTRODUCTION

Background and Rationale

English is one of the official languages of the Philippines and serves as the medium of instruction, communication, and professional interaction. However, studies and recent reports indicate a gradual decline in English proficiency among learners despite the country's long-standing exposure to the language. At the elementary level, reading and vocabulary remain pressing challenges, as many pupils demonstrate limited interest in reading and struggle with comprehension due to inadequate vocabulary knowledge.

In response to this, educational technology and gamification have been explored as innovative approaches to improve language learning. Gamified learning integrates elements of games—such as rewards, challenges, and collaboration—into educational contexts to boost learner motivation, engagement, and performance. This study was conducted to examine the effectiveness of gamified technology-based learning materials in enhancing the vocabulary proficiency of Grade 5 pupils at Dangdangla Elementary School.

Review of Related Literature

Previous studies emphasize that Information and Communication Technology (ICT) plays a crucial role in enhancing teaching and learning. ICT tools such as online games, interactive applications, and gamified platforms have been found to improve reading, writing, listening, and speaking skills.

Gamification has been defined as the application of game elements in non-game contexts to foster engagement and motivation (Deterding et al., 2011; Kapp, 2012). Research shows that gamified learning increases learners' vocabulary acquisition, improves motivation, and sustains interest in reading activities (Hamari & Hassan, 2019; Waluyo, 2021). Studies also confirm that learners exposed to gamified interventions demonstrate better retention, comprehension, and critical thinking compared to those taught with traditional methods (Wichadee & Pattanapichet, 2018).

In language learning, gamified tools provide repeated exposure to vocabulary, encourage contextualized understanding, and supply immediate feedback. These factors make gamified instruction particularly effective for young learners who benefit from interactive and engaging strategies. Despite these benefits, Filipino pupils still face challenges in vocabulary development, necessitating innovative solutions such as gamified technology-based learning materials.

Statement of the Problem

This study aimed to determine the effectiveness of Gamified Technology-Based Learning Materials as an intervention in enhancing the vocabulary skills of Grade 5 pupils of Dangdangla Elementary School. Specifically, it sought to answer the following questions:

1. What is the level of vocabulary skills of the Grade 5 pupils before the use of gamified technology-based learning materials?
2. What is the level of validation of the gamified technology-based learning materials?
3. Is there a significant agreement among experts in the evaluation of the gamified technology-based learning materials?



4. What is the level of vocabulary skills of the Grade 5 pupils after the use of gamified technology-based learning materials?
5. Is there a significant difference in the vocabulary skills of the pupils before and after the intervention?

Objectives and Research Hypotheses

Capping off objectives and research hypotheses, the researcher target to verify the following:

Objectives

1. To evaluate the vocabulary skills of Grade 5 pupils before and after the intervention;
2. To confirm the quality of the gamified technology-based learning materials through expert review;
3. To find out how much agreement there is among experts in their evaluation of the learning materials;
4. To determine if the intervention leads to clear improvement in pupils' vocabulary proficiency.

Hypotheses

1. There is no significant difference in the vocabulary skills of Grade 5 pupils before and after the use of gamified technology-based learning materials.
2. The level of validation of the gamified technology-based learning materials is not significantly high based on expert evaluation.
3. There is no significant agreement among experts in their evaluation of the materials.

Pupils will not show significant improvement in vocabulary skills after the intervention.

II. MATERIALS and METHODS

This part of manuscript focuses on research design, participants of the study, instruments, procedure, and data analysis.

Research Design

The study used a descriptive–experimental one-group pretest–posttest design to assess how effective gamified technology-based learning materials are in improving the vocabulary skills of Grade 5 pupils. A pretest was first given to identify the pupils' initial level of vocabulary proficiency. This was followed by an intervention using gamified learning activities, and then a posttest was administered to measure the progress made after the intervention.

Participants

Thre participants were a total enumeration of thirty-five (35) Grade 5 pupils enrolled at Dangdangla Elementary School during the school year 2023–2024. The group consisted of 18 males and 17 females. In addition, five evaluators were included to validate the gamified learning materials: two faculty members from Abra State Institute of Science and Technology (ASIST) and three Master Teachers from the Department of Education, Schools Division of Abra.



Instruments

Two main instruments were used in this research:

1. **Gamified Technology-Based Learning Materials** – created and adapted by the researcher. These included interactive activities aimed at improving vocabulary skills such as antonyms, synonyms, configuration clues, and context clues.
2. **Questionnaire** – validated by experts and used as the primary tool to measure pupils' vocabulary skills before and after the intervention.

For validation, the evaluators used a DepEd Evaluation Sheet for Reading Resources and a Validation Tool for Research Instruments to check the accuracy, relevance, technical quality, and usability of the materials. The reliability of the instruments was tested through the Split-half Method.

Procedure

Before the conduct of this research, permission was secured from school authorities. The following steps were carried out:

1. Pretest Administration – Pupils first took a vocabulary test to determine their initial level of proficiency;
2. Intervention – An 18-session gamified learning program was implemented, with each session lasting 30 minutes. These sessions included interactive activities designed to build and strengthen vocabulary skills;
3. Posttest Administration – After the intervention, the same test was given again to measure any improvement in the pupils' performance;
4. Validation of Materials – Five expert evaluators reviewed the gamified technology-based learning materials using official DepEd validation tools.

Data Analysis

Collected data were organized, tabulated, and analyzed using the following statistical tools:

- Mean – used to identify the pupils' level of vocabulary skills before and after the intervention;
- Validation Tool (DepEd Evaluation Sheet) – applied to evaluate the effectiveness and overall quality of the learning materials;
- T-test for Dependent Samples – used to check whether there were clear differences in vocabulary skills before and after the intervention;
- Cohen's Kappa Statistics – applied to measure the degree of agreement among the evaluators in reviewing the gamified materials.

All calculations were done using standard statistical software to ensure both accuracy and reliability.

III. RESULT

1. Vocabulary Skills Before the Intervention

Table 1 shows the pretest results of pupils' vocabulary proficiency across four domains: antonyms, synonyms, configuration clues, and context clues.

Table 1. Level of Vocabulary Skills of the Respondents before using Gamified Technology-Based Learning Materials

Vocabulary Skills	No. of Items	Mean (\bar{X})	Descriptive Rating
Antonyms	10	4.09	Satisfactory
Synonyms	10	5.57	Satisfactory
Configuration Clues	5	1.69	Fair
Context Clues	15	7.14	Satisfactory
As a Whole	40	18.49	Satisfactory

Norms:

Statistical Limits				Descriptive Rating
For 5 items	For 10 items	For 15 items	For 40 items	
4.00 – 5.00	8.00 – 10.00	12.00 – 15.00	32.00 – 40.00	Excellent (E)
3.00 – 3.99	6.00 – 7.99	9.00 – 11.99	24.00 – 31.99	Very Satisfactory (VS)
2.00 – 2.99	4.00 – 5.99	6.00 – 8.99	16.00 – 23.99	Satisfactory (S)
1.00 – 1.99	2.00 – 3.99	3.00 – 5.99	8.00 – 15.99	Fair (F)
0.00 – 0.99	0.00 – 1.99	0.00 – 2.99	0.00 – 7.99	Poor (P)

The vocabulary proficiency of students prior to using gamified learning resources was evaluated, with an overall mean score of 18.49, which is considered satisfactory. The students showed moderate proficiency in various areas, including Context Clues ($\bar{X} = 7.14$), Antonyms ($\bar{X} = 4.09$), and Synonyms ($\bar{X} = 5.57$). However, they performed poorly in Configuration Clues, scoring a significantly lower mean of 1.69.

This suggested that while students had a fair grasp of basic vocabulary, they struggled with understanding word structures such as root words, prefixes, and suffixes. This finding aligned with existing research that highlights a lack of morphological awareness among learners (e.g., Ahmed & Al-Khazraji, 2021; Yıldız & Karakaya, 2022). Additionally, it underscored the potential effectiveness of gamified learning environments in improving vocabulary skills, particularly in areas where students face challenges, as supported by studies like Lee & Chen (2023).

The results point to the need for target interventions, particularly in teaching students to recognize and use structural clues in words. Despite an overall satisfactory performance, the area of Configuration Clues required more focused instructional attention to help students strengthen their abilities in this vocabulary skill. Regular practice across all vocabulary areas, especially in structural word clues, could potentially elevate student performance from satisfactory to good or very satisfactory levels. This baseline data is expected to serve as a point of comparison for evaluating the impact of the gamified learning intervention on students' vocabulary proficiency in the future.

2. Validation of Gamified Learning Materials

Table 2.a. Evaluation on the Gamified Technology-Based Learning Materials in Terms of Content

Indicators	Mean	Descriptive Rating (DR)
1. The RR is/are appropriate for the learner's reading ability level	3.60	Very Satisfactory
2. The RR is appropriate for the intended Reading Profile (refer to National Reading Program (NPR) Policy Guidelines)	4.00	VS
3. The RR purposively promotes literacy	4.00	VS
4. The RR is consistent with the DepEd social content guidelines	3.80	VS
5. The RR enhances the development of desirable values, traits, and Skills	3.60	VS
The plot/story line/reading selection/article:	3.93	VS
6.1 Is appropriate to the intended readers and emphasizes the moral of the lesson	4.00	VS
6.2 Stimulates critical thinking and has a logical flow	4.00	VS
6.3 Ends with a resolution of the conflict introduced and emphasizes the moral of the lesson	3.80	VS
The visuals:	4.00	VS
7.1 Clarify the story	4.00	VS
7.2 Are easily recognizable, attractive, and appealing	4.00	VS
7.3 Are appropriate to the target readers	4.00	VS
8. Adequate warning/cautionary notes are provided in topics and activities where safety and health are of concern	3.60	VS
Overall	3.82	Very Satisfactory (VS)

Legend:

- 1.00 – 1.75 = Poor 1.76 – 2.50 = Fair
- 2.51 – 3.25 = Satisfactory 3.26 – 4.00 = Very Satisfactory

Table 2.a on the previous page shows the level of validation on the Gamified Technology-Based Learning Materials in Terms of Content. The materials received an overall mean score of 3.82 for this criterion, with corresponding descriptive rating of very satisfactory.

It was determined that the reading resources (RR) were appropriate for the learner's reading ability level. It was also clearly shown that the materials were purposively promoted literacy, consistent with the DepEd social content guidelines, and enhanced the development of desirable values, traits, and skills.

In terms of the plot/story line/reading selection/article, the materials were evaluated and validated which received significant rating of very satisfactory. This proved that the Gamified Technology-Based Learning Materials were appropriate to the intended readers and emphasizes the moral of the lesson, and stimulated critical thinking and had a logical flow.



The gamified technology-based learning materials visual components received high scores as well which is 4.00 with a descriptive score of Very Satisfactory. The visuals were found to clarify the story, be appealing, and appropriate for the target audience. This finding was corroborated by the work of Lee & Cho (2020), who noted that visually engaging materials are crucial for capturing learners' attention and enhancing their understanding of educational content, indicating that they are not only acceptable and appealing but also useful for improving comprehension. The teachings also took health and safety into account, exhibiting accountability in the production of material. The inclusion of safety and health cautionary notes (mean = 3.60) highlighted the materials' commitment to responsible content design, a practice emphasized in the recent guidelines on educational safety (Pineda, 2021).

In conclusion, the evaluation revealed that the gamified learning materials were well-designed in terms of content, aligning with national policies, promoting critical thinking, and effectively using visuals to enhance learning. These results were supported by recent studies highlighting the impact of well-structured educational technology on learner engagement, critical thinking, and overall academic performance.

Table 2.b Evaluation on the Gamified Technology-Based Learning Materials in Terms of Format and Technical Design/Specifications

Indicators	Mean	Descriptive Rating (DR)
1. Volume and Quality of sound is appropriate.	3.80	Very Satisfactory (VS)
2. Audio enhances understanding of the concept.	3.40	Very Satisfactory (VS)
3. Pacing is effective and appropriate to instructional purposes.	4.00	Very Satisfactory (VS)
4. Audio–visual effects (music, sound, graphic, etc.) are appropriate and effective for instructional purposes.	3.80	Very Satisfactory (VS)
5. There is complete synchronization of audio with the visuals, if any.	3.60	Very Satisfactory (VS)
6. Speech and narration (correct pacing, intonation, and pronunciation) is clear and can be easily understood.	3.60	Very Satisfactory (VS)
7. The material can easily and independently be used.	4.00	Very Satisfactory (VS)
8. The design allows the target user to navigate freely through the material.	4.00	Very Satisfactory (VS)
9. The material will run using minimum system requirements.	4.00	Very Satisfactory (VS)
10. The program is free from technical problems.	3.80	Very Satisfactory (VS)
Overall	3.80	Very Satisfactory (VS)

Legend: 1.00 – 1.75 = Poor 1.76 – 2.50 = Fair
 2.51 – 3.25 = Satisfactory 3.26 – 4.00 = Very Satisfactory

As shown in Table 2.b, the format and technological design of the gamified technology-based learning materials received an overall mean rating of 3.80, falling into the "Very Satisfactory" (VS) range. This suggests that the technical execution and usability of the materials were generally well accepted. The highest ratings were given to aspects such as effective pacing, ease of independent use, navigation flexibility, and the ability to run on systems with minimum technical requirements, all of which received a score of 4.00. This suggested that the materials were user-friendly, easily accessible, and technically strong. However, the lowest rating was for the indicator about how well the audio helps with understanding the concepts, which scored 3.40, suggesting there is room for improvement in this area. The overall score of 3.80 showed that the materials were generally very effective.

The results implied that the gamified materials were well-designed and can engage students, and promoted independent learning. The slight concern with the audio suggested that

improvements could be made to better support learning. These findings were supported by recent studies, such as those by Aguilar and Rueda (2021) and Wang et al. (2020), which highlighted the importance of clear audio-visual elements in engaging students and improving learning. Studies by Huang and Hew (2019) and Hamari et al. (2019) also emphasized that easy-to-use materials and low technical requirements were important for successful use, which matched the positive feedback on these aspects in this study. Overall, the materials have great potential to improve student motivation and learning, with some minor improvements needed for the audio.

Table 2.c Evaluation on the Gamified Technology-Based Learning Materials in Terms of Presentation and Organization

Indicators	Mean (\bar{x})	Descriptive Rating (DR)
1. Presentation is engaging, interesting, and understandable by the intended readers	4.00	Very Satisfactory (VS)
2. There is logical and smooth flow of ideas	4.00	VS
3.0 Content Readability and Language Use	4.00	VS
3.1 Readability Index	4.00	VS
3.2 Language used	4.00	VS
3.3 Text types / structure / organization	4.00	VS
4. For non-print RRs, the length of the video is appropriate to the attention span of the learner	4.00	VS
5. Visual presentations (non-text) are clear and easy to interpret	4.00	VS
6. Screen displays (text) are uncluttered, easy to read, and aesthetically pleasing	4.00	VS
7. The user support materials (if any) are Effective	4.00	VS
8. Visuals provide accurate representation of the concept discussed	3.60	VS
Overall	3.95	Very Satisfactory (VS)

Legend:

1.00–1.75 = Poor

2.51–3.25 = Satisfactory

1.76–2.50 = Fair

3.26–4.00 = Very Satisfactory

Table 2.c on the previous page reveals that the gamified technology-based learning materials were very satisfactory in terms of their presentation and organization. The materials received the total mean rating of 3.95, which was "Very Satisfactory". Each indicator obtained a high rating; the majority received a perfect 4.00. Research has consistently emphasized the importance of engaging, clear, and user-friendly presentation styles in enhancing learner

outcomes. For instance, studies by Huang et al. (2020) and Nguyen et al. (2021) highlighted that well-structured and aesthetically pleasing materials significantly improve student engagement and comprehension. These studies found that when digital learning resources are presented in an organized, logical manner, learners are better able to grasp complex concepts and retain information. The high ratings for language use and readability in the current study also reflect broader trends observed in recent literature. Research by Lee (2021) emphasized that the readability of content is directly linked to its effectiveness in learner comprehension, particularly in self-paced, technology-driven learning contexts.

In connection to a study by Kalay and Arıkan (2023) focused on the impact of gamified instructional materials on learners' perceived motivation and academic achievement. The results revealed that students perceived gamified materials as more engaging and motivating, leading to enhanced academic performance. This underscored the importance of aligning instructional content with engaging game elements to maximize learning effectiveness. Overall, the gamified technology-based learning materials were skillfully crafted, carefully arranged, and successful at conveying instructional material.

Table 2.d Evaluation of the Gamified Technology-Based Learning Materials in Terms of Accuracy and Recency of Information

Indicators	Mean (\bar{x})	Descriptive Rating (DR)
1. The RR is free from conceptual errors	4.00	Very Satisfactory
2. The RR is free from factual errors	4.00	Very Satisfactory
3. The RR is free from grammatical and computational errors	3.80	Very Satisfactory
4. Visuals provide accurate representation of the concept discussed	4.00	Very Satisfactory
Overall	3.95	Very Satisfactory

Legend:

1.00 – 1.75 = Poor

1.76 – 2.50 = Fair

2.51 – 3.25 = Satisfactory

3.26 – 4.00 = Very Satisfactory

Table 2.d shows the result of the evaluation of the gamified learning materials based on accuracy and recency. First, the materials were found to be free from conceptual and factual errors, scoring 4.00 ("Very Satisfactory"). This matched research from recent studies, which highlight that error-free content was essential for trust and effectiveness in learning tools (Smith

& Johnson, 2020; Lee et al., 2021). Next, the materials scored 3.80 for grammatical and computational errors, which still falls under "Very Satisfactory." This result was consistent with studies by Garcia and Brown (2022) and Wong et al. (2023), who noted that minor errors don't significantly impact the learning experience as long as the content was accurate overall.

The materials received a 4.00 for visual accuracy, indicating that the images adequately conveyed the lessons. This was consistent with studies by Chang et al. (2020) and Patel & Singh (2021), which demonstrated that effective visual aids, particularly in gamified learning, aid in understanding and maintaining student engagement.

Lastly, the materials' total score of 3.95 indicated that they were well-designed and satisfy the requirements outlined in recent research by Thomas and Williams (2024). The findings implied that these resources were useful and offer a top-notch educational experience.

Table 2.e Overall Result on The Evaluation of Gamified Technology-Based Learning Materials

Area of Evaluation	Mean (\bar{x})	Descriptive Rating
1. Content	3.82	Very Satisfactory
2. Format and Technical Design/Specifications	3.80	Very Satisfactory
3. Presentation and Organization	3.95	Very Satisfactory
4. Accuracy and Recency of Information	3.95	Very Satisfactory
Overall	3.88	Very Satisfactory

Legend:

1.00 – 1.75 = Poor

1.76 – 2.50 = Fair

2.51 – 3.25 = Satisfactory

3.26 – 4.00 = Very Satisfactory

Table 2.e shows the overall result on the evaluation of Gamified Technology-Based Learning Materials. The evaluation of the gamified technology-based learning materials across content, technical design, presentation, and accuracy yielded consistently "Very Satisfactory" ratings, with mean scores ranging from 3.80 to 3.95. Findings indicate that the materials are pedagogically sound, engaging, and accessible, aligning well with current standards in digital learning. High scores in presentation and accuracy suggest strong instructional design and up-to-date, error-free content. These results are consistent with recent studies emphasizing the effectiveness of gamified and multimedia-based instruction in enhancing student motivation, engagement, and learning outcomes (Alsubhi et al., 2021; Akçayır & Akçayır, 2020). Minor

areas for improvement—such as enhancing audio-visual synchronization and ensuring the inclusion of safety-related content—mirror concerns noted by Omodan and Ige (2022), who stressed the importance of clear design and learner protection in digital platforms. Overall, the materials demonstrate strong potential as effective tools for 21st-century learning, corroborating the growing body of research supporting technology-enhanced, learner-centered education.

3. Agreement of Evaluators

Table 3. Significant Agreement in the Evaluation of Gamified Technology-Based Learning Materials

Factor	KAPPA	Significance
Content	0.421*	0.05
Format and Technical Design/ Specifications	0.562*	0.05
Presentation and Organization	0.211*	0.040
Accuracy and Recency of Information	0.538*	0.039

Legend: * - 0.05 level of significance

** - 0.01 level of significance

Table 3 on the previous page shows the agreement of evaluators on four evaluation criteria (content, format and technical design/specifications, presentation and organization, and correctness and recency of information). The degree of agreement was determined through the use of the Cohen's Kappa statistics.

The calculated Kappa score for Content was 0.421, which indicate a level of significance at 0.05 indicating a moderate level of agreement among the evaluators and being statistically significant. Five years ago, a related study by Dela Cruz (2020) found that similar content-based gamified materials had a slightly lower Kappa value of 0.384. This suggested that the current study's pedagogical alignment and content coherence were slightly better.

The greatest agreement was found between Format and Technical Design/Specifications, with a Kappa value of 0.562 that was likewise significant at the 0.05 level. This reflected a substantial agreement among evaluators and implied that the materials were well-structured, visually coherent, and technically sound. This outcome also outperformed Santos et al. (2020), whose assessment of instructional games produced only a fair agreement (Kappa = 0.493), underscoring recent improvements in technical development and user interface design.

In terms of Presentation and Organization, still statistically significant at 0.040, the Kappa score of 0.211, suggested that there was difference in the evaluators' perceptions of the materials' structural clarity and information flow. This result was still better than the previous

study by Ramos and Villanueva (2020), which revealed a Kappa of 0.180 in evaluating non-linear instructional modules, even if it has the lowest agreement across the four criteria.

Finally, with a significance level of 0.039 and a Kappa value of 0.538, Accuracy and Recency of Information showed moderate to great agreement. This demonstrated that most of the evaluators agreed that the information was accurate and current. This is especially significant given how quickly digital educational content is changing and how out-of-date references and materials frequently presented difficulties for earlier research, including Mendoza's (2020) study.

The findings indicated that the gamified technology-based learning resources that were adapted showed a consistent and trustworthy level of quality across a number of assessment criteria. A 2021 study by De-Marcos, Domínguez, and García-Sánchez corroborated the importance of design in gamified learning tools, emphasizing that consistent, quality assessment criteria in these systems lead to both enhanced learner satisfaction and improved educational outcomes. These findings collectively reinforced the interpretation that gamified technology-based learning resources were both consistent and trustworthy, offering a reliable framework for educational success.

4. Vocabulary Skills After the Intervention

Table 4. Level of Vocabulary Skills of the Respondents after using Gamified Technology-Based Learning Materials

Vocabulary Skills	No. of Items	Mean(x)	Descriptive Rating
Antonyms	10	7.49	Very Satisfactory
Synonyms	10	8.17	Excellent
Configuration Clues	5	3.51	Very Satisfactory
Context Clues	15	11.17	Very Satisfactory
As a Whole	40	30.34	Very Satisfactory

Statistical Limits				Descriptive Rating
For 5 items	For 10 items	For 15 items	For 40 items	
4.00 – 5.00	8.00 – 10.00	12.00 – 15.00	32.00 – 40.00	Excellent (E)
3.00 – 3.99	6.00 – 7.99	9.00 – 11.99	24.00 – 31.99	Very Satisfactory (VS)
2.00 – 2.99	4.00 – 5.99	6.00 – 8.99	16.00 – 23.99	Satisfactory (S)
1.00 – 1.99	2.00 – 3.99	3.00 – 5.99	8.00 – 15.99	Fair (F)
0.00 – 0.99	0.00 – 1.99	0.00 – 2.99	0.00 – 7.99	Poor (P)

Norms:

Table 4 on the previous page shows the result of the vocabulary performance of the grade 5 pupils after using gamified technology-based learning materials. It indicates significant improvement across all vocabulary skills. The overall mean score of 30.34, categorized as "Very Satisfactory," demonstrated a substantial enhancement in pupils' vocabulary skills. The highest

improvement was observed in the Synonyms, which received an "Excellent" rating with a mean score of 8.17, it proved pupils' strong ability to identify words with similar meanings. Other areas, such as Antonyms, Context Clues, and Configuration Clues, were graded as "Very Satisfactory," indicating noteworthy progress, although slightly lower compared to Synonyms.

The integration of gamified, technology-driven learning materials proved to have a positive impact on all vocabulary domains. The results suggested that the interactive, digital nature of the resources played a key role in improving pupils' ability to infer meaning from context and identify word opposites. Synonyms and Context Clues got the highest mean scores, highlighting the effectiveness of using gamified technology-based learning materials in enhancing word comprehension and usage. The findings aligned with previous research, such as Wang and Lieberoth (2019), who found that gamified learning can enhance vocabulary retention by making learning more engaging and purposeful. Similarly, Chen and Tsai (2020) noted that games provide immediate feedback and increase student engagement, both of which contributed to better learning outcomes. Krouska et al. (2021) also emphasized that game-based learning improves concentration and engagement, particularly in language studies.

Overall, the data strongly supported the use of gamified, technology-based learning materials as an effective method for improving vocabulary. Students demonstrated substantial improvement in all evaluated domains, moving from "Satisfactory" to "Very Satisfactory" or "Excellent," confirming the efficacy of these learning tools in enhancing vocabulary acquisition and retention.

5. Comparison of Pretest and Posttest Scores

Table 5. t-Test showing Significant Differences in the scores before and after the use of Gamified Technology-Based Learning Materials in teaching-learning process.

Vocabulary Skills	t-Test	t-critical	t-probability	Interpretation
Antonyms	11.705**	1.691	8.93E - 14	Highly Significant
Synonyms	7.569**		4.3E - 09	Highly Significant
Configuration Clues	6.099**		3.21E - 07	Highly Significant
Context Clues	10.819**		7.47E - 13	Highly Significant
Total	19.765		1.61E - 20	Highly Significant

Legend: * - 0.05 level of significance | ** - 0.01 level of significance

Table 5 reveals the findings of t-Test showing the significant differences in the scores before and after the use of gamified technology-based learning materials in the teaching-learning process. Results revealed highly significant improvements in various aspects of vocabulary skills

through the use of gamified, technology-based learning materials. For antonyms, a significant difference was observed with a computed t-Test of 11.705, t-critical value of 1.691 and with a t-probability of $8.93E - 14$. This shows that there is a large difference between the t-Test and t-critical, indicating that the gamified approach effectively enhanced students' ability to recognize antonyms. Similarly, the skill of recognizing synonyms showed a substantial gain of t-Test is 7.569 and a t-Probability of $4.3E - 09$ which is less than 0.01, confirming that the gamified strategy had a significant positive impact. In terms of configuration clues, there was notable improvement ($t = 6.099$, $p < 0.01$), particularly considering the initially low scores, which suggests that the material was effective in addressing even weaker areas. The use of context clues also demonstrated a strong boost in higher-order inference and comprehension skills, with a very significant difference ($t = 10.819$, $p < 0.01$). Finally, the total score ($t = 19.765$, $p < 0.01$) reflected a highly significant overall improvement, reinforcing the effectiveness of the gamified instructional method. These findings underscored the potential of gamified learning materials to enhance vocabulary acquisition across multiple dimensions. Educational planners and curriculum developers are encouraged to consider incorporating similar digital innovations into language programs to improve student achievement, motivation, and engagement.

The table indicates that following their use of Gamified Technology-Based learning materials, pupils' vocabulary skills greatly improved. The results were statistically significant because the t-test values were significantly higher than the critical value of 1.691 and the probability values were extremely low. Antonyms showed the largest improvement ($t = 11.705$), followed by configuration clues ($t = 6.099$), synonyms ($t = 7.569$), and context clues ($t = 10.819$). The overall score ($t = 19.765$) indicates a significant increase in vocabulary proficiency.

These results were consistent with recent research showing that tech-based and gamified learning can improve student learning. Gamified learning increases student engagement and enhances learning, particularly vocabulary, according to Hamari et al. (2020). According to Zainuddin et al. (2020), Quizizz and Kahoot are two examples of tools that encourage students to actively participated in their vocabulary learning. According to Alqahtani and Mohammad (2021), mobile learning applications improved vocabulary retention and usage for ESL students. Chen and Wang (2022) demonstrated that students' comprehension of new words is enhanced by digital games that provide context clues. Gamified lessons help pupils retain vocabulary for longer, according to Lee & Kim (2023).

The findings demonstrated the efficacy of gamified technology-based learning materials in enhancing vocabulary. Recent research supported these findings, which imply that gamified tools were an effective way to teach vocabulary.

The utilization of gamified, technology-based learning resources resulted in highly substantial gains in all vocabulary skill categories, including synonyms, antonyms, configuration clues, and context clues.

Strong statistical evidence suggested that students' language abilities significantly improved as a result of the gamified, technology-based learning materials. These results

confirmed that the method was both entertaining and scientifically successful in improving learning outcomes.

Summary of Findings

As part of the summary of findings, following results were drawn:

1. In the pretest, pupils showed a generally satisfactory level of performance, with their weakest scores in configuration clues;
2. The gamified technology-based learning materials received a very satisfactory rating from the expert evaluators;
3. The evaluators showed a clear level of agreement in their assessments across different criteria;
4. In the posttest, pupils' performance improved to a very satisfactory level, with their highest achievement in synonyms, which was rated excellent;
5. Results of the paired-sample t-tests confirmed that improvements across all vocabulary areas were highly significant ($p < 0.01$).

IV. DISCUSSION

Interpretation of Findings

The study showed that Grade 5 pupils at Dangdangla Elementary School started with only a satisfactory level of vocabulary skills, particularly struggling with configuration clues. After completing the 18-session program using gamified technology-based learning materials, their performance rose to a very satisfactory level, with clear improvements across all areas of vocabulary. The most notable progress was seen in synonyms, which reached an excellent rating. Statistical analysis confirmed that these improvements were highly significant ($p < 0.01$), proving that the intervention effectively addressed gaps in vocabulary. Expert evaluators also confirmed the quality and appropriateness of the materials, giving them a "Very Satisfactory" rating in all aspects.

Overall, the results suggest that gamified technology-based learning strategies are an effective way to build vocabulary, boost learner motivation, and keep pupils actively engaged in language learning.

Comparison to Existing Studies

Results of this study support earlier research highlighting the advantages of gamification in education. Waluyo (2021) found that gamified vocabulary tools greatly improved learners' language acquisition and motivation, while Wichadee and Pattanapichet (2018) also reported better academic outcomes among students who used gamified learning approaches.

The clear improvement in pupils' vocabulary skills in this study is consistent with the findings of Lee and Chen (2023), who explained that gamified learning environments help students overcome weaknesses in specific areas, such as morphological awareness. Likewise, the strong validation ratings in this study reflect the observations of Aguilar and Rueda (2021), who emphasized that well-designed and user-friendly gamified resources play an important role in keeping learners engaged.



What sets this study apart is its demonstration that offline gamified materials, not just online platforms like Kahoot! or Quizizz, can effectively improve vocabulary skills. This shows that gamification can be adapted even in schools with limited internet access, making it a more inclusive and practical approach to language learning.

Implications for Practice and Policy

The findings of this study carry meaningful implications for both classroom practice and educational policy, whereas;

1. For Teachers – Gamified technology-based materials should be incorporated into regular vocabulary instruction to make lessons more engaging, interactive, and student-centered. Teachers can also adapt these materials for other areas of language learning, such as grammar, reading comprehension, and writing;
2. For School Leaders – The positive results highlight the importance of supporting teacher training in creating and using gamified learning resources. Schools may consider including gamification in in-service trainings and professional development programs;
3. For Curriculum Developers and Policymakers – The Department of Education (DepEd) may explore formally recognizing gamification as an innovative approach to reading and vocabulary instruction. Policy guidelines that encourage the integration of gamified resources into language programs could help address ongoing challenges in reading proficiency across the country.

Study Limitations

Although the study produced positive results, several limitations should be noted:

1. Small Sample Size – The participants were only 35 Grade 5 pupils from a single elementary school, which limits how far the findings can be applied to other populations;
2. One-Group Design – Since there was no control group, it was not possible to compare the improvements with pupils who did not take part in the intervention;
3. Short Duration – The intervention ran for only 18 sessions. A longer implementation period might provide stronger evidence on long-term vocabulary retention;
4. Focus on Vocabulary Only – The study focused solely on vocabulary skills and did not include other areas such as reading comprehension, grammar, or writing, which gamified learning might also improve.

Future research could address these limitations by involving larger and more diverse groups of learners, adding control groups for comparison, extending the duration of the intervention, and examining how gamification affects other areas of language learning.



V. CONCLUSION and RECOMMENDATION

The last part of the manuscript stresses conclusions and recommended areas of improvement.

Conclusion

The study explored the effectiveness of gamified technology-based learning materials in improving the vocabulary skills of Grade 5 pupils at Dangdangla Elementary School. In lieu of this, results showed that pupils began with only a satisfactory level of vocabulary proficiency, with their weakest area in configuration clues. After completing the 18-session gamified intervention, their performance rose to a very satisfactory level, with clear improvements in synonyms, antonyms, context clues, and configuration clues.

Expert evaluators confirmed that the gamified materials were educationally sound, technically practical, and rated very satisfactory in terms of content, format, organization, and accuracy. Statistical analysis further revealed highly significant differences between pretest and posttest scores, providing strong evidence of the intervention's effectiveness.

In conclusion, it is demonstrated that gamified technology-based learning materials are effective tools for strengthening vocabulary skills, increasing learner engagement, and supporting language instruction in elementary classrooms.

Recommendations

Based on the results and conclusions, the following recommendations are proposed:

1. For Teachers – Incorporate gamified technology-based learning materials into regular vocabulary instruction. Similar strategies may also be developed for grammar, reading comprehension, and writing to maximize language learning outcomes;
2. For School Leaders and Curriculum Developers – Provide training and support for teachers in designing and applying gamified resources. Including gamification in school programs and DepEd initiatives can further strengthen reading and language instructions;
3. For Policymakers – Consider adopting gamified learning approaches as part of national reading and literacy programs. Policy guidelines may also encourage the development of localized gamified materials that match learners' specific needs and contexts;
4. For Future Research – Take note of the following suggestions:
 - Involve larger and more diverse groups of students across different grade levels and schools to improve generalizability;
 - Use experimental designs with control groups to establish stronger causal claims;
 - Examine the long-term effects of gamification on vocabulary retention and overall reading comprehension.;
 - Explore how gamified learning materials can be applied to other subject areas beyond English.

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