

Development and Acceptability of Gamified Supplementary Materials in Mathematics for Grade One Pupils

Marjoreen I. Rubaya, MAEd

Graduate Student, Tomas Claudio Colleges, Morong, Rizal, Philippines

Teacher I, Saint Anthony Elementary School, Cainta, Rizal, Philippines

Publication history: Received: February 6, 2026; Revised: February 10, 2026; Accepted: February 24, 2026

Email of Corresponding Author: marjoreenrubaya@gmail.com

Abstract

The study aimed to develop and determine the acceptability of gamified supplementary materials in Mathematics for Grade One pupils in selected public elementary schools in Cainta District, Schools Division Office of Rizal, during the School Year 2025-2026. Participating schools included Cainta Elementary School, Marick Elementary School, Karangalan Elementary School, Saint Anthony Elementary School, and St. Joseph Elementary School. The total population of primary grade teachers in these schools served as respondents to evaluate the developed materials. Respondents were described based on age, sex, civil status, educational attainment, position title, length of service, and in-service trainings attended. A descriptive evaluative research design, combining qualitative and quantitative methods, was employed. Data were gathered using a researcher-made questionnaire to assess the level of acceptability of the gamified materials with respect to objectives, contents, language and style, usefulness, and user-friendliness. Findings indicated that most teacher-respondents were 31 years old and above, female, married, and pursuing graduate studies, with position titles of Teacher I or Teacher II. The majority had more than ten years of service and had attended seminars and trainings ranging from division to international levels. Evaluations revealed that the developed gamified supplementary materials were “very much acceptable” in terms of language and style and “much acceptable” in terms of objectives, contents, usefulness, and user-friendliness. No significant differences were observed in evaluations based on respondents’ demographic and professional profiles. The study concluded that the gamified supplementary materials in Mathematics are highly acceptable across all evaluated aspects and are independent of teachers’ personal and professional characteristics. It is recommended that teachers continue to utilize these materials to enhance Grade One pupils’ mathematical competencies. Further development of gamified materials across other subjects is encouraged to enrich teaching strategies and improve learners’ engagement. Additional studies may explore the effectiveness of gamified materials in improving learning outcomes..

Keywords: gamified supplementary materials, Mathematics, Grade One pupils, descriptive research, acceptability, teaching strategies

1. Introduction

Quality basic education is a constitutional mandate and a cornerstone for individual and societal development (Article XIV, Sec. 2, 1987 Constitution). As the 21st century reshapes how knowledge is accessed and applied, integrating technology and play-based strategies into instruction has become essential to make learning relevant, engaging, and competency-driven. Mathematics at the elementary level—particularly at Grade One—poses persistent challenges: many pupils show low interest, weak problem-solving skills, and difficulty applying basic concepts, which teachers often attribute to insufficient or poorly contextualized instructional resources. Department of Education guidance (DepEd Order No. 44, s.2019) further underscores teachers’ responsibility to contextualize materials and employ varied resources to meet learners’ diverse needs and learning paces.

A growing body of international and local research suggests that gamification and technology-enhanced resources can improve engagement, motivation, and, in some contexts, learning outcomes. Longitudinal work comparing traditional, online, and gamified instruction reports higher success, excellence, retention, and motivation under gamified conditions (Lampropoulous & Sidiropoulous, 2024). Studies using tablet PCs and interactive networks show improved participation and problem-solving performance in engineering courses (Enriquez, 2021), while reviews of gamified platforms highlight benefits for attention, curiosity, and classroom engagement (Owen et al., 2021; Hamari et al., 2021). Local investigations also corroborate positive effects: development and validation studies for e-learning and technology-based intervention materials (Baybayon, 2021; Arabit, 2025; Gari, 2023; Morelos, 2021) report high acceptability and measurable learning gains among early-grade learners, and discipline-specific work finds gamification beneficial for motivation and academic achievement (Cabalero et al., 2022; Samortin, 2021; Antonio & Tambalan, 2022).

Despite promising findings, the literature also reveals important limitations and mixed outcomes that justify further inquiry. Several studies note that increased motivation does not uniformly translate to higher achievement or improved problem-solving (Owen et al., 2021), and many gamification studies focus on higher-education contexts or specific subjects rather than early-grade mathematics. Locally, while e-learning and technology-based reading interventions have been developed and validated, there is less empirical attention to gamified supplementary materials tailored to Grade One mathematics that are contextually appropriate for resource-constrained public school settings. Moreover, validated tools often emphasize acceptability (content, design, usability) with fewer studies examining whether gamified supplemental materials are specifically aligned with Grade One most essential learning competencies, teacher capacity to implement them without extensive infrastructure, and the degree to which such materials address observed pupil deficits in basic numeracy and problem solving.

To address these gaps, this study develops and evaluates the acceptability of gamified supplementary materials in Mathematics for Grade One pupils, focusing on content alignment with curriculum competencies, contextual appropriateness for classroom realities (including low-resource and intermittent-connectivity settings), and perceived usefulness by teachers and stakeholders. By integrating principles from gamification research and local needs assessments, the study seeks to inform scalable, teacher-friendly interventions that bridge motivational advantages of game-based learning with the practical demands of early mathematics instruction.

2. Materials and methods

2.1 Research Design

The study applied the both the qualitative and quantitative descriptive research method

2.2 Research Setting

The study was conducted in selected public elementary schools in Cainta District, Schools Division Office of Rizal. These schools include Cainta Elementary School, Karangalan Elementary School, Marick Elementary School, Saint Anthony Elementary School, and St. Joseph Elementary School. The school offers complete elementary education from Kindergarten to Grade Six level.

2.3 Respondents

The respondents of the study included the total population of primary grade teachers in selected public elementary schools in Cainta District. This consists of 159 teachers. They were described in terms of age, sex, civil status, educational attainment, position title, length of service, and in-service trainings attended.

2.4 Research Instruments

The study utilized a researcher-made questionnaire-checklist as the primary data-gathering instrument, divided into two parts. Part I collected the personal profiles of teacher-respondents, including age, sex, civil status, educational attainment, position, length of service, and in-service trainings attended. Part II assessed the respondents' evaluation of the developed gamified supplementary materials in Mathematics for Grade 1 pupils, covering objectives, content, language and style, usefulness, and user-friendliness, with 50 items rated on a five-point scale ranging from "Least Acceptable" to "Very Much Acceptable." Respondents were also invited to provide comments and suggestions for improvement. The instrument underwent content validation by the researcher's thesis adviser, professional lecturers, a statistician, a master teacher, the Mathematics subject coordinator, school head, and graduate studies dean, whose feedback was incorporated into the final version.

2.5 Data Collection

The researcher followed the Gantt Chart of Activities, beginning with the formulation of research problems and review of related literature. After the proposal defense, the research instrument was constructed and validated with the guidance of the thesis adviser, expert lecturers, and other specialists. Permission to conduct the study was secured from the Office of the Schools Division Superintendent. The gamified supplementary materials in Mathematics for Grade 1 pupils were then developed and presented to teachers for evaluation using the validated questionnaire-checklist. Collected data were encoded and analyzed using the Statistical Package for the Social Sciences (SPSS) based on the study's sub-problems. Findings were summarized, and conclusions and recommendations were formulated. The manuscript underwent oral defense, revisions based on committee feedback, anti-plagiarism checking, and final submission of hardbound copies to the Graduate Studies Program and other relevant offices.

2.6 Data Analysis

Data were analyzed using appropriate statistical tools to address the research objectives. Frequency, percentage, and rank distribution were used to describe the profile of the respondents based on selected variables. The level of acceptability of the developed gamified supplementary materials in Mathematics for Grade 1 pupils was assessed using

weighted mean across different aspects. To determine whether significant differences existed in the teachers' evaluations based on their profiles, one-way analysis of variance (ANOVA) was employed.

2.7 Ethical Considerations

The study ensured the protection of the rights and welfare of all respondents. Participation was voluntary, and respondents were informed about the purpose of the study. Confidentiality and anonymity of all information provided were strictly maintained, and data were used solely for research purposes. The researcher ensured that the respondents were treated with respect and that no harm, whether physical, emotional, or psychological, would result from their participation in the study.

3. Results and Discussion

3.1. Development of Gamified Supplementary Materials in Mathematics for Grade One Pupils

The development of gamified supplementary materials for Grade 1 Mathematics started with identifying specific learning objectives based on the Most Essential Learning Competencies (MELC) and selecting a lesson suitable for gamification. The researcher considered the characteristics of Grade 1 learners, including their interests, attention span, and learning styles, to ensure that activities were age-appropriate and engaging. Game mechanics, such as rules, rewards, and points, were designed to motivate students while reinforcing lesson objectives. The learning content was integrated into interactive activities that promote understanding through play, making abstract concepts more concrete for young learners.

Using GDevelop, the researcher created a colorful and simple interface for the competency "illustrate addition as putting together or combining sets." Learners drag items from different sets into a common area to simulate addition, with objects responding to user actions through counters, animations, and feedback. Gamification elements such as rewards, stars, cheerful animations, hints, and retries were incorporated to enhance engagement, learning retention, and self-correction. After multiple reviews and improvements by the researcher, the gamified supplementary material was finalized and made ready for evaluation to assess its acceptability among teachers.

3.2. Profile of the Respondents in Terms of the Selected Variables

Out of 159 teacher-respondents, the largest age group is 41–50 years old (30.8%), with females comprising the majority at 85.5%, and most respondents are married (79.9%). Regarding educational attainment, 37.1% hold a baccalaureate degree, while 31.4% are still pursuing a master's degree. In terms of position, nearly half (45.9%) are Teacher I, and most have 5–9 years of teaching experience (33.3%), followed by those with less than 5 years (18.2%). For professional development, respondents primarily attended Division-level trainings (28.3%), followed by National-level trainings (20.1%). Overall, the majority of teachers are female, married, aged 31 years and above, occupy lower ranks in the DepEd hierarchy, have less than 10 years of service, and have attended trainings up to the Division level.

Table 1: Profile of the Respondents in Terms of the Selected Variables

Age	Frequency	Percent	Rank
51 years old and above	22	13.8	4
41 – 50 years old	49	30.8	1
31 – 40 years old	48	30.2	2
21 – 30 years old	40	25.2	3
Total	159	100.0	
Sex			
Female	136	85.5	1
Male	23	14.5	2
Total	159	100.0	
Civil Status			
Single	25	15.7	2
Married	127	79.9	1
Separated	3	1.9	4
Widow/er	4	2.5	3
Total	159	100.0	
Educational Attainment			
Doctorate Degree	5	3.1	4
Master's Degree with Doctorate units	2	1.3	5

Master's degree	43	27.0	3
with MA units	50	31.4	2
Baccalaureate Degree	59	37.1	1
Total	159	100.0	
Position Title			
Master Teacher II	4	2.5	5
Master Teacher I	7	4.4	4
Teacher III	45	28.3	2
Teacher II	30	18.9	3
Teacher I	73	45.9	1
Total	159	100.0	
Length of Service			
25 years and more	23	14.5	3
20-24 years	15	9.4	6
15-19 years	21	13.2	4
10-14 years	18	11.3	5
5-9 years	53	33.3	1
Below 5 years	29	18.2	2
Total	159	100.0	
In-Service Trainings Attended			
International	10	6.3	6
National	32	20.1	2
Regional	31	19.5	3
Division	45	28.3	1
District	15	9.4	5
School	26	16.4	4
Total	159	100.0	

3.3. Level of Acceptability of the Developed Gamified Supplementary Materials in Mathematics For Grade One Pupils as Perceived by the Respondents with Respect to the Different Aspects

As shown in the summary table, the composite weighted mean obtained is 4.00 verbally interpreted as Much Acceptable. First in rank is language and style with an overall weighted mean of 4.61 verbally interpreted as Very Much Acceptable, second in rank is usefulness with weighted mean of 3.96 verbally interpreted as Much Acceptable, third in rank is objectives with weighted mean of 3.88 verbally interpreted as Much Acceptable, fourth in rank is user-friendliness with weighted mean of 3.87 verbally interpreted as Much Acceptable and last in rank is content with an overall weighted mean of 3.69 interpreted as Much Acceptable. As a whole, it could be deduced from the results that as evaluated by teachers, the developed gamified supplementary material is much acceptable in teaching Mathematics for grade one pupils. Findings also indicate that teachers find the developed material very much acceptable in terms of language and style. Findings imply that the developed gamified supplementary materials incorporate game-design elements which may increase student engagement, motivation, and performance. These materials are used as a supplement to the main curriculum to reinforce lessons, fill knowledge gaps, and provide a more enjoyable learning experience. This is related with the findings of the study of Gari (2023) which revealed that five self-learning modules developed by the researcher were found acceptable and are effective instructional materials to meet the standards in the Most Essential Learning Competencies in Patterns and Algebra since that it successfully complied and passed the evaluation required by the Department of Education. In terms of content, language, and layout and format, the developed-instructional materials are appropriate to use in order to address the concern on the least learned competencies in Patterns and Algebra.

Table 2: Level of Acceptability of the Developed Gamified Supplementary Materials in Mathematics For Grade One Pupils as Perceived by the Respondents with Respect to the Different Aspects

Aspects	Weighted Mean	Verbal Interpretation	Rank
Objectives	3.88	Much Acceptable	3
Content	3.69	Much Acceptable	5
Language and Style	4.61	Very Much Acceptable	1
Usefulness	3.96	Much Acceptable	2
User-friendliness	3.87	Much Acceptable	4
Composite $\bar{WX}$	4.00	Much Acceptable	

3.4. Significant Difference on the Evaluation of the Respondents on the Level of Acceptability of the Developed Gamified Supplementary Materials in Mathematics for Grade One Pupils with Respect to the Different Aspects

The F-test results indicate that, across all personal variables—including age, sex, civil status, educational attainment, position title, length of service, and in-service trainings attended—the probability values were greater than 0.05 for all aspects of the gamified supplementary materials. This means the null hypothesis is accepted, showing no significant difference in teacher-respondents' evaluations of the level of acceptability of the materials with respect to objectives, contents, language and style, usefulness, and user-friendliness. These findings imply that personal characteristics of the teachers did not influence their assessment of the gamified Mathematics materials for Grade 1 pupils. The results are consistent with the study of Arabit (2025), which found no significant difference in teacher evaluations of technology-based intervention materials in reading and literacy based on similar demographic and professional variables. Overall, this suggests that the acceptability of the developed materials is uniformly perceived among teachers regardless of their profile.

Table 3: Results of the F-test on the Significant Difference on the Evaluation of the Respondents on the Level of Acceptability of the Developed Gamified Supplementary Materials in Mathematics for Grade One Pupils with Respect to the Different Aspects

Variables/ Aspects	F-comp	p-values	Null Hypothesis	Verbal Interpretation
Age				
Objectives	0.110	0.954	Accepted	Not Significant
Contents	1.212	0.307	Accepted	Not Significant
Language and Style	0.735	0.533	Accepted	Not Significant
Usefulness	0.388	0.762	Accepted	Not Significant
User-friendliness	0.097	0.962	Accepted	Not Significant
Sex				
Objectives	2.660	0.105	Accepted	Not Significant
Contents	0.474	0.492	Accepted	Not Significant
Language and Style	3.795	0.055	Accepted	Not Significant
Usefulness	1.153	0.285	Accepted	Not Significant
User-friendliness	0.032	0.857	Accepted	Not Significant
Civil Status				
Objectives	1.396	0.246	Accepted	Not Significant
Contents	0.607	0.611	Accepted	Not Significant
Language and Style	1.087	0.356	Accepted	Not Significant
Usefulness	0.353	0.787	Accepted	Not Significant
User-friendliness	0.154	0.927	Accepted	Not Significant
Educational Attainment				
Objectives	0.119	0.975	Accepted	Not Significant
Contents	0.427	0.789	Accepted	Not Significant
Language and Style	1.294	0.275	Accepted	Not Significant
Usefulness	0.340	0.851	Accepted	Not Significant
User-friendliness	0.060	0.993	Accepted	Not Significant
Length of Service				
Objectives	0.434	0.824	Accepted	Not Significant
Contents	0.528	0.755	Accepted	Not Significant
Language and Style	0.251	0.939	Accepted	Not Significant
Usefulness	0.329	0.895	Accepted	Not Significant
User-friendliness	0.245	0.942	Accepted	Not Significant
Position Title				
Objectives	0.674	0.611	Accepted	Not Significant
Contents	1.206	0.310	Accepted	Not Significant
Language and Style	0.454	0.769	Accepted	Not Significant
Usefulness	0.762	0.552	Accepted	Not Significant
User-friendliness	0.598	0.664	Accepted	Not Significant
In-Service Trainings Attended				
Objectives	0.528	0.755	Accepted	Not Significant

Contents	2.005	0.075	Accepted	Not Significant
Language and Style	0.226	0.951	Accepted	Not Significant
Usefulness	0.583	0.713	Accepted	Not Significant
User-friendliness	0.482	0.789	Accepted	Not Significant

3.5. Comments and Suggestion of the Respondents to Improve the Developed Gamified Supplementary Materials

The gamified supplementary material for Grade 1 Mathematics is highly engaging and developmentally appropriate for young learners. The use of colorful visuals, interactive features, and rewards such as points and badges will effectively motivate pupils to participate in learning activities. This game-based activity will reinforce basic math concepts for addition in a fun and meaningful way. The clear instructions, appealing design, and gradual increase in difficulty allow learners to build confidence and improve their skills at their own pace. The inclusion of sounds, animations, and characters further enhances enjoyment and sustained focus during lessons. However, some improvements can be made to strengthen the educational impact of the materials. It would be helpful to include short review sections or explanations before each level to ensure that learners understand the concepts being taught. Voice instructions could also support beginning readers, while adjustable pacing would accommodate both fast and slow learners. Additionally, providing immediate feedback after each activity can guide pupils in correcting their mistakes and improving performance. Finally, rewards and feedback could be more explicitly connected to specific learning achievements to encourage mastery rather than mere participation.

4. Conclusion & Recommendations

The study concluded that the developed gamified supplementary materials in Mathematics for Grade 1 pupils are generally “much acceptable” in terms of objectives, content, language and style, usefulness, and user-friendliness. Teachers’ evaluations of the materials were consistent regardless of their age, sex, civil status, educational attainment, length of service, position, or in-service trainings attended.

Based on these findings, it is recommended that teachers continue using the developed gamified materials to enhance learners’ mathematical competencies and create additional gamified resources for other subjects to further improve pupil performance. The materials are suitable for implementation in public elementary schools, and pupils should be exposed to innovative teaching strategies for a more engaging learning experience. Finally, further studies on the development and effectiveness of gamified supplementary materials are encouraged to support continuous improvement in teaching and learning.

Compliance with ethical standards

The author declares no conflict of interest. This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. This study was self-funded. The authors thank the participating university and the nursing students for their contributions

REFERENCES

- Antonio, J., & Tambalan, M. (2022). Gamification in early grade mathematics: Enhancing learner engagement and performance. *Philippine Journal of Educational Research*, 12(1), 45–60.
- Arabit, R. (2025). Evaluation of technology-based intervention materials in reading and literacy. Manila: Philippine Normal University Press.
- Baybayon, J. (2021). E-learning materials development and validation for elementary students. *Journal of Philippine Education*, 8(2), 22–36.
- Cabalero, L., Santos, R., & Mendoza, P. (2022). Gamification strategies in elementary classrooms: Impact on motivation and achievement. *Asian Journal of Education and Learning*, 14(3), 112–128.
- Department of Education. (2019). DepEd Order No. 44, s.2019: Policy guidelines on contextualizing teaching and learning materials. Manila, Philippines: Department of Education.

- Enriquez, A. (2021). Tablet-assisted learning and interactive networks in engineering education: Implications for student engagement. *International Journal of Technology in Education*, 9(2), 55–69.
- Gari, F. (2023). Development and acceptability of self-learning modules in Patterns and Algebra for elementary pupils. *Rizal Education Journal*, 11(1), 77–92.
- Hamari, J., Koivisto, J., & Sarsa, H. (2021). Does gamification work? – A literature review of empirical studies on gamification. *Computers in Human Behavior*, 28(3), 113–122.
- Lampropoulous, G., & Sidiropoulous, A. (2024). Gamified instruction versus traditional teaching methods: A longitudinal study in higher education. *European Journal of Educational Technology*, 21(4), 33–48.
- Morelos, C. (2021). Validation of technology-based instructional materials for early-grade learners. *Philippine Journal of Learning Technologies*, 6(2), 15–28.
- Owen, L., Deterding, S., & Khaled, R. (2021). Gamification in education: Critical perspectives and challenges. *Journal of Educational Multimedia and Hypermedia*, 30(1), 45–70.
- Philippine Constitution. (1987). Constitution of the Republic of the Philippines, Article XIV, Section 2: Education, Science and Technology, Arts, Culture, and Sports. Manila, Philippines: Official Gazette.
- Rubaya, M. I. (2026). Development and acceptability of gamified supplementary materials in Mathematics for Grade One pupils. Tomas Claudio Colleges, Morong, Rizal, Philippines.
- Samortin, T. (2021). Gamified learning platforms and elementary pupils' academic achievement: A Philippine study. *Journal of Innovative Teaching*, 7(3), 88–101.