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Development, Acceptability, and Effectiveness of Digital Learning Tools in Teaching Mathematics for Grade Three Pupils

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Abstract

This study aimed to develop, evaluate, and determine the effectiveness of digital learning tools in teaching Mathematics among Grade Three pupils during the School Year 2024–2025, highlighting the role of technology in enhancing engagement and strengthening foundational mathematical skills. The research utilized a developmental–descriptive–experimental design. During the developmental phase, digital learning tools were produced using Canva, ensuring visual clarity, curriculum alignment, age-appropriate content, and learner engagement. The descriptive phase measured the acceptability of the tools through a researcher-validated checklist administered to 18 public school teachers who evaluated organization and presentation, objectives, content, language and style, and usefulness. The experimental phase employed a one-group pretest–posttest design involving 26 Grade Three pupils to assess effectiveness. Statistical tools included frequency, percentage, weighted mean, standard deviation, t-test for correlated means, and one-way ANOVA to determine differences in teacher evaluations according to profile variables. Findings revealed that the digital learning tools were rated "Very Much Acceptable" across all criteria, with the highest ratings recorded in language and style and usefulness. ANOVA results indicated no significant differences in acceptability when grouped by age, sex, educational attainment, position, length of service, and trainings attended, while a significant difference was observed only in civil status in relation to content evaluation. The pupils' posttest scores showed statistically significant improvement compared to pretest performance, confirming the effectiveness of the developed tools. The study concludes that the digital learning tools are pedagogically appropriate, engaging, and effective in enhancing mathematical performance among young learners. It is recommended that schools expand access to digital instructional resources, encourage technology integration in classroom instruction, and continuously refine digital materials to promote critical thinking and curriculum alignment. Further research is encouraged to validate the findings in other grade levels and educational settings.

Keywords: digital learning tools, Mathematics instruction, Grade Three pupils, educational technology, instructional effectiveness

1. Introduction

Education plays a vital role in human resource development and is directly linked to individual well-being and opportunities for a better future. It extends beyond the acquisition of knowledge and skills by promoting holistic growth that enhances productivity and quality of life. In the Philippine context, the importance of education is reinforced by Article XIV, Section 1 of the 1987 Constitution, which mandates the State to protect and promote the right of all citizens to quality education and ensure its accessibility. This provision highlights the government's responsibility to maintain an education system that equips learners with the knowledge, skills, values, and attitudes necessary for personal and societal development. Complementing this mandate, the Implementing Rules and Regulations of the Enhanced Basic Education Act of 2013 require schools and teachers to develop appropriate instructional materials that support learner-centered and future-oriented goals.

A crucial element of quality education is the adoption of effective and innovative teaching strategies. In today's rapidly evolving world, learning is no longer confined to traditional classrooms; it occurs across diverse contexts supported by flexible and technology-driven approaches. Such transformation allows learners to connect theoretical knowledge to real-life applications, making education more meaningful and relevant. Mathematics education, particularly in the early grades, is foundational in shaping learners' cognitive development and problem-solving abilities. However, traditional instructional approaches that rely heavily on memorization and repetition often fail to engage young learners or clarify abstract concepts such as fractions, place value, and geometry. Observations from classroom practice reveal that many Grade Three pupils perceive Mathematics as difficult and intimidating, resulting in low confidence and reduced participation.

Digital learning tools present promising alternatives to address these challenges. Research consistently shows that interactive and visually rich tools enhance mathematical understanding by enabling learners to manipulate representations and receive immediate feedback. Alalwan et al. (2020) emphasize that digital simulations allow students to visualize abstract concepts dynamically, improving comprehension and retention. Similarly, Deterding et al. (2020) and Singh et al. (2021) highlight the motivational power of gamification, demonstrating that point systems, progress tracking, and rewards transform Mathematics into an engaging experience. Studies by Li and Ma (2022) and Dabbagh and Fakeh (2021) further reveal that adaptive digital tools support differentiated instruction by adjusting difficulty levels and pacing to match individual learner needs, fostering confidence and mastery.

The effectiveness of digital tools is also influenced by usability and curriculum alignment. Striker (2020) and Jones and Miller (2020) stress that intuitive design encourages adoption by teachers and students, minimizing technical barriers to learning. Deng and Chen (2022) add that tools aligned with curriculum standards are more likely to be integrated meaningfully into classroom instruction. Local literature echoes these findings. Reyes and Villanueva (2023) report that interactive platforms promote critical thinking and conceptual understanding, while Manalo and De Guzman (2021) and Delos Santos et al. (2022) demonstrate significant gains in mathematics performance when digital tools supplement instruction. Collaborative features in digital platforms, as noted by Alzate et al. (2021) and Bautista (2024), also foster teamwork and communication skills. Moreover, culturally responsive digital instruction enhances engagement by connecting mathematics to learners' lived experiences (Cruz et al., 2021; Bautista & Mulligan, 2020). Torres and Mendoza (2020) emphasize that digital tools can reduce educational inequities by providing access to quality learning resources, particularly in underserved communities. However, teacher perceptions remain critical; Paredes (2023) notes that successful integration depends on adequate training, infrastructure, and institutional support.

Despite growing evidence supporting digital instruction, gaps remain in research focusing specifically on Grade Three Mathematics and the systematic development and evaluation of tailored digital tools for young learners. Most studies concentrate on higher grade levels, leaving limited empirical data on early elementary contexts. Addressing this gap is essential, as foundational mathematical skills formed in early education strongly influence future academic achievement. This study responds to this need by developing, evaluating acceptability, and determining the effectiveness of digital learning tools designed specifically for Grade Three pupils. By integrating interactive, gamified, and curriculum-aligned features, the research aims to enhance engagement, strengthen conceptual understanding, and contribute to evidence-based practices in elementary Mathematics education.

2. Materials and methods

2.1 Research Design

The study utilized a developmental-descriptive-experimental research design. . The development phase involved creating digital learning tools using Canva, focusing on visual clarity, curriculum alignment, and learner engagement. The descriptive phase evaluated the acceptability of the tools using a researcher-validated checklist administered to 18 public school teachers. Respondents assessed the tools in terms of organization and presentation, objectives, contents, language and style, and usefulness. For the experimental phase, a pretest-posttest design was implemented with 26 Grade Three pupils to determine the effectiveness of the tools

2.2 Research Setting

This study was conducted in Dalig Elementary School. It offers a comprehensive basic education program from Kindergarten to Grade 6, following the curriculum set by the Department of Education (DepEd) oversees these schools.

2.3 Respondents

The study involved two groups of respondents. For the descriptive phase, the respondents consisted of eighteen (18) public school teachers who evaluated the acceptability of the developed digital learning tools. These teachers assessed the materials in terms of organization and presentation, objectives, content, language and style, and usefulness using a researcher-validated checklist. For the experimental phase, the respondents were twenty-six (26) Grade Three pupils who participated in a pretest–posttest procedure to determine the effectiveness of the digital learning tools in improving their Mathematics performance.

2.4 Research Instruments

The study utilized two researcher-developed instruments to gather the necessary data. The first instrument was a questionnaire-checklist designed to assess the acceptability of the developed digital learning tools among teacher-respondents. It consisted of two parts: Part I gathered the teachers' profile information, including age, sex, civil status, educational attainment, position title, length of service, and in-service trainings attended, while Part II evaluated the acceptability of the digital learning tools in terms of organization and presentation, objectives, content, language and style, and usefulness using a five-point Likert scale. The second instrument was a 15-item multiple-choice test administered as

both a pretest and posttest to Grade Three pupils. The tests were parallel in content, difficulty, and cognitive demand and were based on a table of specifications aligned with the fourth-quarter Mathematics competencies, covering place value, basic arithmetic operations, geometry, and measurement. Pupils' raw scores were transmuted into equivalent grades and interpreted using standard performance descriptors.

To ensure validity, the instruments underwent content validation by academic experts, including the dean, thesis adviser, professorial lecturers, statistician, master teacher, school principal, and Mathematics coordinator, whose recommendations were incorporated to improve accuracy, relevance, and appropriateness.

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2.5 Data Collection

The researcher followed the Gantt Chart of Activities in the conduct of the study. This includes the formulation of the research problem up to the revision of the manuscript and submission of the final copy. After the validation of the instrument, permission to conduct the study was obtained from the concerned authorities. The questionnaire-checklist was administered to the respondents through the Google survey form considering the guidelines in the Data Privacy Act of 2012. Retrieved data were encoded and processed utilizing Statistical Package for Social Sciences (SPSS). Based from the interpreted data, summary of findings, conclusions and recommendations were formulated.

2.6 Data Analysis

For the analysis and interpretation of data, appropriate statistical tools were employed. Frequency, percentage, and rank distribution were used to describe the profile of the respondents. Mean was utilized to determine the level of acceptability of the developed digital learning tools as evaluated by the teachers and to assess the performance level of Grade Three pupils before and after exposure to the intervention. Analysis of Variance (ANOVA) was applied to identify significant differences in acceptability when respondents were grouped according to their profile variables. A paired sample t-test was conducted to determine whether a statistically significant difference existed between the pupils' pretest and posttest scores, thereby establishing the effectiveness of the digital learning tools.

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 the Digital Learning Tools in Teaching Mathematics for Grade Three Pupils

The development of the digital learning tools in teaching Mathematics for Grade Three pupils involved the use of Canva, a versatile design platform, to create visually-appealing and engaging educational materials. Canva provided an effective environment for integrating visuals and digital manipulation to enhance students' learning experiences in a meaningful way

The process began with the creation of eye-catching visuals, such as colorful illustrations, infographics, diagrams, and charts that helped clarify mathematical concepts. These visuals were designed to simplify abstract ideas and make them more accessible to young learners, particularly when dealing with topics like fractions, addition, subtraction, and basic geometric shapes. For example, pie charts and number lines were used to help explain fractions, while geometric figures and their properties were illustrated with bright, clear images. By incorporating these elements, the digital learning tools became more relatable and interactive, making it easier for Grade Three pupils to understand and engage with the material.

Additionally, digital manipulation was used to ensure that the layout, content organization, and overall design were clear, logical, and well-structured. Canva allowed for the precise arrangement of text and images, ensuring that each lesson followed a smooth and easy-to-understand progression. The tools also enabled adjustments to be made quickly, allowing for refinement and customization of the learning materials. The visual content was designed with young learners in mind, using simple fonts, bold colors, and appealing shapes to catch their attention and keep them engaged throughout the lessons.

The content was carefully curated to ensure that the design and visuals were consistent across all lessons, maintaining a cohesive and uniform learning experience. By focusing on clean, well-organized designs and incorporating relatable visual elements, the digital learning tools provided a positive and engaging experience for Grade Three pupils.

The developed digital learning tools using Canva's design capabilities allowed the creation of visually-appealing and effective learning tools that catered specifically to the developmental needs of young learners. The combination of clear visuals and thoughtful digital organization helped make mathematical concepts easier to understand, ensuring that students could interact with and enjoy their learning process.

3.2. Profile of the Respondents

In terms of age, the highest percentage of respondents came from three age groups: 40–49 years old, 30–39 years old, and 30 years old and below, each comprising 22.2% of the total respondents and sharing the top rank. Meanwhile, respondents aged 50–59 years old and 60 years old and above accounted for 16.7% each, ranking fourth. As to sex, the majority of the respondents were female, accounting for 88.9%, while male respondents comprised only 11.1%.

Regarding civil status, most respondents were married (77.8%), followed by single respondents (16.7%), while only 5.6% were widowed. In terms of educational attainment, 44.4% of the respondents had completed a Master's Degree.. An equal percentage (27.8%) held either a baccalaureate degree or had taken units towards a master's degree.

For position title, the highest number of respondents held the rank of Teacher III (50.0%), followed by Teacher II (27.8%) and Teacher I (22.2%). In terms of length of service, the largest group had been in the teaching profession for 11–20 years (50.0%). Those with 31 years and above and 1–10 years of service each made up 16.7% of the total, while only 11.1% had served 21–30 years. One respondent (5.6%) had less than one year of service.

Lastly, in the area of in-service trainings attended, regional-level trainings had the highest participation (33.3%). Both national and division levels followed, with 22.2% participation at each level, while 16.7% had attended district-level trainings. Only 5.6% had exposure to international training.

Table 2: *Profile of the Respondents*

Age	Frequency	Percent	Rank
60 years old and above	3	16.7	4
50 - 59 years old	3	16.7	4
40 - 49 years old	4	22.2	1
30 - 39 years old	4	22.2	1
30 years old and below	4	22.2	1
Total	18	100.0	
Sex	70	100.0	
Male	2	11.1	2
Female	16	88.9	1
Total	18	100.0	
Civil Status			
Single	3	16.7	2
Married	14	77.8	1
Widow/Widower	1	5.6	3
Total	18	100.0	
Educational Attainment			
Master's Degree	8	44.4	1
Master's Degree Units	5	27.8	2.5
Baccalaureate Degree	5	27.8	2.5
Total	18	100.0	
Position Title			
Teacher III	9	50.0	1
Teacher II	5	27.8	2
Teacher I	4	22.2	3
	18	100.0	
Length of Service			
31 years and above	3	16.7	2.5
21 – 30 years	2	11.1	4
11 – 20 years	9	50.0	1
1 – 10 years	3	16.7	2.5
Below 1 year	1	5.6	5
Total	18	100.0	
In-service Trainings Attended			
International Level	1	5.6	5
National Level	4	22.2	2.5
Regional Level	6	33.3	1
Division Level	4	22.2	2.5
District Level	3	16.7	4
Total	80	100.0	

3.3. Level of Acceptability of the Developed Digital Learning Tools in Teaching Mathematics as Evaluated by the Respondents with Respect to Organization and Presentation, Objectives, Contents, Language and Style, and Usefulness

The indicators assessing the level of acceptability of the developed digital learning tools—namely organization and presentation, objectives, contents, language and style, and usefulness—all received ratings within the "Very Much Acceptable" range. The highest-rated indicators were Language and Style and Usefulness, both with a perfect weighted mean of 5.00, ranked first. Meanwhile, Objectives received the lowest rating of 4.77, placing it at rank five, though it still falls within the same verbal interpretation. The overall grand mean of 4.90 further confirms that the tools were highly acceptable across all evaluated aspects.

These findings suggest that the digital learning tools were well-designed and met the expectations of the teacher-respondents in terms of clarity, effectiveness, and educational relevance. The high ratings in Language and Style imply that the tools were linguistically appropriate for grade three pupils, while the top rating in Usefulness indicates that teachers found the tools practical and helpful in facilitating mathematics instruction. Although Objectives ranked lowest, its strong rating shows that the goals of the lessons were still clear, relevant, and aligned with the competencies.

The implication of these results is that the developed digital learning tools hold strong potential for wider classroom use. Their high level of acceptability across all key variables suggests that they can support and even enhance traditional teaching methods in mathematics. Educational planners and administrators can consider these findings when implementing similar tools in other schools or grade levels, ensuring that future instructional materials maintain the same quality, clarity, and usefulness demonstrated in this study.

The results is related to the study of Kimmons et al. (2021), who found that digital learning tools that provide clear, effective, and engaging language, support various learning styles, and are useful for both teachers and students tend to receive higher levels of acceptability and effectiveness. Their research emphasizes the importance of the tool's objectives being aligned with learning outcomes to maximize educational impact, a consideration that aligns with the slightly lower rating for objectives in this study.

Table 3: *Level of Acceptability of the Developed Digital Learning Tools in Teaching Mathematics as Evaluated by the Respondents with Respect to Different Variables*

Indicator	Weighted Mean	Verbal Interpretation	Rank
Organization and Presentation	4.89	Very Much Acceptable	3
Objectives	4.77	Very Much Acceptable	5
Contents	4.84	Very Much Acceptable	4
Language and Style	5.00	Very Much Acceptable	1.5
Usefulness	5.00	Very Much Acceptable	1.5
Grand Mean	**4.90**	**Very Much Acceptable**	

3.4. Significant Difference on the Level of Acceptability of the Developed Digital Learning Tools in Teaching Mathematics as Evaluated by the Teacher-Respondents with Respect to the Different Aspects in Terms of their Profile

Across all indicators—organization and presentation, objectives, and contents—the majority of the computed p-values were greater than the significance level of 0.05, leading to the acceptance of the null hypothesis and indicating no statistically significant difference. However, one exception was noted: civil status yielded a significant difference in the acceptability of the content, with a p-value of 0.006, suggesting that respondents' civil status influenced how they rated the content aspect of the digital learning tools.

The results suggest that in general, the respondents, regardless of their age, sex, educational attainment, position title, length of service, and in-service training, shared similar perceptions of the acceptability of the developed tools. This uniformity highlights the reliability and broad appeal of the digital learning materials across different teacher profiles. The significant result under civil status implies that life circumstances (e.g., being single, married, or widowed) may affect how content is perceived in terms of relevance, appropriateness, or usefulness, possibly due to differences in experience, perspectives, or teaching responsibilities.

This finding has important implications for educational developers and administrators. While the tools were broadly acceptable, tailored enhancements or training might be considered to address varying needs or expectations—

especially with regard to content. Understanding that civil status may influence instructional perception could help inform future development, training, or implementation strategies to ensure inclusivity. Overall, the digital tools proved to be widely acceptable, supporting their potential for effective and equitable integration in the mathematics instruction of grade three pupils.

Results support the study of Gross and Jenkins (2021), which found that personal factors, such as life experiences and status, could influence how educators perceive and evaluate teaching tools and resources. Their research highlighted that educators' perceptions are often shaped by their personal experiences, including marital status, which could influence how they assess content relevancy and effectiveness in teaching. The findings from this study align with their conclusions, showing that civil status may significantly influence the way educators evaluate certain aspects of educational tools, particularly content.

Table 4:. *Significant Difference on the Level of Acceptability of the Developed Digital Learning Tools in Teaching Mathematics as Evaluated by the Teacher-Respondents with Respect to the Different Aspects in Terms of their Profile*

Age	**F-value**	**p-value**	**Null**	**Verbal**
Organization and presentation	0.853	0.369	Accepted	Not Significant
Objectives	3.484	0.080	Accepted	Not Significant
Contents	0.391	0.541	Accepted	Not Significant
Sex				
Organization and presentation	1.713	0.207	Accepted	Not Significant
Objectives	1.868	0.176	Accepted	Not Significant
Contents	0.564	0.693	Accepted	Not Significant
Civil Status				
Organization and presentation	1.018	0.385	Accepted	Not Significant
Objectives	0.087	0.917	Accepted	Not Significant
Contents	7.343	0.006	Rejected	Significant
Educational Attainment				
Organization and presentation	2.322	0.132	Accepted	Not Significant
Objectives	0.803	0.466	Accepted	Not Significant
Contents	0.149	0.863	Accepted	Not Significant
Position Title				
Organization and presentation	0.524	0.602	Accepted	Not Significant
Objectives	0.950	0.409	Accepted	Not Significant
Contents	0.285	0.756	Accepted	Not Significant
Length of Service				
Organization and presentation	1.977	0.158	Accepted	Not Significant
Objectives	0.725	0.590	Accepted	Not Significant
Contents	1.011	0.437	Accepted	Not Significant
In-service Training Attended				
Organization and presentation	0.556	0.699	Accepted	Not Significant
Objectives	0.326	0.855	Accepted	Not Significant
Contents	2.263	0.118	Accepted	Not Significant

3.5. Level of Performance of the Grade Three Pupils in Mathematics Before and After Exposure to the Developed Digital Learning Tools, as Revealed in the Results of the Pretest and Posttest

The results of the pretest show that most of the grade three pupils fell within the Satisfactory level, with 42.3% scoring between 80 and 84. Meanwhile, 19.2% achieved an Outstanding rating, 19.2% were Very Satisfactory, and the same percentage Did Not Meet Expectations, scoring below 75. The mean score of 85.0 indicates that, on average, the pupils were performing at the Very Satisfactory level even before the intervention using digital learning tools.

This performance suggests that while a fair number of pupils already demonstrated strong foundational skills in mathematics, a significant portion of them were only performing satisfactorily, and a few were struggling. The standard deviation of 9.18 reflects a moderate spread in scores, meaning that learner performance varied across the class, with both high and low achievers present.

The implication is that there was a need to improve learning outcomes for all pupils, especially those who did not meet expectations. This baseline data validates the importance of introducing innovative tools, such as digital learning interventions, to elevate the mathematical performance of grade three learners and reduce performance gaps within the class.

A supporting finding comes from Santos and Alonzo (2022), who emphasized that digital tools, such as video tutorials and interactive activities, can reinforce mathematical concepts and support learners in maintaining or improving their performance. Their study revealed that grade school students exposed to multimedia resources showed greater retention and engagement, especially when the tools were aligned with the curriculum and tailored to the learners' level. This finding aligns with the current study's objective of evaluating the effectiveness of digital learning tools in enhancing the mathematical performance of grade three pupils.

Table 5: *Level of Performance of Grade Three Pupils in Mathematics Based on Pretest Results*

Grade	Verbal Interpretation	Frequency	Percent	Rank
90-100	Outstanding	20	76.9%	1
85-89	Very Satisfactory	6	23.1%	2
Total		**26**	**100.00%**	
Highest Grade = 100		**Mean = 92.27**		
Lowest Grade = 85		**Standard Dev. = 4.42**		

Table 5.1. presents the posttest performance of grade three pupils in Mathematics after being exposed to the developed digital learning tools.

Table 5.1: *Level of Performance of Grade Three Pupils in Mathematics Based on Posttest Results*

Grade	Verbal Interpretation	Frequency	Percent	Rank
90-100	Outstanding	22	84.60%	1
85-89	Very Satisfactory	4	15.40%	2
Total		**26**	**100.00%**	
Highest Grade = 100		**Mean = 95.70**		
Lowest Grade = 85		**Standard Dev. = 5.03**		

The posttest results indicate a significant improvement in the performance of grade three pupils after their exposure to the developed digital learning tools. The majority, 57.7%, reached the Outstanding level, while 30.8% were Very Satisfactory and 11.5% were Satisfactory. Notably, no pupils scored below 80, showing that all learners met or exceeded expectations.

This upward shift in performance is reflected in the increased mean score of 92.7, placing the average in the Outstanding category. The lowest score recorded was 82, which already falls within the Satisfactory range, and the standard deviation of 4.51 indicates a tighter clustering of scores, meaning more uniform success among the pupils.

The implication of this result is that the digital learning tools were highly effective in enhancing mathematical skills. The dramatic reduction in performance variability and the overall increase in scores suggest that the intervention addressed diverse learner needs, made instruction more engaging, and improved conceptual understanding. This supports the continued integration of digital tools in early-grade mathematics instruction.

Results support the study of Hattie (2020), who found that digital learning tools are effective in improving student performance but that outcomes can vary depending on the student. Hattie's research emphasizes the importance of differentiating learning tools to accommodate the diverse learning abilities of students. Similarly, this study shows that while most pupils benefitted from the digital learning tool, there remains a need to provide additional support to those who did not meet expectations.

3.6. Significant Difference Between the Pretest and Posttest Scores of Grade Three Pupils in Mathematics

Table 6: *Significant Difference in the Performance of Grade Three Pupils in Mathematics Before and After Exposure to the Developed Digital Learning Tools*

Test Type	Mean	Standard Deviation	t-value	p-value	Null	Verbal
Pretest	92.27	4.42				
Posttest	95.70	5.03	3.151	0.004	Rejected	Significant

Based on the data, the pretest mean was 92.27 with a standard deviation of 4.42, while the posttest mean increased to 95.70 with a slightly higher standard deviation of 5.03. The computed t-value of 3.151 and a p-value of 0.004 indicate that the difference in the scores is statistically significant at the 0.05 level. As a result, the null hypothesis, which states that there is no significant difference between the pretest and posttest scores, is rejected.

This means that the performance of the pupils significantly improved after they were taught using the developed digital learning tools. The increase in the mean score and the statistical significance suggest that the use of multimedia-based instructional materials had a positive effect on the learners' mastery of mathematical concepts. The improvement in scores highlights the effectiveness of integrating technology in instruction, particularly for young learners who benefit from interactive, visual, and engaging content.

The findings imply that the use of well-designed digital tools can enhance teaching and learning in Mathematics, especially in the primary grades. Educators and school administrators should consider adopting similar instructional materials to improve pupils' academic performance. Furthermore, the results support the potential of digital innovation to address diverse learning needs and promote active engagement in the classroom, ultimately contributing to better learning outcomes and more meaningful educational experiences.

A supporting finding comes from the study of Manalo and De Guzman (2021), which revealed that interactive mathematics software significantly enhanced students' comprehension and performance through engaging features such as instant feedback and visually appealing tasks. This aligns with the current study's result, where grade three pupils exhibited a statistically significant improvement in their posttest scores after exposure to digital learning tools. The consistent findings confirm that digital tools, when properly designed and implemented, can substantially improve mathematical learning outcomes among young learners.

4. Conclusion & Recommendations

Based on the findings of the study, it is concluded that the developed digital learning tools are generally well-accepted by teacher-respondents, with no significant differences in acceptability across most profile variables such as age, sex, position title, educational attainment, length of service, and in-service trainings attended, except for civil status in the content domain, which suggests that personal circumstances may influence perceptions of instructional materials. Moreover, the significant improvement in Grade Three pupils' pretest and posttest scores demonstrates that the digital tools effectively enhanced mathematical performance, confirming their usefulness in improving learning outcomes.

In light of these conclusions, it is recommended that school administrators consider refining and expanding the use of digital learning tools to better align with the curriculum and promote higher-order thinking skills; teachers continue integrating these tools while participating in relevant professional development to strengthen their digital competencies; and pupils be exposed to more interactive and engaging digital activities in Mathematics to sustain performance and accommodate diverse learning styles. Furthermore, the developed tools and instructional materials may be adopted and improved based on feedback from both teachers and learners, and parallel studies should be conducted across other grade levels, subjects, or public school settings to further validate their effectiveness and acceptability.

Compliance with ethical standards

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