Development and Validation of Technology-Enriched Lesson in Fostering Reading Skills as Anchored in 'MATATAG' Curriculum

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ABSTRACT

This study aimed to develop and evaluate a technology-enriched lesson in fostering Grade 4 learners' reading skills, explicitly targeting the competency "Identifying author's or speaker's point of view" (EN4LR-1.1), aligned with the DepEd 'MATATAG' curriculum. The study was conducted in an elementary school in Biliran, Eastern Visayas, Philippines, using a pre-experimental design with pre-test and posttest measures. The lesson package, which featured interactive games, video lessons, and PowerPoint presentations intended to improve engagement and comprehension, was completed by forty fourth-grade students. Krippendorff's alpha was used to evaluate inter-rater reliability, and the DepEd Learning Resources Development and Management System (LRDMS) tool was used for validation. Based on the validation results, the lesson met all requirements and received excellent ratings for technical, instructional, and content quality. Stronger reliability for technical quality and no errors in the "Other Findings" category were inter-rater reliability results, which showed moderate to substantial agreement across evaluators. A significant improvement in learners' performance was seen when the Wilcoxon signed-rank test was used to analyze the pre-test and posttest scores. The success of the intervention was demonstrated by the growth in mastery level from "average" to "moving towards mastery," as well as the mean percent score rising from 53. 5% to 71.8%. The results demonstrate how technology-enhanced instruction can significantly improve primary students' reading comprehension abilities. The created tool incorporates multimedia components to meet a range of learning demands while providing a learner-centered approach that complies with curriculum standards. This study emphasizes how incorporating technology into foundational education can help close learning gaps and develop critical reading abilities.

Keywords: Technology-enriched lesson, MATATAG Curriculum

INTRODUCTION

The emergence of digital tools in education has revolutionized conventional teaching methodologies. Contemporary students are digital natives, familiar with interactive and multimedia-intensive settings. Pingil (2022) created an instructional module to improve learners' study and cognitive skills and assess its effectiveness, relevance, and acceptance.

The validators see the module as highly functional and relevant. Therefore, adapting this practices only shows that learning process is crucial as the 'MATATAG Curriculum' holistically develop leaners.

Technology enhances engagement and motivation, rendering lessons more dynamic and relevant. Although some educators are adopting technology-enhanced teaching methodologies, there needs to be more thorough validation studies evaluating their efficacy in fulfilling the goals of the Matatag Curriculum. Diallo (2023) reported on the

function and influence of technology in students' reading, as viewed by the school stakeholders involved in the study, to assess the merits of promoting its application and identify key factors to emphasize. Studies demonstrate that technology dramatically affects students' reading skills. Thematic analysis data reveals that technology enhances student autonomy, engagement, motivation, and collaboration.

The integration of technology in education has attracted more in particular to the needs and in response to 21st century learners. The 'MATATAG Curriculum, helps the learners to enhance their critical thinking skills, creativity and collaborative potentials. The proper execution of this curriculum significantly depends on proficient teaching methodologies that integrate technology. Cubillas (2020) validated the efficacy of Strategic Intervention Materials (SIMs) for teaching English to Grade 4 elementary students, deeming them "very satisfactory" as instructional resources for enhancing mastery of underdeveloped competencies.

The development and evaluation of technology-enhanced lessons in the Grade Four 'MATATAG' Curriculum for Reading brings both obstacles and opportunities. This study addresses the least mastered competency in the English 4 course, namely in comprehending literary texts (EN4LR-1.1), as recognized in the 'MATATAG' learning competencies. This research can enhance reading instruction and student results in Grade Four by equipping teachers with a helpful instructional tool. This study aimed to construct and verify a technology-enhanced lesson to improve reading abilities for fourth-grade learners based on a learning competency specified in the new 'MATATAG' Curriculum.

Objective of the Study

This study aimed to develop and validate the technology-enriched lesson in fostering reading skills of grade four learners as outlined in the 'MATATAG' Curriculum.

Specifically, it sought to answer the following specific objectives.

1. Describe the process of developing a technology-enriched lesson in fostering reading skills among grade four learners as anchored on the 'MATATAG' curriculum.

2. Evaluate the validity and reliability of the developed technology-enriched lesson in fostering reading skills among grade four learners as anchored on the 'MATATAG' curriculum through the LRMDS Assessment and Evaluation tool.

3. Compare the pre-test and post-test scores of grade four learners after the implementation of the validated technology-enriched lesson to foster reading skills.

4. Ascertain the significant difference between the Pre-test and post-test scores of grade four learners after implementing the validated technology-enriched lesson in fostering reading skills.

Hypothesis

Ho1: There is no significant difference between the pre-test and post-test scores of grade four learners after implementing the validated technology-enriched lesson to foster reading skills.

LITERATURE REVIEW

The classroom environment and reading sessions among the children have improved. This study shows that the integration of technology in the learning room helps improve children's reading capabilities. Technology, in this case, helps teachers improve their means of teaching, making it interactive by personalizing the materials to suit one's mode of learning.

Wang et al. (2020) showed that gamified reading platforms helped increase learners' interest and participation better than typical reading approaches suggest that gamification helps learners become attentive and participative.

The MATATAG Curriculum also recognizes that technology can be used to involve pupils. Teachers can make the classroom a fun place that inspires a love for reading by using interactive reading technologies. This approach aligns with the curriculum for fourth-grade students to improve comprehension and critical thinking skills.

The idea by Johnson et al., in 2016 is, Digital enables cooperative activities and peer interactions in terms of fostering the exchange of ideas for independently taking on reading tasks.

Peer collaboration enhances critical thinking of comprehension skills and ensures understanding since through texts are discussed by the learners themselves.

Only a few investigations have focused on technology intervention effects on reading programs. Alon et al. (2020) discovered that the use of digital storytelling positively influences learners' reading skills and enhances their overall abilities. The findings of this research demonstrate the capacity of interactive technology to enhance educational engagement. Conversely, the Hattie (2019) research shown that technology-based interventions in various educational contexts enhanced learners' reading skills, particularly via multimedia including gamification. This conclusion is in line with the educational objectives to be achieved in enhancing learning outcomes. Technology can enhance the reading skills of fourth-grade children.

A good research carried out by Hangrove (2019) illustrated that literacy has positive effects for learners by increasing engagement, motivation, and effectiveness when technology is used. Diallo (2023) investigates the influence of technology on students' reading via the perspectives of stakeholders, examines the justification for promoting its use, and emphasizes the enhancement of individual capabilities. Research indicates that technology significantly improves the reading abilities of students and cultivators. The freedom and participation of learners enhance motivation and foster teamwork. Consequently, technology enhances communication and cooperation. The use of technology in learning has sparked much interest, particularly about its impact on reading skills of young learners. The study by IYare et al. (2018) demonstrated that the interactive technology enhances reading skills and vocabulary for third-grade learners more than the conventional teaching methods.

Kama et al. (2018) claim that digital texts enhance literacy skills, decrease errors, and affect reading comprehension for the learner. According to Ziegler (2019), the results of the study reveal that students who were instructed through multimedia had higher grades than those who received traditional instruction. Helmers (2017) pointed out that technology and collaboration were needed to facilitate reading comprehension, suggesting a variety of tools for learning. These studies illustrate the visibility of the technology-literacy nexus, which highlights the benefits of interactive approaches in terms of learners' literacy and shows the usefulness of the same. Digital technologies have drastically affected the reading behaviors of the Alpha Generation of the current teens. Miranda et al. (2023) also looked at the effects of digital reading platforms that exhibit the developmental trends most beneficial to learning. Rivi et al. (2016) demonstrated that technology has improved reading enjoyment through the use of a technological medium. Yusuf (2020) illustrated that reading is a daily activity and presented the effectiveness of ICT in improving learners' reading skills.

Similarly, Thornton (2017) discussed the role and influence of technology on learner experiences. The previous argument shows the digital resources for language arts and art education emphasize the necessity of using it appropriately. It refers to the importance of reading habits and more broadly, practices in educational activities involving learners. Cubillas (2020) made SIMs to enhance eight skills in Elementary English 4, which were agreed upon by expert rating as supporting tools for teachers during the first grading period and beyond. Pingil (2022) developed an instructional module to enhance learners' cognitive abilities, which was rated as very effective and relevant according to the data results. Ballocanag (2023) asserts that institutional resources for reading comprehension should be established, as the nation is seen to be declining in learning according to international evaluations. Developing initiatives that improve educational outcomes.

MATERIALS & METHODS

Research Design

This study utilized a pre-experimental design, specifically a "Pre-test and post-test only Design," as outlined in

the study of Cresswell (2008). This design follows systematic procedures as described by Cresswell: (1) administer a pre-test among the target learners, (2) apply the intervention to the learners, and finally, (3) administer the posttest. According to Harris (2006), this is best suited when evaluating the interventions implemented by a researcher.

Research Locale

This study was conducted in one of the elementary schools situated within the Biliran Division, part of Region VIII-Eastern Visayas, Philippines. The school is in the centre of town. The student population likely will include learners from various socio-economic backgrounds, thus providing a diverse sample for the research. This will help understand how technology-enriched lessons help students with different learning needs and experiences. It is likely to possess a minimum educational infrastructure, including schools and access to Internet connectivity. This will give it some base for implementing and assessing technology-rich lessons. Studying the influence of technology-rich lessons in this context can be very helpful in discovering the effectiveness of such interventions.

Research Instrument

The study utilized a standardized test- questionnaire provided by the Department of Education outlined in the 'Matatag' Curriculum. This questionnaire tests the reading skills of the Grade-4 learners in learning competency, specifically "Identifying author's or speaker's point of view" (EN4LR-1.1), and it was used during the pre-tests and posttests to determine the effectiveness of the technology-enriched lesson. Meanwhile, the researchers adopted the validation tool from LRMDS Assessment and Evaluation, and the same instrument was also used to compute the reliability of the developed lesson. The validation tool was a four-point Likert scale, which was composed of sets of criteria, including content quality, instructional quality, technical quality, and other findings that specifically mentioned the tool's grammatical errors. Meanwhile, in assessing the reliability, the researchers used an inter-rater agreement, and they identified three raters to evaluate their developed tool. The said raters were experts from the respective discipline, to be specific, a master teacher in the field, an English professor from the university, and a school head.

Statistical Analysis

This study utilized the following descriptive and inferential statistics. In descriptive statistics, the researchers utilized frequency, per cent, mean, standard deviation, ranges, maximum scores, and minimum scores in analyzing, interpreting, and comparing the pre-test and posttest scores of the grade four learners. In assessing the reliability of the evaluation tool from LDRMS, Krippendorff's alpha was used to determine the agreement level across three raters who were experts on the material. Meanwhile, for inferential statistics, the Wilcoxon signed-rank test was utilized in determining the difference that is highly significant between the pre-test and posttest scores of the learners since the data is not normally distributed, thus identifying the effectiveness of the developed technology-enriched lesson to foster the reading skills of grade four learners.

RESULT AND DISCUSSION

Development of technology-enriched lesson in fostering reading skills among grade four learners as anchored on the 'MATATAG' curriculum.

The design of a technology-supported reading lesson to strengthen the least-learned competency in the identified elementary school for Grade 4 students. The skill is identifying the point of view of a speaker or author, EN4LR-1.1. A set of interactive games, video courses, and PowerPoint presentations was explicitly designed to involve the students and enhance their understanding. There were three phases in the project's systematic approach: planning, content development, and evaluation.

To determine the least-learned skill based on the outcomes of the first grading period, the planning phase started by collecting data from the school. The researchers ensured that they aligned the tool with the curriculum by using multiple resources, such as teacher's guides, Department of Education Student Learning resources (SLMs), textbooks, and resource modules. The procedure involved establishing a comprehensive timeframe, choosing the validation methodology, and assessing the financial implications of tool development.

The above primary steps ensured the learning materials were relevant, cost-effective, and practicable to use.

In the second phase, content for the learning tool was made and described. Custom video lessons that showed how to realize an author's or speaker's point of view through relatable examples, interactive PowerPoint presentations about explicit and visually appealing content for delivery, and educational games that reinforced the learning objective were all part of this instructional package. All the multimedia elements were incorporated accordingly to enhance student understanding as well as engagement without straying from the DepEd requirements.

The last stage was evaluation and validation. Four evaluators reviewed the generated materials and used a Department of Education standardized criteria to determine the quality of the materials. Some of the evaluation criteria were technical quality, instructional efficacy, content quality, and error identification, which included conceptual, factual, grammatical, and typographical errors. The assessors gave helpful criticism that pointed out advantages and recommended enhancements. Their suggestions were taken into consideration to improve the materials further.

This final learning package is an elaborate, learner-centered intervention developed to help fourth-grade students master the skill of authorial or speaker point of view. It comprises fun, interactive games and animated video courses and visually presents concepts to make learning more engaging and effective. With these multimedia elements, the tool strives to bridge learning gaps for young learners and enhance excellent comprehension skills.

Table 1. Validation result of the developed technology-enriched lesson in fostering reading skills

Factors	Total Points per factor	Obtained Points	Interpretation
A. Content Quality	40	39	Pass
B. Instructional Quality	40	36	Pass
C. Technical Quality	52	50	Pass
D. Other Findings	16	16	Pass

Note: *Any material that fails Factor D must not be recommended for use in public schools until the identified issues have been fixed. A material which Failed in at least one of the four Factors in this rating sheet should not be recommended for possible use in public schools*

The DepEd Learning Resources Development and Management System (LRDMS) evaluation tool was utilized in validating the developed technology-enriched lesson for strengthening Grade 4 reading skills. The outcome of the study revealed that the content meets the needed requirements in all the assessed factors. The lesson was highly relevant to the indicated competency and in line with curriculum requirements, as evidenced by its score of 39 out of 40 in content quality. The content achieved 36 out of 40 marks in terms of instructional quality, which indicates that the content is effective in grabbing students' attention and improving comprehension. The technical quality score obtained by the content was 50 out of 52, meaning that it had good technical features such as clear audio and images and general user accessibility. The 'other findings' category score for this lesson is 16 out of 16, which is ideal, so there were no factual, conceptual, grammatical, or typographical errors.

Any content that fails Factor D or any one of the factors cannot be suggested for use in public schools, according to LRDMS guidelines. The created lesson is considered eligible and prepared for use since it meets all requirements. It ends These findings prove that indeed the content is a thoughtful and reliable tool to be effective when used to enhance the abilities to read for fourth graders, especially when it matters to identify the point of view of an author or speaker.

Table 2. Inter-rater reliability results of the developed technology-enriched lesson in fostering reading skills.

			95% CI	
Factors	Krippendorff's alpha	SE	Lower	Upper
A. Content Quality	0.716	0.405	-0.093	1
B. Instructional Quality	0.716	0.405	-0.093	1
C. Technical Quality	0.764	0.212	0.433	1
D. Other Findings	1.000	0.000	1	1

***Note. 3** raters/measurements.*

Table 2 presents the reliability result of the evaluated tool from 3 raters, Krippendorff's Alpha has been used to evaluate inter-rater reliability since the evaluation tool was ordinal in nature, and the results show that the three raters who evaluated the generated technology-enriched lesson in developing reading abilities had differing degrees of agreement.

The Krippendorff's Alpha values for both instructional quality and content quality are 0.716, indicating a moderate to significant degree of agreement. However, because of a larger range, which is probably caused by the small sample size of raters, the 95% CIs (confidence intervals) for both variables range from -0.093 to 1, suggesting some uncertainty in the reliability estimates.

For Technical Quality, Krippendorff's Alpha is 0.764, meaning that the raters' agreement is at a high level. The narrower confidence interval, from 0.433 to 1, shows that there is greater consistency and reliability in ratings compared to the previous two factors.

Lastly, for Other Findings, the Krippendorff's Alpha is a perfect 1.000, reflecting complete agreement among the raters with no variability in their ratings. This indicates that the raters consistently identified no errors in this category.

Overall, the results demonstrate that the lesson was evaluated with a moderate to high level of reliability across most factors, with Technical Quality and Other Findings showing stronger reliability compared to Content Quality and Instructional Quality.

Table 3. Compared result of Pre-test and Post-test of Grade 4 Learners

Data Description	**Scores**	
	Pre-test	**Post-test**
Number of Learners (n)	40	40
Mean	5.35	7.175
SD	1.272	0.958
Ranges	5	3
Maximum Scores	8	8

Minimum Scores	3	5
Mean Percent Score (%)	53.5	71.75
Interpretation	Average Mastery	Moving Towards Mastery

Based on the table, a marked difference in the student's performance can also be seen in the pre-test and post-test results. Learners were in the "average mastery" level according to the pre-test mean score of 5.35 (SD = 1.27), but the post-test mean score of 7.18 (SD = 0.96) shows progress toward "moving towards mastery." This improvement is bolstered by the mean per cent score rising from 53.5% in the pre-test to 71.75% in the post-test. Moreover, a post-test with a narrow range of 5 to 3 and a higher minimum score of 5-point to more consistent and enhanced student performance.

Table 2: Significant difference between Pre-test and Post-test Scores

Measure1	Measure 2	W	z	p	Decision
Pre-test	Post-test	26.5	-4.725	<0.001	Reject Ho

Note. *Wilcoxon signed-rank test.*

After the technology-enriched lesson, the scores in the pre-test and the posttest of the grade 4 students in regard to the Wilcoxon signed-rank test, a test designed for non-parametric data showed considerable difference, as can be seen in Table 2. With a z-value at -4.725 and having a test statistic (W) of 26.5, the paired scores exhibited statistical difference. The p-value of less than 0.001 was way beyond the conventional significance criterion of 0.05. The null hypothesis, therefore, that there is no significant difference between the pre-test and posttest scores, was rejected. That the students' posttest performance improved significantly means that the technology-enhanced class enhanced their reading abilities, particularly in recognizing the point of view of an author or speaker.

CONCLUSION

A successful instructional innovation was the development of a technology-enhanced lesson A successful instructional innovation was the development of a technology-enhanced lesson designed to improve the reading abilities of Grade 4 students, precisely the least-learned skill of recognizing the point of view of a speaker or author (EN4LR-1.1). To align with the 'MATATAG' curriculum and standards of DepEd, the intervention was designed to incorporate interactive multimedia elements such as games, video lessons, and PowerPoint presentations guided by a systematic planning, content development, and evaluation process. Validation results met all the requirements set for the DepEd Learning Resources Development and Management System: excellent technical quality, instructional efficacy, and content quality. The inter-rater reliability study confirmed the tool's credibility, showing moderate to high agreement among the raters. Moreover, posttest results revealed higher mastery levels and a statistically significant score increase ($p < .001$) established that the learners' reading comprehension had improved significantly.

These results reveal how technology-supported teaching resources can fill learning gaps and raise reading comprehension and performance. The developed resources offer a sustainable and scalable methodology for reinforcing elementary school students' core literacy skills.

RECOMMENDATIONS

The recommendations put forward by the researchers are as follows:

1. Elementary school teachers can bridge students' learning gaps with the help of the positive impacts of technology-enriched teaching, including identifying an author's point of view. By making use of

multimedia resources like games, movies, and slide presentations in their teaching strategies, they can create engaging and effective learning activities that supplement curriculum-based standards and foster understanding.

2. Encourage your child to use the educational resources that are developed by this study to practice reading at home, such as interactive games and video sessions. Encouraging your kid to use these materials will help build their confidence in reading skills and reinforce what they learn at school.

3. Future researchers should build on this study by exploring how technology-assisted instruction can cover additional crucial literacy skills or subject areas. They should also explore their long-term effects on student learning and consider creating resources that can be used by students with different requirements to ensure sustainability and inclusivity in educational innovations.

DECLARATION BY AUTHORS

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