Universe International Journal of Interdisciplinary Research
(International Peer Reviewed Refereed Journal)
DOI No. – 08.2020-25662434
© UIJIR | ISSN (O) – 2582-6417
OCT 2025 | Vol. 06 Issue 05
www.uijir.com

COMPARATIVE STUDY ON THE EFFECTIVENESS OF ELECTRONIC FLIPBOOK VS. PRINTED STORYBOOK IN TEACHING ENVIRONMENTAL CONSERVATION CONCEPTS TO GRADE 3 PUPILS

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ABSTRACT

This study investigated the effectiveness of electronic flipbooks and printed storybooks in teaching environmental conservation concepts to Grade 3 pupils at Baquilan Resettlement School II, Zambales, during the school year 2024–2025. The study employed a quasi-experimental design with two intact classes serving as control and experimental groups. The respondents of the study were the 65 Grade 3 pupils of Baquilan Resettlement School II. The printed big book version of "Ang Pagsisisi ni Lebron" was used for the control group, while the experimental group engaged with its electronic flipbook counterpart via the 3D Pageflip application. A researcher-made 15-item quiz served as a pre-test and post-test. Results revealed significant improvement in both groups: the control group's mean score increased from 4.69 to 11.53, while the experimental group's mean score rose from 5.63 to 12.03. However, the comparative analysis of post-test scores showed no significant difference, indicating that both formats were equally effective. This aligns with prior studies (Hennessy, 2006; Guzey, 2009) emphasizing that both traditional and technology-based tools can effectively support learning when pedagogically grounded. Findings suggest that educators may flexibly adopt either format depending on resources, with both fostering environmental awareness among young learners.

Keywords: Electronic Flipbook, Printed Storybooks, Quasi-experimental design

DOI Link :: https://doi-ds.org/doilink/11.2025-92131246/UIJIR

INTRODUCTION

In the 21st-century classroom, the integration of technology and culturally responsive pedagogy has become essential, especially in science education. As environmental issues grow more urgent, early education must instill conservation values in learners. This study investigates how two instructional formats—electronic flipbooks and printed storybooks—impact Grade 3 pupils' understanding of environmental conservation at Baquilan Resettlement School II, Zambales. The story "Ang Pagsisisi ni Lebron," developed by the Department of Education's Bureau of Learning Resources, serves as the core material. The research is grounded in constructivist theory, emphasizing active learning, contextual relevance, and learner engagement.

The study is particularly relevant in Indigenous Peoples (IP) communities, where access to digital tools is limited but growing. It explores how technology-enhanced learning can complement traditional methods, offering insights for educators navigating resource constraints while striving to deliver inclusive, values-based science instruction.

RESEARCH PROBLEM

A comparative study to evaluate the effectiveness of electronic flipbooks versus printed storybooks in enhancing Grade 3 pupils' understanding of environmental conservation at Baquilan Resettlement School II, Malomboy, Botolan, Zambales.

OBJECTIVES

- To evaluate the effectiveness of electronic flipbooks and printed storybooks in teaching environmental conservation concepts.
- To determine which format yields greater improvement in comprehension and retention.
- To provide evidence-based recommendations for instructional material selection in low-resource, culturally diverse classrooms.
- To contribute to the discourse on blended learning and its applicability in early science education.
- To support the development of inclusive, engaging, and context-sensitive teaching strategies for IP learners.

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MATERIAL AND METHODS

The study utilized a quasi-experimental design, appropriate for natural classroom settings where random assignment is not feasible. Two intact Grade 3 classes were designated as control and experimental groups. The control group used the printed big book version of "Ang Pagsisisi ni Lebron," while the experimental group accessed its electronic flipbook counterpart via the 3D Pageflip application.

Part A: Participants. Purposive sampling was used, involving all 65 Grade 3 pupils at Baquilan Resettlement School II. Each section had 32 pupils, randomly assigned via draw lots to ensure fairness and reduce selection bias.

Section	Enrollees
1 (Control)	32
2 (Experimental)	32

Part B: Instruments. A researcher-made, quality-assured 15-item quiz was administered as both pre-test and post-test. The quiz was validated by the school's Master Teacher and Research Coordinator to ensure reliability. Both groups followed identical lesson procedures, with the only variable being the format of the storybook presentation.

Part C: Data Collection and Analysis. Data were collected through direct classroom implementation and analyzed using Microsoft Excel's Data Analysis Toolpack. A two-tailed t-test was used to determine statistical significance at a 0.05 alpha level. The study also considered contextual observations and pupil engagement during sessions.

RESULTS

Table-1: Control Group (Printed Storybook)

Metric	Pre-Test	Post-Test
Mean	4.69	11.53
Variance	3.71	4.45
t Stat	11.93	
T Critical	2.04	
Significance	Significant	

The control group showed a substantial increase in scores, indicating the effectiveness of printed storybooks in conveying environmental concepts.

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Table-2: Experimental Group (Electronic Flipbook)

Metric	Pre-Test	Post-Test
Mean	5.63	12.03
Variance	6.18	3.97
t Stat	11.54	
T Critical	2.04	
Significance	Significant	

The experimental group also demonstrated significant improvement, suggesting that digital formats can be equally effective when pedagogically grounded

Table 3: Comparison of Post-Test Scores

Group	Mean	Variance	t Stat	t Critical	Significance
Electronic Flipbook	12.03	3.97	0.98	2.04	Not Significant
Printed Storybook	11.53	4.45	-	-	-

Although the electronic flipbook group had a slightly higher mean score, the difference was not statistically significant.

DISCUSSION

The results of this study affirm that both printed and electronic storybooks significantly enhance Grade 3 pupils' understanding of environmental conservation concepts. The statistically significant gains in both groups' post-test scores demonstrate that narrative-based instruction—regardless of format—can effectively support science learning when aligned with pedagogical principles and contextual relevance.

The slight edge in mean scores for the electronic flipbook group, though not statistically significant, suggests that digital formats may offer additional engagement benefits. Features such as animated page transitions, interactive visuals, and the novelty of using technology can stimulate curiosity and motivation, particularly among digital-native learners. This aligns with Boholano's (2021) assertion that 21st-century learners thrive in environments that integrate familiar digital tools.

However, the printed big book format also proved highly effective, especially in fostering communal learning experiences. In IP classrooms like Baquilan Resettlement School II, storytelling is not just instructional—it is cultural. Printed storybooks allow for shared reading, teacher-led dramatization, and

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tactile interaction, which are deeply rooted in Indigenous pedagogical traditions. These elements support social-emotional development, oral language skills, and values formation, reinforcing the idea that learning is relational and embodied.

The findings also highlight the importance of pedagogical consistency. Both groups followed the same lesson procedures, ensuring that the observed gains were attributable to the format of the material rather than differences in instruction. This reinforces the principle that how a story is taught matters as much as what is taught. When educators use culturally relevant narratives, scaffold comprehension, and facilitate discussion, learners are more likely to internalize key concepts—whether through paper or screen.

Another key insight is the role of contextual relevance in environmental education. In Baquilan, the abundance of natural resources may contribute to a false sense of environmental security among pupils. The story "Ang Pagsisisi ni Lebron" addresses this by presenting a relatable character who learns the consequences of neglecting nature. This narrative approach helps bridge the gap between pupils' lived experiences and abstract conservation principles, making the lesson more meaningful and memorable.

The study also opens up conversations about digital equity and blended learning. While electronic flipbooks offer dynamic features, their effectiveness depends on access to devices, electricity, and stable internet—resources that may be limited in IP schools. The comparable effectiveness of printed storybooks underscores the value of low-tech solutions that are sustainable and inclusive. At the same time, the success of the digital format suggests that even minimal ICT integration—such as using offline apps like 3D Pageflip—can enhance learning when thoughtfully implemented.

From a curriculum development perspective, the findings support the use of blended storytelling models. Strategies such as rotational reading, flipped classrooms, and digital companions to printed texts can cater to diverse learning styles and foster deeper engagement. These approaches also promote digital literacy, preparing pupils to navigate and critically evaluate information in a technology-driven world.

Finally, the study underscores the need for teacher capacity-building. Effective use of both formats requires educators to be skilled in storytelling, classroom facilitation, and basic ICT operations. Professional development programs should therefore include training on integrating narrative-based instruction with digital tools, adapting materials for local contexts, and assessing learning outcomes holistically.

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In sum, this research contributes to the growing body of evidence that format flexibility, cultural relevance, and pedagogical intentionality are key to effective science instruction. It invites educators, curriculum developers, and policymakers to recognize that innovation is not limited to technology—it includes the creative, values-driven use of stories to shape young minds and nurture environmental stewardship.

CONCLUSION

This research concludes that both electronic flipbooks and printed storybooks are effective in teaching environmental conservation to Grade 3 pupils. The choice of format can be guided by resource availability, learner preference, and instructional goals. For IP schools and other resource-constrained settings, this flexibility is crucial.

The study advocates for a blended approach that leverages the strengths of both formats. It also underscores the need for culturally responsive materials that reflect learners' realities and values. By integrating technology with narrative-based instruction, educators can foster deeper engagement, critical thinking, and environmental stewardship among young learners.

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