



Development of Flipbook Based Learning Media to Enhance Elementary Students' Reading Interest and Learning Outcomes

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Abstract: This study aims to develop Flisco, a Flipbook Scan Code literacy-based learning medium themed around family and community traditions for third-grade elementary school students, and to evaluate its feasibility and effectiveness in improving students' literacy interest and learning outcomes. This study employed a mixed-methods approach combining qualitative and quantitative methods within a Research and Development (R&D) framework consisting of eight systematic development stages, with a focus on expert validation and field testing. The study was conducted at SDN Sidomulyo 1 involving 30 students selected through saturated sampling, while 15 students from SDN Sidomulyo 3 participated in a small-scale trial selected through purposive sampling. Data were collected through pretest and posttest assessments as testing techniques, and through observations, interviews, Likert-scale questionnaires, and documentation as non-testing techniques. The validity of the test instruments was established using the Pearson correlation method on 30 items at a significance level of $\alpha = 0.05$. Data analysis involved normality testing, homogeneity testing, paired-samples t-test, and N-Gain analysis. The validation results from material and media experts indicated that Flisco was categorized as "highly feasible," with scores of 96% and 94%, respectively. The paired-samples t-test showed a correlation coefficient of 0.787 with a significance value of $p < 0.001$, confirming that Flisco significantly improved students' IPAS learning outcomes. The N-Gain score of 76.15% was categorized as high. Furthermore, literacy interest measurements showed that 76.7% of students achieved the very high category, while 23.3% were categorized as high. These findings demonstrate that Flisco is a valid, feasible, and effective literacy-based learning medium that provides an innovative alternative for enhancing elementary school learning experiences.

Article History

Received: 04-04-2026

Revised: 12-05-2026

Accepted: 09-06-2026

Published: 20-07-2026

Key Words:

Flipbook Scan Code;
Learning Media; Literacy
Interest; Learning
Outcomes; Elementary
Education.

How to Cite: Fitrianti, N., & Astuti, T. (2026). Development of Flipbook Based Learning Media to Enhance Elementary Students' Reading Interest and Learning Outcomes. *Jurnal Paedagogy*, 13(3), 1177-1187. <https://doi.org/10.33394/jp.v13i3.20149>



<https://doi.org/10.33394/jp.v13i3.20149>

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Introduction

The advancement of the digital age requires a thorough transformation of the educational process, especially in leveraging information and communication technology to improve the overall quality of student learning outcomes. This shift has significantly impacted education, where the quality of learning is no longer determined solely by curriculum and facilities, but also by teachers' capacity to innovate in designing effective, engaging, and responsive learning processes that meet students' needs in the digital age (Ramadhan et al., 2025). Therefore, teachers need to develop creative and innovative learning strategies to foster an enjoyable learning environment, ensuring that students remain motivated and do not experience boredom during the learning process (Astuti et al., 2024). Under the Regulation of the Minister of Education, Culture, Research, and Technology



Number 56 of 2022, Based on the Ministerial Regulation on Education, Culture, Research, and Technology Number 56 of 2022, teachers are defined as professional educators whose role extends beyond knowledge transmission to encompass value formation, character development, and the facilitation of students' overall potential. In alignment with this role, the present study introduces Flisco (Flipbook Scan Code), a literacy-based learning medium that integrates text, images, videos, and barcode-based educational games, thereby supporting teachers in facilitating the holistic development of students' potential, particularly in enhancing literacy interest and IPAS learning outcomes.

Low literacy culture among students remains one of the primary challenges in national education. Data from CEOWorld Magazine 2024 indicates that Indonesia ranks 31st globally in reading time, averaging 129 hours per year (Aderson, 2024), and while this places Indonesia third in Southeast Asia, it does not yet reflect a strong national literacy culture. In response, the government issued Ministerial Regulation on Education and Culture Number 23 of 2015, introducing a 15-minute pre-lesson reading program to systematically strengthen literacy from the elementary level. Syafitri & Yamin (2022) assert that literacy culture holds considerable potential in shaping students' reading interest, as children accustomed to reading through shared reading, home book access, or regular library visits are more likely to develop the habit organically. Nadya et al. (2025) further emphasize that early literacy cultivation builds strong reading skills and learning outcomes, better equipping students to focus, comprehend content, and navigate academic challenges independently.

According to Suriandari & Harahap (2024), illustrated Flipbook media is highly suitable for classroom use and can improve student learning outcomes in social studies subjects. This suggests that the visual presentation of Flipbook makes subject matter more accessible and engaging compared to conventional textbooks. Students tend to retain information presented visually more effectively than dense text, making illustrated Flipbooks an effective approach to improving comprehension of social studies content. Pangestu et al. (2024) further found that Flipbook use significantly contributes to enhancing literacy interest among elementary school students, as students become more motivated to read when materials are presented in an attractive and enjoyable format. Students who previously showed little interest in reading often begin to demonstrate engagement when presented with materials that differ visually from conventional books, which constitutes the primary strength of Flipbook media in fostering early literacy interest. Amalia & Fathurrahman (2023) evaluated the effectiveness of Flipbook media and concluded that it is both feasible and effective for use in learning, as evidenced by high acceptance rates from both teachers and students, establishing Flipbook as a relevant alternative medium aligned with students' classroom needs. When both teachers and students find a learning medium comfortable and beneficial, the learning process flows more smoothly and instructional objectives are more readily achieved. Flipbooks designed to be engaging and interactive have been shown to increase student learning enthusiasm and promote the development of more critical reading comprehension (Mirnawati & Fabriya, 2022), indicating that Flipbooks not only stimulate visual interest but also encourage deeper engagement with content, fostering meaningful reading habits through curiosity-driven interaction. However, despite these promising findings, prior studies on Flipbook media reveal several notable limitations that underscore the necessity of the present study. Most existing Flipbook-based research has focused predominantly on static digital formats that, while visually appealing, lack interactive and technology-integrated features capable of sustaining student engagement in increasingly digitally oriented learning environments. Furthermore, previous studies have largely



examined Flipbook effectiveness in social studies or general literacy contexts, with limited attention given to its application in science-integrated subjects such as IPAS at the elementary level. Crucially, no prior study has explored the integration of scan code (QR code) technology within a Flipbook medium to embed multimedia content and game-based learning elements, a combination that characterizes the innovation proposed in Flisco. This gap in the literature spanning interactive multimedia integration, subject-specific application, and technology enhanced engagement justifies the urgency of developing and empirically testing Flisco as a more comprehensive, responsive, and contextually relevant learning medium for elementary school students.

Based on interviews conducted with the Grade 3 classroom teacher, the school principal, and students at SDN Sidomulyo 1, it was concluded that Natural and Social Science (IPAS) is among the least favored subjects, as reflected in low learning outcomes and limited literacy engagement. This condition is attributed to insufficient variation in learning media, suboptimal implementation of the 15-minute literacy program, and the absence of a reading corner in classrooms. Furthermore, students showed limited understanding of family and community traditions, largely due to the predominantly textual delivery of content that lacks contextual learning experiences. For instance, traditions such as Tedak Siten from Central Java are difficult for students to appreciate without engaging and culturally relevant media. Accordingly, there is a need for learning media that not only presents information visually but also stimulates students' curiosity and appreciation for local cultural heritage.

In response to these challenges, the novelty of this study lies in the development of Flisco (Flipbook Scan Code), an enhanced Flipbook that integrates text, illustrative images, videos, and barcode-based educational games within a single unified medium. Unlike conventional Flipbooks developed in prior studies, Flisco enables students to access multimedia content directly by scanning barcodes using digital devices, while also being printable as a conventional book to accommodate limited technological access in elementary schools. This novelty positions Flisco as an integrated solution bridging the gap between digital and conventional learning in the context of Indonesian elementary education. This study aims to develop Flisco, a literacy-based learning medium on the theme of family and community traditions for Grade 3 IPAS students, and to analyze its feasibility and effectiveness in enhancing students' literacy interest and learning outcomes.

Research Method

This research utilized a mixed-methods design that combines both qualitative and quantitative approaches through a Research and Development (R&D) framework. The R&D model adopted in this study is Sugiyono (2023), adaptation of the Borg and Gall model, which simplifies the original ten stages into a more applicable framework suited to educational research contexts at the elementary school level. According to Sugiyono (2023), R&D is a research method used to produce new products or refine existing ones while simultaneously testing their effectiveness. Sugiyono's adaptation retains the core developmental principles of the original Borg and Gall model including needs analysis, design, development, validation, and testing while offering greater flexibility in implementation, particularly within the Indonesian educational setting. This approach was selected as it provides a comprehensive understanding of both the media development process and the measurement of its effectiveness. The focus of this study is the development of an innovative literacy-based learning medium known as Flisco, designed to enhance the literacy interest and learning outcomes of Grade 3 students at SDN Sidomulyo 1.



The development procedure of Flisco media is grounded in Sugiyono's R&D model (Sugiyono (2023)), comprising eight sequential and interrelated stages: potential and problem identification, data collection, product design, design validation, design revision, small-scale trial, product refinement, and large-scale usage trial. Each stage was carried out systematically to ensure that the resulting medium met quality standards in terms of content, feasibility, and effectiveness prior to broader implementation.

This research was carried out at SDN Sidomulyo 1, Sidomulyo Village, Wonosalam District, Demak Regency, Central Java. The research population comprised all Grade 3 students at SDN Sidomulyo 1. Sampling was carried out using a saturated sampling technique, in which all 30 Grade 3 students served simultaneously as both the sample and the population. For the small-scale trial, 15 Grade 3 students from SDN Sidomulyo 3 were selected through purposive sampling based on academic achievement level, comprising 5 high-achieving students, 5 moderately-achieving students, and 5 low-achieving students.

Data were gathered using both test and non-test techniques. The test technique, consisting of pretest and posttest assessments, was used to collect data on students' learning outcomes prior to and following the implementation of Flisco media. Non-test techniques included observation, interviews, and Likert scale questionnaires to measure students' literacy interest, while documentation served as supporting data throughout the research process. Research instruments consisted of test items and questionnaires. Pretest and posttest instruments were used to measure students' learning outcomes, while questionnaires were used to assess literacy interest. Validity and reliability were calculated using the following formulas:

$$r_{pbi} = \frac{Mp - Mt}{St} \times \sqrt{\frac{p}{q}}$$

Table 1. Instrument Validity Criteria

Result	Criteria
r_{pbi}	Valid
r_{pbi}	Not valid

(Kasmadi & Sunariah, (2017)

$$r_{11} = \left(\frac{n}{n-1} \right) \left(\frac{s^2 - \sum pq}{s^2} \right)$$

Table 2. Instrument Reliability Coefficient Criteria

Co-Coreollation	Corelation	Interpreted Reability
$0,90 \leq r \leq 1,00$	Very High	Very Good
$0,70 \leq r \leq 0,90$	High	Good
$0,40 \leq r \leq 0,70$	Moderate	Fairly Good
$0,20 \leq r \leq 0,40$	Low	Poor
$R < 0,20$	Very Low	Very Low

(Arikunto, 2016)

The feasibility of the learning medium and its content was assessed by media and content experts based on their respective validation scores, with reference to the interpretation criteria outlined in Table 3.

$$\text{Validation Percentage} = \frac{\text{Total Score Obtained}}{\text{Maximum Score}} \times 100\%$$



Table 3. Expert Validation Interpretation Criteria

Percentage	Criteria
$82\% < x \leq 100\%$	Very Feasible
$63\% < x \leq 81\%$	Feasible
$44\% < x \leq 62\%$	Fairly Feasible
$25\% < x \leq 43\%$	Not Feasible

(Budiastuti & Bandur, 2018)

Pretest and posttest data were analyzed using normality testing, homogeneity testing, paired sample t-test, and N-Gain analysis to measure the effectiveness of the medium on students' learning outcomes, with all statistical analyses performed using IBM SPSS Statistics version 27. Students' literacy interest was measured using a Likert scale with a score range of 1 to 5 per item, and subsequently analyzed using the same statistical procedures to determine the improvement in literacy interest before and after the use of Flisco media. The normality test, homogeneity test, paired sample t-test, and N-Gain values were calculated using the following formulas.

- 1) Normality Test (Sugiyono, 2023)

$$X^2 = \sum_{i=1}^k \frac{(F_o - F_h)^2}{F_h}$$

- 2) Homogeneity Test (Supriadi, 2021)

$$F = \frac{\text{Largest Variance}}{\text{Smallest Variance}}$$

- 3) Paired Sample T-Test (Sugiyono, 2023)

$$t = \frac{x_1 - x_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_1} - 2r \cdot \left(\frac{s_1}{\sqrt{n_1}}\right) \left(\frac{s_2}{\sqrt{n_2}}\right)}}$$

- 4) N-Gain Test (Latri *et al*, 2021)

$$N - Gain = \frac{Sp_{posttest} - Sp_{pretest}}{Sm_{aksimum} - Sp_{pretest}}$$

The N-Gain score interpretation criteria used in this study are presented in Table 4.

Table 4. N-Gain Interpretation Criteria

N-Gain Score	Criteria
$N-Gain \geq 0,7$	Effective
$0,3 \leq N-Gain < 0,7$	Fairly Effective
$N-Gain < 0,3$	Less Effective

(Latri *et al*, 2021)

Results and Discussion

Feasibility of Flisco Learning Media

The development of Flisco (Flipbook Scan Code) media yielded a literacy-based learning product that underwent validation by both content and media experts. The results of the expert validation are summarized in Table 5 below.

Table 5. Expert Validation Results of Flisco Media

No	Aspect	Score	Max Score	Percentage
Content Expert				
1	Content Material	25	25	100%
2	Material Presentation	25	25	100%



3	Literacy	22	25	88%
Total		72	75	96%
Media Expert				
1	Cover and Initial Display	17	20	85%
2	Component Completeness	20	20	100%
3	Content Quality and Presentation	20	20	100%
4	Media Attractiveness	17	20	85%
5	Ease of Use	20	20	100%
Total		94	100	94%

These high validation percentages indicate that the presented content was assessed as appropriate, accurate, and pedagogically relevant, while the visual and technical aspects of the medium met the quality standards required for elementary-level learning. This high level of feasibility is attributable to the media design process, which integrates text, images, instructional videos, and barcode-based educational games within a unified platform, enabling students to process information through multiple channels simultaneously.

Digital flipbook media integrating text, images, and educational games has proven to be a highly feasible innovation for IPAS instruction, presenting material visually and interactively to ensure active student engagement. Its page-turning interface creates a more engaging experience relative to conventional media, a finding consistent with (Pigai & Yulianto, 2024). who demonstrated that digital flipbook-based media is highly feasible and capable of generating compelling learning experiences. However, such success depends on a systematic development process encompassing validation by domain experts across content, visual design, and language readability, as evidenced by Ni'mah, (2024), whose systematically developed flipbook attained very good feasibility ratings and positive student responses. Together, these findings reinforce Flisco's position as a medium that meets technical and content feasibility standards while remaining relevant to the characteristics and learning needs of primary school students.

From a pedagogical standpoint, the design of Flisco aligns with Vygotsky's (1978) constructivist theory Saksono et al. (2023), which emphasizes that knowledge is actively constructed through interaction with the learning environment. In this framework, Flisco functions as scaffolding within the Zone of Proximal Development (ZPD), enabling students to independently scan barcodes, access videos, and engage with educational games bridging the gap between their current abilities and potential, without supplanting the teacher's role. This pedagogical alignment is further confirmed by overwhelmingly positive user responses, with students scoring 92% (mean 4.60) and teachers 95% (mean 4.75) on a 1–5 scale. These findings suggest that Flisco is not merely a supplementary tool, but a meaningful instructional medium that effectively supports learning outcomes for Grade 3 students across both digital and print environments.

Effectiveness of Flisco Media on Student Learning Outcomes

Prior to effectiveness testing, the normality of pretest and posttest data from both the small-scale class ($n = 15$) and the large-scale class ($n = 30$) was first examined using the Shapiro-Wilk method. The results indicated that all data yielded significance values greater than 0.05, as presented in Table 5, leading to the conclusion that the data were normally distributed and therefore met the requirements for further parametric analysis. This step is essential, as without first establishing data normality, the validity of subsequent statistical analyses cannot be assured and may produce inaccurate conclusions.

**Table 6. Normality Test Results of Pretest and Posttest Data**

Group	Shapiro-Wilk		
	Statistic	df	Sig.
Pretest A (Small Class)	0,924	15	0,220
Posttest A (Small Class)	0,899	15	0,093
Pretest B (Large Class)	0,945	30	0,126
Posttest B (Large Class)	0,931	30	0,051

The homogeneity test using Levene's statistic yielded a significance value of 0.843, as presented in Table 6, indicating that the variance of posttest data across groups was homogeneous. The fulfillment of both normality and homogeneity assumptions confirms that the obtained data are of good quality and representative, ensuring that the academic analysis results are statistically justifiable.

Table 7. Homogeneity Test Results

Score	Levence Statistic	df1	df2	Sig.
Based on Mean	0,040	1	43	0,843
Based on Median	0,053	1	43	0,820
Based on Median and with adjusted df	0,053	1	41,640	0,820
Based on trimmed mean	0,036	1	43	0,851

The Paired Sample T-Test results yielded a correlation value of 0.787 with a significance level of <0.001 . Based on the decision-making criteria, if the significance value is less than 0.05, the alternative hypothesis (H_1) is accepted, whereas if the significance value exceeds 0.05, the null hypothesis (H_0) is rejected. Given that the obtained significance value of <0.001 is less than 0.05, H_1 is therefore accepted. The correlation value of 0.787 further indicates a strong relationship between pretest and posttest results, suggesting that the improvement in students' learning outcomes occurred consistently and was not attributable to chance. Accordingly, the Flisco (Flipbook Scan Code) literacy-based learning medium developed in this study is both feasible and effective in improving the Natural and Social Science learning outcomes of Grade 3 students at SDN Sidomulyo 1.

Table 8. Paired Sample T-Test Results

Pair 1	N	Correlation	Sig.
Pretest & posttest	30	0,787	<0.001

The N-Gain analysis yielded an N-Gain score of 0.7615, or 76.15%, with a standard deviation of 0.17230, classified in the high category as it satisfies the criterion of $N\text{-Gain} \geq 0.7$. The N-Gain test was employed to determine whether an improvement in students' learning outcomes occurred before and after instruction using the Flisco literacy-based learning medium. An N-Gain score of 76.15% represents a substantial achievement, demonstrating that Flisco successfully brought about real and measurable learning improvement in students. The findings reveal a notable improvement in students' learning outcomes following the use of Flisco literacy-based learning medium, with the level of improvement classified as high. In other words, the implementation of Flisco literacy-based learning medium has been proven effective in enhancing students' learning outcomes, as reflected by an N-Gain score of 0.7615, or 76.15%, which surpasses the threshold for the high N-Gain category of ≥ 0.7 .

Table 9. N-Gain Test Results

Pair 1	N	Minimum	Maximum	Mean	Std. Deviation
NGain Score	30	0,33	1,00	0,7615	0,17230
NGain Persen	30	33,33	100,00	76,1508	17,23008
Valid N (listwise)	30				



The Paired Sample T-Test result yielding a significance value of <0.001 constitutes robust statistical evidence that the use of Flisco media produced a tangible impact on the improvement of students' learning outcomes. This finding is consistent with the study by Sudarto et al. (2025), which demonstrated that the use of interactive flipbook media significantly influenced IPAS learning outcomes, as evidenced by a substantial increase in students' mean scores from pretest to posttest. Sudarto further affirmed that interactive flipbook media successfully created a more student-centered learning environment, facilitating the comprehension of abstract concepts, enhancing learning independence, developing critical thinking skills, and fostering positive attitudes throughout the learning process. This achievement aligns with the N-Gain score of 0.7615, classified in the high category, further confirming that the observed improvement in learning outcomes was not coincidental but rather a direct consequence of Flisco media's effectiveness in facilitating meaningful and structured student learning. This effectiveness is also attributable to the design of Flisco media, which promotes active student engagement through various interactive elements, transforming the learning process from a unidirectional transmission into a dynamic and enjoyable learning experience with a significant impact on Grade 3 students' mastery of IPAS content.

Improvement in Student's Literacy Interest

Literacy interest measurement using Likert scale questionnaires administered to 30 students revealed that the highest score was 97, the lowest was 86, and the mean score was 91.5. These results indicate that students overall demonstrated high interest in literacy activities while using Flisco media, as even the lowest score remained considerably above the low category threshold. The analysis showed that 23 students (76.7%) were in the very high category and 7 students (23.3%) in the high category, with no students falling into the low category. This distribution is noteworthy, as it is uncommon for an entire class to collectively achieve high or very high categories simultaneously. These findings indicate that all students responded enthusiastically to Flisco media and were actively engaged in literacy activities. Such enthusiasm likely emerged because students perceived learning with Flisco as distinctly different from conventional approaches more enjoyable, more interactive, and less monotonous naturally motivating them to continue reading and exploring the medium's content. This high level of literacy interest is supported by interactive features such as barcode-integrated videos and educational games that offer a qualitatively different learning experience compared to conventional media. Literacy culture holds considerable potential in influencing the reading interest of elementary school students (Lehan et al., 2023), as demonstrated through the implementation of digital literacy media assisted by locally-informed flipbooks, which elicited highly positive student responses in online learning settings. This further reinforces the conviction that selecting media that is relevant to students' lives is substantially more effective than relying solely on static textbooks. Students need to perceive that the material they are studying is connected to their world, and Flisco successfully bridges this gap through contextually packaged content that is readily comprehensible to Grade 3 elementary school students.

These findings confirm that innovative and interactive media can significantly stimulate the growth of students' literacy interest (Sari et al., 2025), as demonstrated by substantial improvements in student learning outcomes after the implementation of science flipbook media. Flisco extends these findings by demonstrating that the addition of barcode-based multimedia elements enabled 76.7% of students to attain the very high literacy interest category an achievement not previously reported in studies utilizing flipbook media. This



demonstrates that innovation in learning media does not merely add visual variety but tangibly contributes to an overall improvement in the quality of students' learning experiences. Furthermore, this achievement indicates that Flisco media functions not only as a learning tool but also as a catalyst for literacy enthusiasm, the impact of which can be directly experienced by students throughout the learning process.

The high level of students' literacy interest is inseparable from the characteristics of Flisco media, which introduces a new learning experience through the integration of barcode-based videos and educational games. According to Nurdiansah (2022), flipbook media packaged in a modern and interactive manner has been shown to consistently stimulate students' reading motivation, which is particularly relevant to today's digitally-oriented generation. This is consistent with the findings of the present study, in which no student fell into the low literacy interest category, reflecting that all students responded enthusiastically to Flisco media throughout the learning process.

Thus, the integration of barcode-based multimedia in Flisco has been demonstrated to not only improve cognitive learning outcomes but also to cultivate students' literacy interest and culture from an early age, while affirming that innovative learning media plays a strategic role in fostering a generation of independent and avid readers. Cultivating a literacy culture from an early age is admittedly not an endeavor that can be accomplished within a short timeframe; however, with engaging and enjoyable media such as Flisco, this process becomes considerably more accessible and effective, as students do not feel burdened but rather find genuine enjoyment in the experience.

Conceptually, these findings support multimedia learning theory, which argues that students learn more effectively when verbal and visual information are presented together, as evidenced by the N-Gain score of 0.7615 (76.15%) in the high category and 76.7% of students attaining the very high literacy interest category. The integration of scan code technology within a print-based flipbook demonstrates that hybrid media combining physical and digital elements can be a practical and affordable approach to technology-enhanced learning in elementary schools. Practically, Flisco offers classroom teachers a replicable model for developing literacy-based media without requiring advanced technical skills, while for school administrators and policymakers, these results reinforce the importance of supporting innovative media development aligned with national literacy goals, as outlined in Ministerial Regulation Number 23 of 2015 on the School Literacy Movement.

Conclusion

This study produced a literacy-based learning medium known as Flisco (Flipbook Scan Code), an innovative integrated flipbook that combines text, images, illustrative videos, and barcode-based educational games within a single medium, while also being printable as a conventional book, thereby enabling its use in schools with limited technological access. This medium has been demonstrated to be feasible, effective, and capable of enhancing the literacy interest of Grade 3 students in the Natural and Social Science (IPAS) subject. Expert validation by both content and media specialists confirmed that Flisco meets the quality standards required for elementary-level learning, with both aspects receiving very feasible ratings. This assessment was further reinforced by consistently positive responses from students and teachers, reflecting a high degree of acceptance and comfort in using the medium during the learning process. In terms of effectiveness, statistical analysis confirmed a significant improvement in students' learning outcomes before and after the use of Flisco, with the normalized gain falling in the high category, indicating that the medium contributed



meaningfully to students' academic progress. In addition, the overwhelming majority of students demonstrated very high literacy interest, with the remaining students achieving the high category, suggesting that the integration of barcode-based multimedia genuinely stimulated students' motivation and engagement with reading. Taken together, these findings confirm the research hypothesis that Flisco significantly enhances both the literacy interest and learning outcomes of Grade 3 IPAS students compared to conventional media, rendering it worthy of broader implementation and further development across other subject matter and grade levels.

Recommendation

It is therefore suggested that teachers utilize this medium as an innovative alternative instructional tool. For future research, it is recommended to broaden the development of Flisco media across other subject areas and grade levels by involving larger and more diverse samples in order to strengthen the generalizability of the findings. Future researchers should also consider several potential barriers that may influence research outcomes, including limited access to digital devices in elementary schools, particularly in remote areas, as well as insufficient digital literacy among some teachers, which may hinder the optimal implementation of the medium. Accordingly, teacher training programs should be established as an integral component of a broader strategy for the wider implementation of Flisco media.

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