Jurnal Penelitian dan Pengkajian Ilmu Pendidikan: e-Saintika
https://journal-center.litpam.com/index.php/e-Saintika/index

November 2025 Vol. 9, No. 3
e-ISSN: 2615-6881
pp. 816-840

Development of a Games Book Media to Improve Early Reading Skills of Second-Grade Elementary School Students

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Received: September 2025; Revised: October 2025; Published: November 2025

Abstract

Reading ability is fundamental for literacy development, yet many Indonesian students, including those at MIS Al-Hidayah Karangploso, struggle with simple texts due to limited engaging learning media. This study developed and evaluated an interactive Games Book to enhance early reading skills among 32 second-grade students using the ADDIE-based R&D approach. The digital flipbook integrates progressive reading stages (words, sentences, texts) with game-based activities providing immediate feedback and sustained engagement. Expert validation indicated high content validity with I-CVI = 1.00 for media, material, and language. Media was visually appealing and technically reliable; material was relevant, accurate, and engaging; language was appropriate, readable, and clear. Teacher and student responses confirmed strong practicality. Effectiveness testing showed students' average scores increased from 63.78 to 91.56 (N-Gain = 0.8, high category), with Paired Sample t-test Sig. = 0.000 < 0.05. Furthermore, Cohen's d = 1.51 and the 95% confidence interval (–34.90 to –20.66) indicate that the improvement was both statistically significant and practically meaningful. The Games Book is therefore highly valid, practical, and effective in improving early reading skills and motivation through structured, interactive digital learning experiences.

Keywords: Games Book; Early Reading Skills; Digital Learning Media; ADDIE Model

How to Cite: Wahyuni, H., Susilawati, S., & Yaqin, M. Z. N. (2025). Development of a Games Book Media to Improve Early Reading Skills of Second-Grade Elementary School Students. *Jurnal Penelitian Dan Pengkajian Ilmu Pendidikan: E-Saintika*, *9*(3), 816-840. https://doi.org/10.36312/d6n7gp18

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INTRODUCTION

Education plays a crucial role in shaping a quality generation, and reading skills serve as the foundation for students' literacy development (Ain & Ain, 2024; OECD, 2019; Snow, 2021). Reading is a complex cognitive process involving letter recognition, comprehension, and text analysis (Alfiani et al., 2024; Ali, 2020; Grabe & Stoller, 2013). In the context of basic education, early reading proficiency is crucial because it determines students' ability to understand learning materials in later stages.

However, various national reports show that Indonesian students still face severe difficulties in reading. National studies reveal that many students continue to struggle with reading comprehension after the Covid-19 pandemic, and around 35% of elementary school students in Indonesia are not yet proficient in reading (Fauziyyah & Iswara, 2024; Indrastuti, 2024; Kiwari, 2024). Similarly, the 2018 PISA results placed Indonesia among the bottom ten countries with an average reading score of 371 (OECD, 2019; Pendidikan, 2021). This situation highlights a major challenge in Indonesia's literacy development, as low reading ability directly impacts

comprehension and academic achievement. Reading is the foundation for lifelong learning, and improving it from the early grades is essential to ensure academic success and the development of critical literacy skills (Mariamah et al., 2024; Susilawati et al., 2023; Williams, 2002).

In the Merdeka Curriculum, achieving early reading competence in Phase A (Grades 1–2) is a significant learning milestone (Kemendikbud, 2022). Yet, observations at MIS Al-Hidayah indicate that many second-grade students still struggle to recognize words, read sentences fluently, and understand short texts. Several students are unable to retell the content of simple passages, and interviews with teachers revealed that more than five students in each class faced these challenges. This finding indicates that students' early reading skills have not yet reached the expected competencies outlined in the curriculum.

Another contributing factor is the limited and less engaging learning media used in the classroom. At the second-grade level, students need visual, interactive, and engaging media that align with their cognitive characteristics (Clark et al., 2003; Hidayati, 2021; Mansyur & Aminah, 2024). Conventional printed materials that are text-heavy and monotonous tend to make students less interested and more easily bored, which, in turn, reduces their motivation and engagement in reading activities (Mayer, 2014; Resti et al., 2024; Sari & Munir, 2024). Meanwhile, today's learners belong to Generation Alpha, a generation born and raised in the digital era. They are accustomed to interacting with technology, dynamic visuals, and gamified experiences. Therefore, learning media must adapt to their characteristics by integrating technological and game-based elements that foster active participation and sustained motivation (Hendri et al., 2025; Masyhura & Ramadan, 2021).

Previous studies have demonstrated that game-based and digital media can improve students' motivation and literacy skills (Anggraeni et al., 2023; Latif et al., 2021; Rahmat, 2018). However, these studies often focus on isolated aspects of reading, such as vocabulary recognition or sentence comprehension, without providing a continuous progression from word recognition to sentence reading and text comprehension within a single integrated platform. In addition, earlier research rarely combines embedded formative assessments, alignment with Phase A competencies in the Merdeka Curriculum, and contextualized Indonesian content within a single interactive product. Most existing studies also rely on stand-alone applications, such as Wordwall, rather than integrating them into digital flipbooks or hybrid media that enable sequential, meaningful learning experiences.

Several other studies have also examined the use of game-based or digital media in literacy learning. Mastoah (2023) developed PEBI, an interactive educational game-based teaching material, but it remained print-based and followed the Dick and Carey model. Similarly, Setiarini, Margunayasa, and Rati (2024) focused on digital games to increase motivation among first graders, while Haqqah (2023) and Anggraeni et al. (2023) emphasized picture storybooks and audiovisual media for reading and pronunciation. Meanwhile, Rosnawati (2024) and Muazarah (2025) implemented Wordwall-based games to improve literacy in mixed-grade students but did not specifically target early reading competencies. Compared with these studies, the current research develops a digital Games Book that integrates Wordwall-based activities within an interactive flipbook (Heyzine) and presents a structured reading sequence from words to sentences and short texts. This media also embeds formative

assessments, aligns with Phase A competencies, and is designed for offline or low-connectivity use, with teachers acting as facilitators, making it more comprehensive and adaptable to students' learning needs.

To address these gaps, this research developed a digital Games Book that integrates reading and educational games within an interactive flipbook format. The product offers a structured reading sequence from word to sentence to text comprehension while incorporating formative assessment elements and aligning with Phase A learning objectives. The design of this media also considers the characteristics of Generation Alpha, combining colorful visuals, interactive navigation, and engaging games that can be accessed both online and offline using laptops or tablets (Fleer, 2017). During implementation, teachers act as facilitators, guiding students in play and reading activities to ensure the learning process remains purposeful and well-directed (Mariamah et al., 2024).

This study aims to develop and test the effectiveness of the Digital Games Book in improving early reading skills among second-grade students at MIS Al-Hidayah. The novelty of this research lies in the development of a digital flipbook that uniquely integrates a progressive reading structure with interactive game-based activities to enhance early literacy. Through this innovation, early literacy learning is expected to become more engaging, adaptive, and aligned with the demands of 21st-century education, while contributing concretely to improving reading proficiency in Indonesian elementary schools.

METHOD

Design & Product

This study employed the Research and Development (R&D) method using the ADDIE model Analyze, Design, Develop, Implement, and Evaluate (see Figure 1)—as proposed by Dick and Carey (Mawardi, 2018) and refined by Sugiyono (2019). The ADDIE model was selected because it provides a systematic, iterative framework for developing, validating, and evaluating educational products to ensure feasibility and effectiveness. The product developed in this research is a digital Games Book designed to improve second-grade students' early reading skills at MIS Al-Hidayah Karangploso.

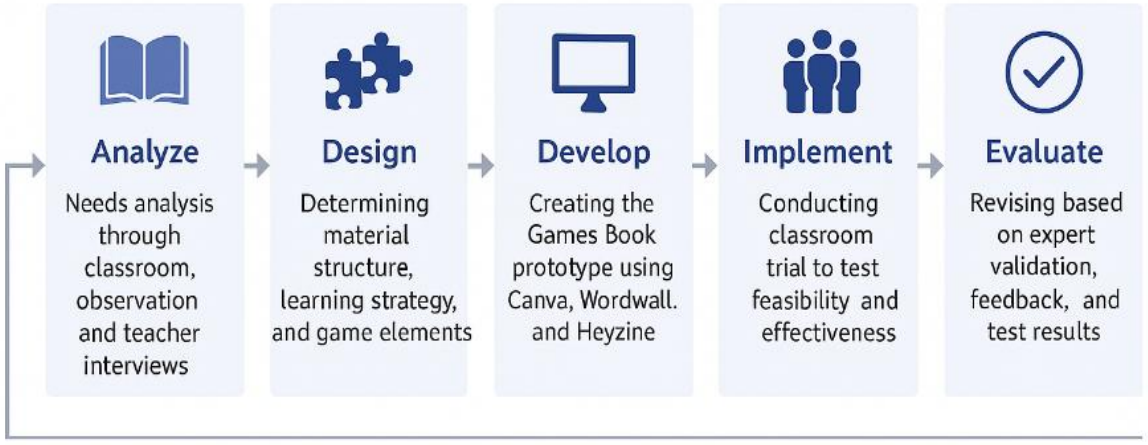

Figure 1. Research Procedure

Analyze

At this stage, problems related to students' early reading skills were identified through classroom observations and teacher interviews. The findings showed that many students still had difficulty recognizing words, constructing sentences, and understanding short texts. The media used in class were primarily conventional and less engaging, which reduced students' motivation to read. Therefore, there was a need for interactive, visually appealing, and game-based learning media suited to students' cognitive development and learning styles.

Design

In this phase, the structure and content of the Games Book were planned. The material, learning strategies, and educational game components were selected to align with Phase A learning objectives in the *Merdeka Curriculum*. The design emphasized a gradual reading progression from word recognition to sentence formation and short-text comprehension, supported by formative assessment activities. The interface layout, color scheme, and navigation structure were first drafted using Canva (new version). The game components were developed using Wordwall (https://wordwall.net), and the final product was compiled into an interactive flipbook format using Heyzine Flipbook (https://heyzine.com).

Develop

This stage involved the creation of the Games Book prototype based on the design blueprint. The flipbook includes embedded hyperlinks that direct users from the home page to multiple learning sections, including *Word Recognition Games*, *Sentence Building Activities*, *Short-Text Reading Tasks*, and *Formative Quizzes*. The prototype was hosted online via Heyzine. Expert validation was conducted by three specialists: a media expert, a materials expert, and a language expert. The validation aimed to assess the product's feasibility in terms of design, content accuracy, interactivity, and readability.

Implementation

After validation and revision, the finalized Games Book was implemented in a classroom setting involving 32 second-grade students at MIS Al-Hidayah *Karangploso*, Kabupaten Malang, during the 2025/2026 academic year. Participants were 7–8 years old, consistent with the typical age range of second-grade students in Indonesian elementary schools. Sampling was conducted purposively, as this class was most relevant to the study's focus on early reading skills (Etikan, 2016). Prior to participation, parental consent and school approval were obtained to ensure ethical compliance in data collection involving children.

During implementation, teachers acted as facilitators guiding students through interactive reading and game-based activities using the Games Book. The research adopted a one-group pretest–posttest design to measure learning progress. The pretest assessed students' initial reading ability before using the media, while the posttest measured improvement after the learning intervention. Students also completed response questionnaires to evaluate the usability, engagement, and appeal of the Games Book. The comparison between pretest and posttest scores, along with feedback from students and teachers, served as the primary indicators of the media's feasibility and effectiveness.

Evaluation

The final stage consisted of analyzing the validation results, teacher and student feedback, and learning outcomes. Both qualitative and quantitative analyses were used to determine the product's feasibility and effectiveness. Revisions were made based on evaluative findings to improve clarity, engagement, and technical accessibility. The evaluation ensured that the Games Book met pedagogical, technological, and linguistic standards, making it suitable for use as an early reading learning medium in elementary schools.

Participants

The study involved 32 second-grade students from MIS Al-Hidayah Karangploso, Kabupaten Malang, during the 2025/2026 academic year, consisting of 16 boys and 16 girls aged 7–8 years. Participants were selected purposively based on regular attendance, basic reading ability, and parental consent. During the activity, students accessed the *Digital Games Book* using school-provided computers under teacher and school operator supervision. Limited digital literacy and internet access were addressed through guided sessions to ensure all students could participate effectively.

Instruments

This study used four data collection techniques: classroom observation, teacher interviews, questionnaires, and an early-reading achievement test. Observation was carried out to document the Grade II reading-learning process before and after the Games Book was used, with attention to students' reading difficulties, the strategies applied by the teacher, and how effectively the media supported learning activities. Interviews were conducted with Grade II teachers to obtain information about students' reading abilities, learning challenges, and teachers' responses to the Games Book as an instructional medium. Questionnaires were distributed to experts, teachers, and students to evaluate feasibility, content suitability, visual appearance, and user experience of the Games Book. Because questionnaire data primarily represent judgments and perceptions, these results were interpreted as evidence of acceptability and usability rather than direct evidence of learning improvement, which was assessed through achievement testing. Tests were administered as pretests and posttests to measure changes in initial reading skills after exposure to the Games Book, and the resulting scores were analyzed to evaluate media effectiveness.

Before implementation, the pretest and posttest instruments underwent expert review to assess language clarity, material accuracy, and item construction. This review was intended to reduce construct-irrelevant barriers (such as confusing wording) and to strengthen the defensibility of the test in terms of validity and reliability for Grade II learners.

Expert validation instruments

Expert validation was conducted to determine whether the developed Games Book met validity requirements for classroom use. The validation questionnaires involved three expert domains: media, material/content, and language. The complete blueprint of the expert validation instruments, including each domain's item focus, number of items, and example indicator descriptions, is presented in Appendix 1.

The media expert instrument evaluated visual display, design quality, structural clarity, ease of use, and technical–interactive quality. The material/content expert

instrument evaluated content relevance and depth, student relevance, clarity of presentation, scientific accuracy, and student engagement, including alignment with the Merdeka Curriculum and the suitability of activities for early reading objectives. The language expert instrument evaluated age-appropriateness, clarity of expression, compliance with Indonesian language rules (PUEBI), readability, and consistency of terminology and instructions across the Games Book. In total, the expert validation questionnaire comprised 49 items rated on a 5-point Likert scale (1 = very invalid to 5 = very valid), as specified in Appendix 1.

Feasibility instruments

Teacher response questionnaire

Teacher responses were collected to assess the feasibility of the Games Book for improving early reading skills among Grade II students at MIS Al-Hidayah Karangploso. This instrument captured practitioner judgments about curricular fit, clarity, usability, and classroom practicality. The full indicator grid and item mapping are presented in Appendix 2.

The teacher questionnaire covered curriculum alignment, learning relevance, material clarity, text readability, visual attractiveness, ease of use, interactivity, and perceived impact on students. Indicators addressed conformity with the Merdeka Curriculum and Grade II competencies, systematic and understandable presentation, age-appropriate language, legibility of font type and spacing, supportive illustrations and layout, ease of teacher implementation and clarity of instructions, the presence of engaging educational games and exercises, and perceived influence on motivation, comprehension, and suitability across different ability levels.

Student response questionnaire

Student responses were collected to assess feasibility from the learner perspective, emphasizing usability and engagement with the Games Book. The full instrument grid is provided in Appendix 3.

The student questionnaire included indicators of design attractiveness, text readability, material clarity, learning enjoyment, ease of use, and reading interest. Items were phrased as simple statements suitable for Grade II students, capturing whether students liked the colors and pictures, found the text easy to read and understand, felt the book helped them learn to read more easily, enjoyed the games and found them helpful for understanding lessons, could use the book independently or with peers, could follow instructions, and felt more interested in reading.

Procedures

The implementation consisted of three individual learning sessions, each lasting 60 minutes. The sessions aimed to improve students' early reading skills using the Digital Games Book. Students worked individually on school-provided computers, while the teacher acted as a facilitator to guide the learning process. The school operator assisted in ensuring the technical readiness of devices and smooth operation during activities. The detailed implementation schedule is presented Appendix 4. Throughout all sessions, students interacted individually with the media under teacher supervision, supported by the school operator to handle technical aspects and ensure learning continuity.

Data Analysis Techniques

Media Validity Test Data Analysis

Media validity was evaluated through expert judgment involving three domains of expertise: media/design, material/content, and language. Expert ratings used a five-point relevance scale (1–5). Following common CVI conventions, ratings of 4 ("relevant") and 5 ("highly relevant") were treated as expert agreement that an item was relevant, while ratings of 1–3 were treated as not meeting the relevance threshold. Validity evidence was quantified using the Content Validity Index (CVI) at two levels.

Item-Level Content Validity Index (I-CVI)

$$\boldsymbol{I-CVI} = \frac{Number\ of\ experts\ rating\ item\ 4\ or\ 5}{Maximum\ Total\ Score}$$

Scale-Level Content Validity Index (S-CVI/Ave)

$$\boldsymbol{S-CVI/Ave} = \frac{\sum I-CVI\ of\ all\ items}{Total\ number\ of\ items}$$

CVI values were interpreted using the criteria in Table 1. While these cutoffs provide a practical decision rule, they should be read as guidance rather than as an absolute guarantee of "validity," because CVI primarily captures expert agreement on relevance, not empirical item functioning in the target population.

Table 1. CVI Criteria

CVI Value	Category
0.80 – 1.00	Highly Valid
0.60 – 0.79	Acceptable
< 0.60	Needs Revision

Media feasibility analysis

Feasibility (and attractiveness for users) was assessed using teacher and student response data. The teacher questionnaire employed a five-point Likert scale (1–5), whereas the student questionnaire used a dichotomous Guttman format ("Yes" = 1; "No" = 0). Because the two response formats produce scores on different scales, feasibility results were standardized into a percentage suitability score so that interpretations followed a single rubric. The suitability score was calculated as follow.

$$\boldsymbol{Suitability\ Score} = \frac{Total\ Score\ Obtained}{Maximum\ Total\ Score} x\ 100\%$$

Table 2. Media Suitability Test Criteria

Suitable Value	Category
81 – 100%	Very Suitable
61 – 80%	Suitable
41 – 60%	Moderately Suitable
21 – 40%	Less Suitable
0 – 20%	Not Suitable

Suitability percentages were interpreted using the criteria in Table 2. These categories support reporting clarity, but they do not replace substantive judgment about what "suitable" means in a specific instructional context.

Media effectiveness analysis

Effectiveness was examined by comparing students' early-reading performance before and after implementation of the Games Book using pretest and posttest scores. Improvement magnitude was first estimated using the normalized gain (N-Gain), which contextualizes score change relative to the maximum possible improvement from the pretest baseline.

$$\boldsymbol{N-Gain} = \frac{Posttest\ Score - Pretest\ Score}{Maximum\ Score - Pretest\ Score}$$

N-Gain values were classified using the criteria in Table 3. A key limitation to note is that N-Gain can be sensitive to very high or very low pretest scores, so the interpretation should be aligned with the observed score distribution, not only the category label.

Table 3. N-Gain Test Criteria

N-Gain Value	Category
≥ 0.7	High Effectiveness
0.3 – 0.7	Moderate Effectiveness
< 0.3	Low Effectiveness

In addition to N-Gain, a paired-sample t-test was conducted to test whether the mean difference between pretest and posttest scores was statistically significant for the same group of students. The significance level was set at $\alpha = 0.05$. If the Sig. (2-tailed) value was less than 0.05, the change was interpreted as statistically significant, indicating that the posttest scores differed meaningfully from pretest scores after the Games Book intervention. This inference is statistical rather than causal: without a comparison group, the t-test supports evidence of change over time in the sample, but it cannot fully rule out alternative explanations (for example, maturation or routine instruction effects).

RESULTS AND DISCUSSION

Media Development Process

Analyze

The analysis stage was conducted to identify problems and needs in early reading instruction for second-grade students at MIS Al-Hidayah Karangploso. The results of observations and interviews indicate that students' reading skills remain low; some students still struggle with reading and are unable to comprehend simple texts. Learning is still dominated by conventional methods that often rely on limited media, such as textbooks and worksheets, making it less engaging and less aligned with students' cognitive development. The teacher also stated the need for practical, interactive, and enjoyable media to keep students more motivated. Given that students are Generation Alpha, who are familiar with visual media and digital games, the Games Book media was developed as an innovative solution that integrates

educational game elements and reading activities to improve early reading skills, in line with the principles of student-centered learning within the Merdeka Curriculum.

Design

At the design stage, the researcher developed the Games Book as an engaging and interactive learning medium tailored to the cognitive characteristics of second-grade students. This medium was developed to address the weaknesses of conventional media, which are less motivating for students in early reading. The design process began with creating a storyboard to systematically map the media's flow, content, and appearance. The visual design of the Games Book is kept simple yet engaging, utilizing bright colors with a "Staying Healthy" theme and child-friendly typography, such as "Bubblebody Neue" for titles and "Dekko" for content, to make it easy to read and stimulate students' interest in learning.

Development

At this stage, the researcher developed the Games Book into an interactive digital product to improve students' early reading skills. The development process involved three main applications: Canva for visual and content design, Wordwall for creating interactive learning games, and Heyzine Flipbook for integrating both elements into an engaging and user-friendly digital format. The development steps are summarized as follows.

Design Creation in Canva

The researcher began by designing the visual layout and learning content using Canva (Figure 2). This included selecting backgrounds, characters, and illustrations that matched the reading materials. Each page was arranged according to the storyboard and saved as a PDF for further integration.

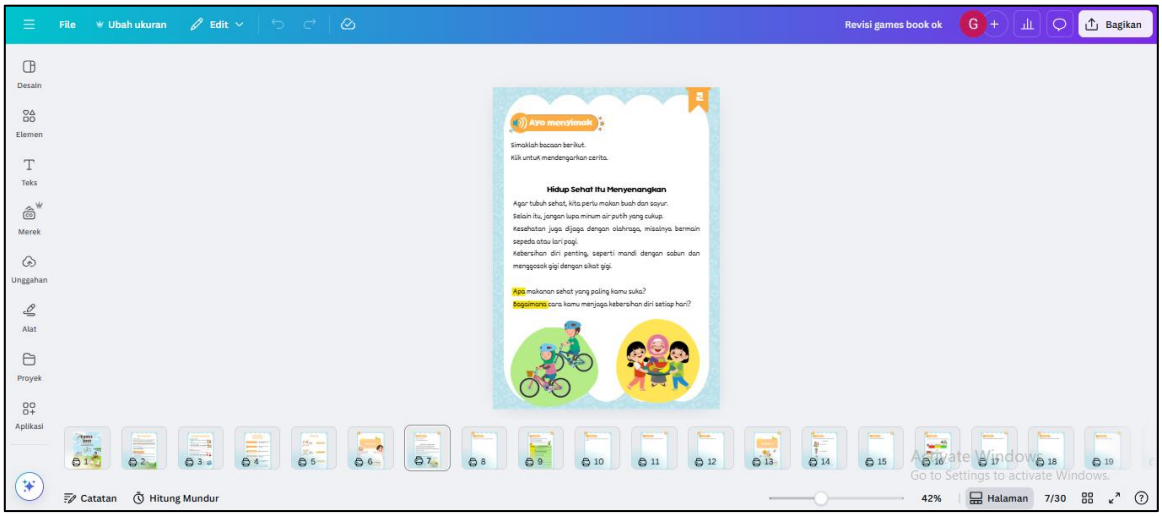

Figure 2. Designing Media Display in Canva

Game Development in Wordwall

Next, interactive games related to early reading topics were created using Wordwall as presented in Figure 3. The researcher selected suitable game templates (such as matching words, arranging sentences, or quizzes) and added relevant text or images. Once completed, each game's link was copied for embedding into the final digital book.

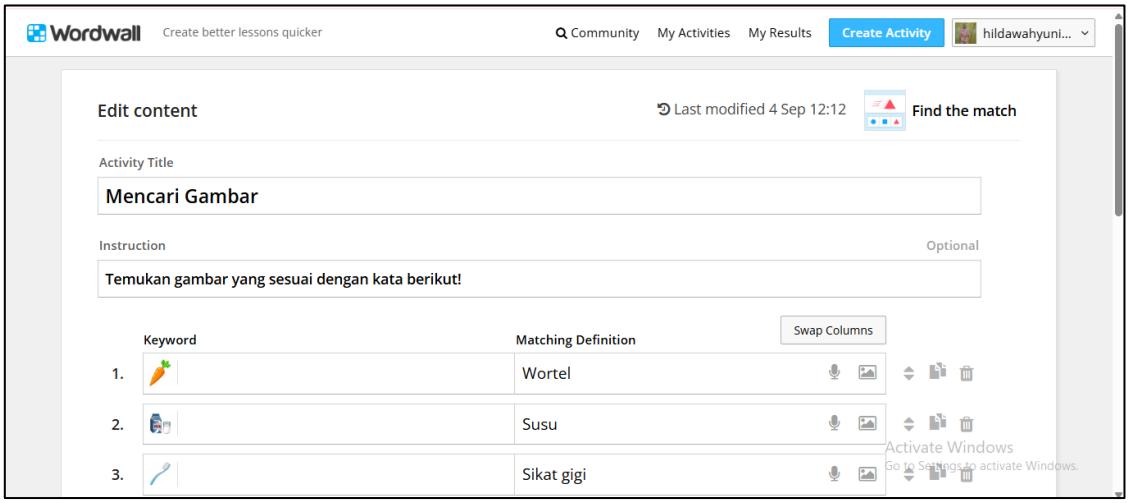

Figure 3. Creating Interactive Games in Wordwall

Integration in Heyzine Flipbook

Finally, the Canva PDF design and Wordwall games were integrated using Heyzine Flipbook (Figure 4 and Figure 5). The PDF file was uploaded, then interactive links from Wordwall were embedded into the pages. The final product resulted in a digital flipbook that allows students to read, play, and learn interactively.

Figure 4. Final Interactive Games Book in Heyzine Flipbook

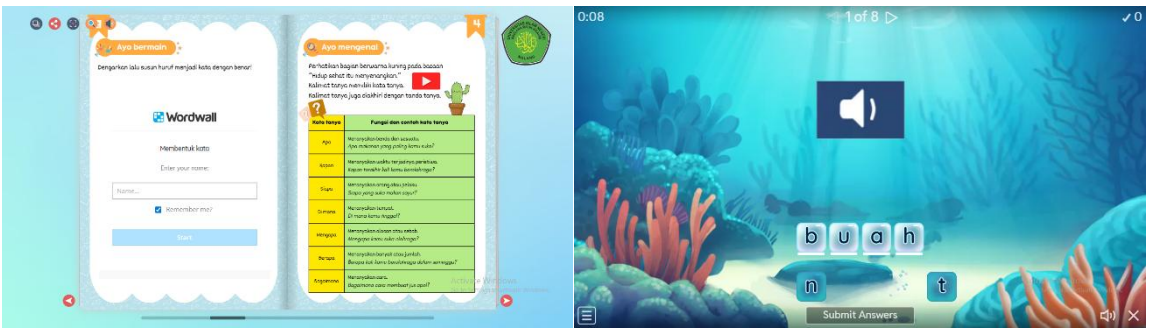

Figure 5. Game View in Games Book

Next, product validation was conducted by content experts, media experts, and language specialists to assess the content, appearance, and suitability of the language. Based on the validation results, revisions and improvements were made to certain parts of the product in accordance with the validators' input and suggestions to ensure it met the expected suitability standards.

Implementation

This stage is carried out after the Games Book media is deemed suitable through the validation and revision process. The media was then implemented with 32 second-grade students at MIS Al-Hidayah Karangploso to test its feasibility and effectiveness in improving early reading skills. Researchers used pretests and posttests to measure the improvement in students' reading abilities before and after learning with the Games Book. The comparison of the results from these two tests served as the basis for evaluating the media's effectiveness in supporting students' reading skills.

Evaluation

The evaluation stage was conducted to assess the effectiveness of the Games Book media in improving students' initial reading skills. The pretest and posttest results showed an increase in scores after using the press, indicating its effectiveness as a learning tool. Additionally, the positive response from students and teachers indicates that this medium is engaging, easy to use, and enjoyable. Thus, the Games Book is declared suitable and effective for use in initial reading instruction in Class II of MIS Al-Hidayah Karangploso.

Implementation Results of the Media

Validation Results (Media Validity)

Validation was conducted by media experts, content experts, and language experts to assess the feasibility, suitability, and readability of the Games Book before testing. The complete result of experts' evaluations is presented in Appendix 5. Based on the expert validation process involving media, material, and language specialists, the Games Book demonstrates a high level of validity across all evaluated aspects. The media expert provided consistently strong ratings, with I-CVI = 1.00 for all components, indicating perfect agreement with the suitability of visual appearance, design quality, structural clarity, ease of use, and technical interactivity. The mean scores ranging from 4.67 to 5.00 reflect that the media design is visually appealing, structurally organized, easy to navigate, and technically reliable for use across various devices.

Material validation also shows strong results, with all aspects achieving I-CVI = 1.00 and mean scores between 4.33 and 5.00. These indicate that the content is highly relevant to the curriculum, appropriately challenging, scientifically accurate, clearly presented, and capable of engaging students in meaningful learning activities. The highest score was obtained for "Relevance to Students" and "Student Engagement," demonstrating that the Games Book effectively connects with students' experiences and increases motivation through interactive tasks.

Language expert validation produced mean scores between 4.25 and 4.67 with an I-CVI of 1.00 across all components. These findings confirm that the language used in the Games Book is appropriate for Grade 2 students, grammatically correct, readable, consistent, and supported by clear instructions. Minor improvements may be considered in areas such as consistency and instruction clarity, although overall results still fall within the "highly valid" category.

Overall, the validation results from the three experts demonstrate that the Games Book is highly valid and feasible for implementation in learning activities. The strong agreement shown through I-CVI = 1.00 across all aspects further reinforces the instrument's accuracy, clarity, and suitability without requiring major revisions.

Questionnaire Results (Media Feasibility)

Teacher and student response questionnaires were analyzed to examine the feasibility and attractiveness of the developed Games Book. Feasibility scores were summarized by questionnaire type, number of items, response scale, sample size, average percentage, and category classification. Detailed item-by-item results for teachers and students are presented in Appendix 6 and Appendix 7, while the overall feasibility results are summarized in Table 4.

Table 4. Questionnaire Result

Questionnaire Type	N Items	Scale Type	Sample Size	Average Percentage	Category
Teacher Response	20	Likert (1–5)	1 teacher	95%	Very Suitable
Student Response	10	Guttman (1–0)	32 students	98%	Very Suitable

As shown in Table 4, the teacher questionnaire produced an average feasibility score of 95%, classified as **Very Suitable**, and the student questionnaire produced an average feasibility score of 98%, also classified as **Very Suitable**. These results support the conclusion that the Games Book was perceived as highly usable and attractive by both respondent groups. However, the interpretation should be kept proportional to the evidence: the teacher result reflects a single teacher's judgment (n = 1), which is informative for practicality in the trial setting but not strong enough to claim broad teacher consensus. Student responses were based on a larger sample (n = 32), providing stronger evidence of learner acceptability, though these responses still represent perceptions of feasibility rather than direct proof of effectiveness in improving reading skills.

Media Effectiveness Results

Media effectiveness was examined by comparing students' early-reading scores before and after using the Games Book. Pretest and posttest scores for 32 Grade II students were analyzed using normalized gain (N-Gain) to describe the magnitude of improvement. The complete student-by-student results are presented in Appendix 8.

Across students, the mean pretest score increased from 63.78 to a mean posttest score of 91.56, corresponding to an average raw gain of 27.78 points. The mean N-Gain was 0.84 (rounded to 0.8 when reported to one decimal), which falls in the high effectiveness category. Most students were classified as high N-Gain, with a smaller portion in the moderate category.

Table 5. Summary of Pretest–Posttest and N-Gain Results (n = 32)

Summary	Pretest	Posttest	Gain	N-Gain
Mean	63.78	91.56	27.78	0.84
SD	26.49	11.76	18.38	0.18
Median	63.50	93.00	26.50	0.90
Min–Max	13–93	60–100	6–67	0.50–1.00
Category distribution				High: 26 (81.25%); Moderate: 6 (18.75%); Low: 0 (0%)

To examine whether the observed improvement from pretest to posttest was statistically reliable, a paired-sample t-test was conducted. This test compares the mean scores of the *same* students measured at two time points (before and after the Games Book intervention). The significance threshold was set at α = 0.05.

As reported in Table 6, the mean difference was –27.78 (pretest minus posttest), indicating that posttest scores were higher by an average of 27.78 points. The t-test result was t(31) = –8.55 with Sig. (2-tailed) = 0.000, which is below 0.05, supporting a statistically significant increase from pretest to posttest. Table 13 also reports a 95% confidence interval for the mean difference (–34.90 to –20.66). Because the interval does not cross zero, it supports the conclusion that the improvement is unlikely to be due to random variation in this sample. In addition, the effect size was large (Cohen's d = 1.51), suggesting that the score increase is not only statistically detectable but also substantial in magnitude.

Table 6. Summary Statistics and Paired Sample t-Test Results

Variable	M	SD	t	df	p	95% CI (Lower–Upper)	Cohen's d
Difference	–27.78	18.38	–8.55	31	0.000	–34.90 – –20.66	1.51

Discussion

The results of this study indicate that the Games Book is a feasible and effective digital learning medium that can significantly improve students' early reading skills. This improvement is reflected not only in increased students' post-test scores relative to their pre-test scores, but also in their growing motivation and active participation during the learning process. The use of the Games Book successfully created a meaningful learning atmosphere where students engaged with reading activities playfully and enjoyably, combining literacy skill development with elements of entertainment. This finding supports the argument of Oktaviany et al. (2025), who stated that game-based media can stimulate student motivation and interest in reading by reducing monotony and encouraging active learning. Similarly, research by Andika et al. (2025) demonstrated that learning through games helps develop literacy and critical thinking by presenting material in a contextual, interactive manner.

The use of the Games Book also aligns with the principles of constructivist learning, where students actively construct knowledge through meaningful experiences. The activities in the book, such as matching words, arranging sentences, and reading short texts, enabled students to explore reading concepts step by step, guided by visual cues and interactive feedback. This approach corresponds to Vygotsky's theory of the Zone of Proximal Development (ZPD), which emphasizes that learners acquire skills more effectively when provided with appropriate scaffolding (Lasmawan & Budiarta, 2020). By progressing from more straightforward to more complex tasks, the Games Book provided structured support that helped students gradually master reading skills at their own pace. Moreover, the presence of colors, animations, and game-based rewards stimulated students' affective engagement, which is an important factor in maintaining learning motivation (Jipli & Elaklouk, 2025; Staneviciene & Gintarė Žekienė, 2025). The findings are also consistent with those of Susanti et al. (2024), who found that game-based media enhances student participation and makes the learning process more enjoyable and meaningful.

Likewise, Rambe et al. (2024) and Afrianti (2025) highlighted that interactive learning media based on games can increase students' confidence and independence by allowing them to learn by doing rather than passively listening. Evandri (2024) and Harahap (2024) added that digital interactive media helps students internalize material more effectively by allowing repeated practice and immediate feedback. The Games Book, by integrating textual learning with interactive game elements, thus provides both cognitive and motivational benefits, making reading a fun and rewarding process.

From classroom observations, students showed enthusiasm and concentration when using the Games Book. They appeared motivated to complete each task and expressed excitement toward the stories, colors, and characters within the media. This behavioral response demonstrates the success of the Games Book in fostering intrinsic motivation, a type of motivation that arises from genuine interest and enjoyment in learning activities. Furthermore, such enthusiasm reflects the value of student-centered learning, as emphasized by Ningsih (2025), who argued that learning becomes more effective when students are actively involved in constructing their own knowledge. The finding also resonates with the study by Huljanah and Zai (2025), which found that digital media encourages students to become more independent and creative in expressing understanding.

From a pedagogical standpoint, the effectiveness of the Games Book can also be explained by dual coding theory, which posits that combining verbal and visual information enhances learning by activating two distinct cognitive channels (Sadoski & Paivio, 2013). In the Games Book, stude nts were not only reading text but also interpreting images, colors, and visual cues, thus strengthening memory retention and comprehension. Similarly, Mayer (2014) in his cognitive theory of multimedia learning, emphasized that learning becomes more effective when learners receive information through multiple representations that work synergistically to reduce cognitive load. In this context, the Games Book helped students to process linguistic information more easily because the visual design guided their understanding step by step.

In addition, the design of the Games Book, which integrates Canva-based visual storytelling, Wordwall interactivity, and Heyzine flipbook presentation, reflects an innovative approach to early literacy education. This integration creates a holistic learning experience that aligns with the Merdeka curriculum's principle of joyful, contextual learning (Wahyuningsih & Küçükoğlü, 2025). The use of technology also resonates with Islamic educational values that encourage adapting teaching methods to contemporary contexts, as reflected in the saying of Sayyidina Ali bin Abi Thalib RA: "Educate your children according to their time"(Zahro' et al., 2022). Thus, incorporating digital media, such as the Games Book, into literacy instruction fulfills both pedagogical and moral imperatives to prepare students for modern learning environments.

Despite these positive outcomes, several limitations should be acknowledged. The study used a one-group pretest–posttest design, which may be vulnerable to internal validity threats such as maturation, testing effects, and teacher expectancy (Crooks et al., 1996). Additionally, a limitation exists regarding the reliability of the measurement instruments, as no reliability coefficients were reported. Ceiling effects may also have occurred, as some high-performing students could have reached the

maximum attainable scores on certain tasks. Moreover, the study lacked a detailed blueprint for the assessment instruments, which could have guided more systematic item development and improved content coverage. These factors should be considered when interpreting the results.

Nevertheless, the results of this research contribute significantly to the development of digital learning innovations, particularly in early literacy education. By combining play, visual design, and interactive elements, the Games Book serves as a model for integrating technology into reading instruction that is both pedagogically sound and developmentally appropriate. This aligns with Arsyad's (2020) and Haleem et. al (2022) argument that integrating media technology into learning can increase students' engagement and understanding when designed in accordance with cognitive and motivational principles. The Games Book thus not only improves students' reading abilities but also supports teachers in implementing creative, student-centered learning practices aligned with the goals of the Merdeka Curriculum.

CONCLUSION

The results of this study indicate that the Games Book developed through the ADDIE model successfully produced a valid, practical, and effective digital learning medium to enhance students' early reading skills. The media integrates structured stages of reading activities (from words to sentences to texts) with engaging game-based elements that help reduce cognitive load, support gradual mastery, and sustain students' motivation. Moreover, the Games Book fosters an enjoyable, interactive learning environment that encourages active participation and builds reading confidence among young learners. Future research could implement a quasi-experimental design with a comparison group and further psychometric refinement to strengthen evidence of effectiveness.

RECOMMENDATION

This research proposes several recommendations as a continuation of the development outcomes. First, before classroom implementation, both teachers and students should receive clear instructions or brief training to ensure smooth use of the media. The Games Book serves as an engaging and interactive alternative for learning Indonesian, but still requires teachers' active facilitative roles to guide and assist students effectively. Second, the Games Book demonstrates strong potential for broader dissemination because it has been validated and proven feasible for classroom use. Dissemination efforts can be realized through teacher training programs, workshops, seminars, and scientific publications so that this media can be adopted in various schools and contribute more widely to improving early reading skills. Third, from a development perspective, future work could expand the Games Book to include other curriculum-based themes and language skills, such as writing and speaking, and advance it into a mobile or web-based interactive application to meet the evolving needs of digital learning environments.

Acknowledgments

The author would like to express sincere gratitude to the principal, teachers, and students of MIS Al-Hidayah Karangploso for their support and active participation during the research process. Their cooperation and openness greatly contributed to the smooth implementation of the study. Appreciation

is also extended to the administrative and technical staff for the assistance provided throughout the data collection and trial stages. During the preparation of this work, the authors used ChatGPT to enhance the clarity of the writing. After using ChatGPT, the authors reviewed and edited the content as needed and took full responsibility for the publication's content.

Funding Information
This research received funding support from the Indonesia Bangkit Scholarship (BIB) of the Ministry of Religious Affairs of the Republic of Indonesia, which contributed to supporting the completion of this learning media research and development process.

Author Contributions Statement

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Hilda Wahyuni	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	
Samsul Susilawati		✓	✓			✓		✓	✓	✓	✓	✓		
M. Z. Nurul Yaqin		✓		✓			✓	✓	✓	✓	✓		✓	

Conflict of Interest Statement
Authors state no conflict of interest.

Informed Consent
The protection of participants privacy was strictly observed in this study. Written informed consent was obtained from all individuals prior to their inclusion in the research. All procedures involving human participants were conducted in accordance with ethical standards**.** We have obtained informed consent from all individuals included in this study.

Ethical Approval
Informed consent was obtained from all participants prior to their involvement in the study. Participants privacy and data confidentiality were strictly protected, and all research data were managed responsibly and used solely for scientific purposes.

Data Availability
The data resulting from this study are entirely derived from original research conducted by the authors research team.

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Appendix 1
Expert Validation Instruments

No	Expert Domain	Item Focus	Number of Items	Sample Indicator Description
1	**Media Expert**	Visual display, design quality, structural clarity, ease of use, and technical–interactive quality.	**16 items**	Indicators describe how the Games Book uses appropriate colors and font sizes for Grade II students, maintains consistent and attractive page design, presents materials and games in a clear sequence, provides easy-to-follow instructions, and ensures that visuals, contrast, and game elements function smoothly to support learning.
2	**Material (Content) Expert**	Content relevance, content depth, student relevance, clarity of presentation, scientific accuracy, and student engagement.	**18 items**	Indicators explain the alignment of materials with the Merdeka Curriculum, suitability for early reading objectives and cognitive development, adequate depth and level of difficulty, connection to students' daily experiences, clarity of explanation using simple language, factual correctness, and the inclusion of educational games and interactive activities that enhance motivation and comprehension.
3	**Language Expert**	Language appropriateness, clarity of expression, compliance with Indonesian language rules, text readability, and consistency of terminology and instructions.	**15 items**	Indicators reflect the appropriateness of language for Grade II students, clarity and simplicity of sentence structures, adherence to PUEBI standards, readability through proper sentence length and vocabulary familiarity, and consistent terminology along with clear and engaging instructions presented throughout the Games Book.
	Total		**49 items**	All items were assessed using a 5-point Likert scale (1 = very invalid, 5 = very valid).

Appendix 2
Teacher Response Instrument Grid

No	Assessed Aspect	Indicator	Item Number
1	Curriculum Alignment	1.1. Conformity with the Merdeka Curriculum	1
		1.2. Material coverage aligned with Grade II competencies	2
		1.3. Material supports reading skill development	3
2	Learning Relevance	2.1. Material suits students' needs	4
		2.2. Can serve as primary or supplementary learning media	5
3	Material Clarity	3.1. Materials are systematic and understandable	6
		3.2. Language is age-appropriate and straightforward	7
		3.3. No difficult terms without clarification	8

4	Text Readability	4.1. Font type, size, and spacing are legible	9
		4.2. Paragraph and sentence structure aids comprehension	10
5	Visual Attractiveness	5.1. Color, illustration, and layout attract students	11
		5.2. Illustrations help students understand the material	12
		5.3. Comfortable media format for student use	13
6	Ease of Use	6.1. Easy for teachers to implement	14
		6.2. Clear usage instructions	15
7	Interactivity	7.1. Presence of engaging educational games	16
		7.2. Exercises encourage reading skills	17
8	Impact on Students	8.1. Media increases reading interest and motivation	18
		8.2. Helps students understand concepts better	19
		8.3. Suitable for different ability levels	20

Appendix 3

Student Response Instrument Grid

No	Assessed Aspect	Indicator	Item Number
1	Design Attractiveness	1.1. I like the colors and pictures in the book	1
		1.2. The book is interesting and makes me happy to learn	2
2	Text Readability	2.1. The letters in this book are easy to read	3
		2.2. The words in this book are easy to understand	4
3	Material Clarity	3.1. The book helps me learn to read more easily	5
4	Learning Enjoyment	4.1. I enjoy the games in the book	6
		4.2. The games help me understand the lessons	7
5	Ease of Use	5.1. The book is easy to use alone or with friends	8
		5.2. I can follow the instructions easily	9
6	Reading Interest	6.1. The book makes me more interested in reading	10

Appendix 4

Session Timeline for the Implementation of the Digital Games Book

Session	Duration (minutes)	Main Activities	Teacher's Role	Assessment / Data Collected
1. Introduction and Pretest	60	The teacher introduced the learning objectives and demonstrated how to use the Digital Games Book. Students completed a pretest to measure their initial reading ability.	Provided guidance and ensured students understood how to navigate the digital media.	Pretest results on early reading skills.
2. Interactive Learning Session	60	Students practiced reading and played interactive literacy	Monitored engagement, provided	Observation checklist on

		games, including word matching, sentence arrangement, and short-text comprehension.	assistance, and gave formative feedback.	student engagement.
3. Evaluation and Posttest	60	Students completed reading tasks, a posttest, and a response questionnaire about the media.	Supervised activity flow, ensured comprehension, and collected responses.	Posttest scores and student questionnaires.

Appendix 5

Result of Expert Evaluation

No	Instrument	Aspect Evaluated	Indicator Description	Mean Score	I-CVI	Decision
Media Expert						
1	Media	**Visual Appearance**	Color harmony, font size readability, and proportional layout of text and images.	**4.67**	1.00	KEEP
2	Media	**Design Quality**	Page design attractiveness, consistency between slides, and relevance of illustrations/animations.	**4.67**	1.00	KEEP
3	Media	**Structural Clarity**	Clear sequence of content, presence of headings/subheadings, and systematic organization.	**4.67**	1.00	KEEP
4	Media	**Ease of Use**	Clarity of instructions, suitability for independent or guided use, and intuitive navigation.	**4.67**	1.00	KEEP
5	Media	**Technical Quality & Interactivity**	Visual clarity, comfortable color contrast, accessibility across devices, and functional interactive games.	**5.00**	1.00	KEEP
Material Expert						
6	Material	**Material Relevance**	Alignment with curriculum, support for early reading skills, and appropriate difficulty level.	**4.67**	1.00	KEEP
7	Material	**Material Depth**	Completeness of content, level of complexity, and	**4.67**	1.00	KEEP

			relevance of practice examples.			
8	Material	**Relevance to Students**	Connection to students' experiences, engagement factors, and relevance of game-based tasks.	**5.00**	1.00	KEEP
9	Material	**Clarity of Presentation**	Clear material presentation, use of simple language, and supportive illustrations.	**4.33**	1.00	KEEP
10	Material	**Scientific Accuracy**	Correct terminology, factual accuracy, and alignment with curriculum standards.	**4.67**	1.00	KEEP
11	Material	**Student Engagement**	Active student involvement, motivation-enhancing content, and presence of engaging exercises.	**5.00**	1.00	KEEP
Language Expert						
12	Language	**Language Appropriateness**	Suitability of vocabulary for Grade 2 level and absence of difficult terminology.	**4.50**	1.00	KEEP
13	Language	**Language Clarity**	Simple sentence structure, clarity of meaning, and non-ambiguous statements.	**4.67**	1.00	KEEP
14	Language	**Compliance with Language Rules**	Adherence to Indonesian grammar (PUEBI), standard spelling, and correct terminology.	**4.33**	1.00	KEEP
15	Language	**Text Readability**	Appropriate sentence length, logical structure, and use of daily vocabulary.	**4.33**	1.00	KEEP
16	Language	**Consistency and Instructions**	Consistent terminology, clear instructions, and attractive and non-confusing wording.	**4.25**	1.00	KEEP

Appendix 6

Result of Teacher Response

No	Assessed Aspect	Indicator	Score
1	Curriculum Alignment	1.1.	5
		1.2.	5
		1.3.	5
2	Learning Relevance	2.1.	5
		2.2.	5
3	Material Clarity	3.1.	4
		3.2.	5
		3.3.	4

4	Text Readability	4.1.	4
		4.2.	4
5	Visual Attractiveness	5.1.	5
		5.2.	5
		5.3.	5
6	Ease of Use	6.1.	5
		6.2.	5
7	Interactivity	7.1.	5
		7.2.	5
8	Impact on Students	8.1.	5
		8.2.	4
		8.3.	5
Total Score			95

Appendix 7

Result of Students Response

No	Assessed Aspect	Indicator	Total Score	Percentage
1	Design Attractiveness	1.1.	32	100%
		1.2.	32	100%
2	Text Readability	2.1.	32	100%
		2.2.	32	100%
3	Material Clarity	3.1.	32	100%
4	Learning Enjoyment	4.1.	32	100%
		4.2.	32	100%
5	Ease of Use	5.1.	29	91%
		5.2.	29	91%
6	Reading Interest	6.1.	32	100%
Average			**314**	**98%**

Appendix 8

Pretest and Posttest Results

Student	Pretest	Posttest	N-Gain Value	Category
1	60	87	0.7	High
2	60	100	1.0	High
3	87	100	1.0	High
4	80	93	0.7	High
5	48	93	0.9	High
6	67	93	0.8	High
7	47	93	0.9	High
8	93	100	1.0	High
9	80	100	1.0	High
10	53	100	1.0	High
11	60	93	0.8	High
12	93	100	1.0	High
13	87	100	1.0	High
14	13	60	0.5	Moderate
15	87	100	1.0	High

16	73	93	0.7	High
17	27	73	0.6	Moderate
18	87	93	0.5	Moderate
19	93	100	1.0	High
20	53	93	0.9	High
21	33	73	0.6	Moderate
22	47	87	0.8	High
23	13	80	0.8	High
24	93	100	1.0	High
25	47	100	1.0	High
26	60	100	1.0	High
27	13	73	0.7	High
28	87	100	1.0	High
29	93	100	1.0	High
30	87	93	0.5	Moderate
31	27	60	0.5	Moderate
32	93	100	1.0	High
Average	**63.78**	**91.56**	**0.8**	**High**