



Development of Local Wisdom–Based Digital Educational Games of the Sasak Tribe to Enhance Second-Grade Students’ Reading Skills

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Abstract: This study aims to develop a digital educational reading game based on the local wisdom of the Sasak tribe to improve the reading skills of second-grade elementary school students. The study employed a Research and Development (R&D) method using the ADDIE model, which consists of five stages: analysis, design, development, implementation, and evaluation. The research instruments included validation questionnaires for media and material experts, teacher and student response questionnaires, and an early reading skills test. Data were analyzed using descriptive statistical techniques to determine feasibility and practicality percentages, while effectiveness was measured using the Normalized Gain (N-Gain) formula to assess the improvement between pre-test and post-test scores. The results showed that the developed game was highly feasible, with a percentage of 97.8% from two media experts and 95% from two material experts. The game was also categorized as highly practical, with teacher response percentages of 98.6% and student response percentages of 95.7% and 97.8%. Furthermore, the N-Gain analysis indicated that the game was effective in improving students’ early reading skills in two schools, achieving 74.15% (moderately effective) at SDN 1 Buwun Mas and 76.37% (effective) at SDN 4 Buwun Mas. Therefore, the developed digital educational game is considered feasible, practical, and effective for second-grade reading instruction. The findings contribute theoretically to the literature on Game-Based Learning and Place-Based Education and provide practical implications for the design of culturally responsive instructional media.

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Introduction

Reading is a very important aspect of the learning process for students because all information and knowledge can be obtained through reading. Therefore, reading ability can influence the success of the teaching and learning process conducted (Oktaviyanti et al., 2022). However, national assessment data in Indonesia indicate that elementary students’ reading literacy remains a critical issue. Based on the 2021 National Computer-Based Assessment (ANBK) results released by the Center for Educational Assessment (Pusmendik) in 2022, students’ reading literacy achievement in West Nusa Tenggara Province is still below the minimum competency threshold, with less than 50% of students reaching the expected level (Pusmendik, 2022). Although the Minimum Competency Assessment (AKM) is officially conducted for fifth-grade elementary students, these results may also reflect the reading learning conditions in previous grades. Thus, the low literacy skills in the ANBK



results could indicate issues with students' reading abilities from early grades, as it is the foundational skill in reading development.

This condition is also evident in the educational context of Buwun Mas Elementary School, located in West Nusa Tenggara Province, Indonesia. Based on the 2024 Education Report Card issued by the Ministry of Education, literacy is identified as the most urgent aspect requiring improvement at SDN Buwun Mas (Kemdikbud, 2024). The data is also supported by initial observations at Buwun Mas Elementary School, which show that more than half of second-grade students at SD Buwun Mas are not yet fluent readers. There are 20 out of 27 students in second grade at SDN 1 Buwun Mas and 13 out of 23 students in second grade at SDN 4 Buwun Mas who cannot read fluently. Most of them still struggle to string letters together and stumble when reading syllables and words. This condition certainly hampers teaching and learning activities because many students find it difficult to follow the learning process.

Based on the information obtained, the reading learning process at SD Buwun Mas has so far only used alphabet reading books and simple letter cards made by teachers with paper. Second-grade teachers usually teach during break time using these media. From a pedagogical perspective, the persistence of reading difficulties is closely related to the mismatch between conventional instructional media and the characteristics of Generation Alpha learners. Generation Alpha students tend to prefer interactive, visual, and experiential learning environments that allow immediate feedback and active engagement (Keengwe & Georgina, 2013). Traditional reading instruction relying solely on printed alphabet books and static letter cards often fails to accommodate these learning preferences, resulting in reduced attention, low motivation, and limited opportunities for meaningful practice (Magdalena et al., 2021). In indigenous and rural learning contexts, such as Buwun Mas, this challenge is compounded by the limited availability of varied instructional media and the lack of contextualized learning resources.

Game-Based Learning (GBL) has been widely recognized as an effective pedagogical approach to addressing these challenges. Some studies show that children are generally more interested in games than conventional learning, so methods/media that involve elements of play can be an alternative to increase their interest and motivation to learn. In line with the opinion of Gee (2003) and Huang & Soman (2013) who posited that GBL emphasizes learning through structured play, allowing students to actively engage with learning content in a fun and motivating way. Related to educational games, one of the innovative approaches that is growing rapidly today is the use of digital educational games as a learning medium (Negara, 2021). According to research of Purnomo (2022) and Musaddat (2021), the use of technology in education has proven to be effective in improving student learning outcomes and creating a creative, innovative, interesting, and challenging teaching and learning process. In relation to reading skills, several studies have shown that digital educational games can significantly improve early reading skills by providing repetitive exercises, multimodal inputs, and hands-on feedback (Kafai & Burke, 2015; Plass et al., 2015). Digital educational games provide immediate feedback and allow for the repetition of material in a fun way, which is indispensable in the process of learning to read (Mardhotillah & Rakimahwati, 2021; Prasetia et al., 2024). These features are especially beneficial for early grade learners who are still developing basic reading skills.

Furthermore, initial observations also indicate that the local traditions and culture around the school are still quite strong. Some of the local Sasak traditions that are still often practiced in the area include Peresean, Begawe, and others. Students also often play traditional games both at school and at home, such as Gasingan, Cap Cap, and others. Based



on this, examples of local wisdom, such as traditional games that are often played by students, can be associated with educational games that are also game-based and liked by children. This relates to Place-Based Education (PBE) which emphasizes learning that is based on the local culture, environment, and community experiences of students (Gruenewald & Smith, 2008). PBE-based learning is able to connect academic content with students' life experiences, making learning more meaningful and relevant. Therefore, the researcher plans to develop a digital educational game by integrating examples of local wisdom about students into the development process. The goal is to make learning meaningful for students because it is contextual and close to their daily lives (Gruenewald & Smith, 2008; Rahmatih et al., 2020).

The integration of local wisdom into learning aims to preserve culture, and one effort to do so is through education (Asrin et al., 2021). Digital educational games based on local wisdom can be an interesting and relevant alternative because they can incorporate local culture into the learning process, making it easier for students to understand and remember the material taught (Nurchim & Purwanto, 2023). Previous studies have also shown that integrating local culture into instructional media increases student engagement, understanding, and sense of identity (Smith & David, 2010; Sobel, 2013). In addition, digital educational games are also able to involve the active participation of students, which can affect their interest and enthusiasm during the learning process (Nurfadhillah et al., 2021).

Although previous studies have explored educational games to improve reading skills, most have focused on general or decontextualized content without integrating local cultural wisdom (Alwan, 2020; Ramadhan & Surahman, 2023). Therefore, this study presents a novelty by developing a digital educational reading game that combines Game-Based Learning and Place-Based Education principles through the integration of Sasak local wisdom. It aims to develop educational games that are not only fun but also educational and culturally relevant. Integrating this local wisdom into digital educational games is not merely a visual aesthetic choice, but as phonetic bridges to support students in learning spelling, word recognition, and meaning-making processes with Local cultural terms and familiar objects. For example, using familiar terms like "Poteng" or "Gasing" helps students map known sounds to new graphemes, easing the transition from oral to written language.

Based on the above explanation, this study aims to develop a digital educational reading board game based on the local wisdom of the Sasak tribe to enhance second-grade elementary students' reading skills and with examine its feasibility, practicality, and effectiveness. This educational game is expected to be an alternative or solution to facilitate students, make it easier for them to understand, and create an engaging, interactive, and contextual experience aligned with their environment during the reading learning process.

Research Method

This research uses a development research method (Research and Development) because its goal is to produce a digital educational game product and test the effectiveness of the product (Sugiyono, 2019). The research procedure is carried out based on the development model used, which is the ADDIE model consisting of five systematic and interconnected stages: analyze, design, development, implementation, and evaluation (Branch, 2018; Winaryati et al., 2021) with a horizontal research flow diagram as shown in the following image:



Figure 1. Research Flow Diagram Based on the ADDIE Model

The subjects of the study are second-grade students of SDN 1 Buwun Mas, totaling 27 students, and second-grade students of SDN 4 Buwun Mas, totaling 23 students. In addition, experimental design was also used in this study to see the effectiveness of the product after it was developed and validated by experts using one group pretest-posttest design in each school. The instruments used in this research include validation questionnaires (media experts and material experts) to determine the feasibility percentage of the product, practicality questionnaires (teacher and student responses) to determine the practicality percentage of the product, and a reading ability test for students to obtain pretest and posttest scores to measure the product's effectiveness. The reading ability test instrument was developed by the researchers based on early reading indicators (letter recognition, syllable reading, and simple word reading) and validated through expert judgment prior to implementation. The feasibility and practicality data analysis uses the average percentage formula according to Arikunto (2013) as follows:

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

Furthermore, based on the acquisition of the feasibility/practicality percentage value, decision-making for the level of product feasibility of the developed media can be determined using the criteria of the achievement level scale, as shown in Table 1 below:

Table 1. Criteria for Feasibility/Practicality Level Based on Percentage

Percentage (%)	Criteria
90-100	Very Feasible/Practical
75-89	Feasible/Practical
65-74	Quite Decent/Practical
55-64	Less Feasible/Practical
0-54	Not Feasible/Practical

Source: (Suhendrianto, 2017)

As for the product effectiveness test, it is seen from the initial reading ability test results using an N-gain score. This gain score is obtained from the results of the pretest and posttest of the students as a whole with the formula of Hake (1998) as follows:

$$g = \frac{\text{Posttest Score} - \text{Pretest Score}}{\text{Maximum Score} - \text{Posttest Score}}$$

Furthermore, the results obtained are made in the form of percentages to determine the level of effectiveness of the treatment application by referring to the following table 2:

Table 2. Criteria for Product Effectiveness Based on N-Gain Score

Percentage (%)	Criteria
>76	Effective
56-75	Quite Effective
40-55	Less Effective
<40	Not Effective

Source: (Sukarelawan et al., 2024)

Results and Discussion

This study resulted in the development of a digital educational reading board game based on the local wisdom of the Sasak tribe, designed to enhance second-grade students' early reading skills. The findings are discussed according to the ADDIE development stages and interpreted using relevant educational theories.

Analysis

The analysis stage in the ADDIE model is the initial phase in the development process to determine the foundation of needs that will serve as the basis for designing and developing the product by identifying learning problems and determining appropriate solutions (Branch, 2018). In this study, the analysis stage was conducted through two main processes, namely performance analysis and needs analysis. This analysis stage was carried out through initial observations and unstructured interviews with the second-grade homeroom teachers at SD Negeri 1 Buwun Mas and SD Negeri 4 Buwun Mas.

The first stage of analysis is performance analysis, which is conducted by identifying and analyzing problems in the school, especially in the learning process (Lestari et al., 2021). Based on field findings, it is known that the reading ability of second-grade students is still very low. Data shows that 20 out of 27 students at SDN 1 Buwun Mas and 13 out of 23 students at SDN 4 Buwun Mas are not yet able to read fluently, and most of them are still at the stage of recognizing letters or reading syllables hesitantly. This condition indicates a gap between the expected reading ability and the ability demonstrated by the students. Meanwhile, reading ability, especially early reading, is a fundamental skill that determines success in learning at the next education level (Marlini & Rismawati, 2019; Oktavianti et al., 2022; Snow et al.).

Performance analysis shows that so far, the reading learning process in both schools has relied only on alphabet reading books and simple letter cards made by teachers from paper. Second-grade teachers at SDN 1 Buwun Mas and SDN 4 Buwun Mas usually teach during break time using these media. Traditional reading instruction relying solely on printed alphabet books and static letter cards often fails to accommodate the preferences of an interactive, visual, and experiential learning environment that allows for immediate feedback and active engagement in the process of learning to read. This results in reduced attention, low motivation, and limited opportunities for meaningful exercise for students (Magdalena et al., 2021). This condition aligns with the opinion Nurfadhillah (2021) that less interactive media can affect students' interest and enthusiasm for learning, so that the process of internalizing reading skills becomes less optimal. As a result, low motivation, lack of active engagement, and limited media variety become factors that hinder students' reading skills (Delmania et al., 2023; Supantriadii & Wardana, 2023). Therefore, there is a need for more



creative and innovative learning media that can attract students' attention and involve their active participation.

Next, the second analysis stage is needs analysis. According to Lestari (2021), this stage is conducted to determine what kind of learning media students need to improve the quality of the learning process. The purpose of needs analysis is to select the most suitable type of media based on the assessment of student performance. In this stage, it was found that second-grade students really enjoy activities that are game-like. The teacher explained that students are more enthusiastic when learning through play activities or when given tasks that resemble games. This supports Game-Based Learning theory, which emphasizes that meaningful learning occurs when learners actively participate in structured play environments (Gee, 2003). Therefore, media or learning methods that incorporate game elements can be an alternative to help increase their attention, focus, and motivation to learn (Adrian & Apriyanti, 2019; Irsyadi et al., 2020).

One of the media that involves games and can be used in the learning process is digital educational games. This is because digital educational games can present learning content in a more interesting, enjoyable way, and involve active participation from students (Huang & Soman, 2013; Musaddat et al., 2021; Purnomo et al., 2022). Mardhotillah & Rakimahwati (2021) also explains that the use of digital-based interactive media in learning has been proven to improve students' early reading skills because it provides immediate feedback and allows for repeated practice of the material in an enjoyable manner, which is very much needed in the process of learning to read.

The needs analysis also shows that integrating local wisdom into educational games is a relevant requirement within the cultural context of Buwun Mas. Teachers conveyed that Sasak culture in the area remains very strong and closely connected to students' lives, ranging from traditional clothing, traditional foods, traditional games, to daily community habits (Alditia & Nurmawanti, 2023; Nabilah et al., 2024). Teachers also reported that students showed greater motivation when learning materials were connected to familiar cultural contexts, reinforcing the relevance of Place-Based Education principles (Smith & David, 2010; Sobel, 2013). Therefore, the researcher plans to develop a digital educational game that incorporates examples of local wisdom around students in its development. Besides being a novelty in educational game development research, the integration of local wisdom into this educational game not only functions to increase the relevance of learning but also plays a role in instilling cultural values and strengthening students' local identity (Asrin et al., 2021). Based on these two analyses, the media developed will be a digital educational reading board game based on the local wisdom of the Sasak tribe. This digital educational game can help students learn letters and their shapes, distinguish letters, syllables, simple words, and attempt to arrange letters into words.

Design

In the design stage, the learning media begin to be realized in the form of media designs that have previously been tailored to students' needs. At this stage, the development of a digital educational game is carried out by determining the appearance, layout, and menus displayed for each game component (Branch, 2018). The digital educational reading board game based on the local wisdom of the Sasak tribe is designed and created using applications such as Construct 2, Canva, Pixelcut, and FreeConvert.

The initial media design is based on the characteristics of students' early reading abilities, including recognizing letters, understanding the sounds of letters, forming syllables and words, and reading simple words (Devi, 2022; Wijayanti & Utami, 2022). Therefore, the game structure is designed with features that allow students to practice reading gradually,

starting from recognizing letter symbols, recognizing syllables, guessing letters, completing missing syllables, to forming words from random letters based on local wisdom images.

In addition to adjusting features to meet reading needs, the design stage also considers visual and pedagogical principles in accordance with elementary school students' characteristics. As explained by Gee (2003) and Riwinoto & Muspita (2017), visual elements in the game must be engaging, simple, and free from excessive distractions to keep children focused on the learning objectives. Therefore, the media design is created with a simple yet attractive layout, the use of bright colors, clear fonts, easy navigation, and the inclusion of sounds for letters and syllables as forms of feedback.

The content design also integrates the local wisdom of the Sasak tribe as a core part of the media. As previously explained, local wisdom includes culture, traditional clothing, local cuisine, traditional games, and other cultural products that are close to students' lives (Alditia & Nurmawanti, 2023; Nabilah et al., 2024). In the design stage, local cultural content is selected selectively to be relevant to students' lives and easily recognizable by them, such as Sasak traditional clothing, special foods like poteng, traditional arts, and traditional games like gasing. The layout design appearance of the digital educational game is as follows:



Figure 2. a) Initial menu display of the educational game; b) Display of menus in educational game; c) Pictures and words from the traditional food of the Sasak tribe; d) The game complements syllables based on images of local wisdom

Development

Next, in the development stage, the process of production and refinement of the media is carried out repeatedly based on expert feedback before finally being ready for field testing (Branch, 2018). In this study, the digital educational reading board game based on local wisdom of the Sasak tribe, which has been previously designed, is started into an initial prototype/draft of the educational game by realizing the visual component design, creating sound features, exporting the educational game to a website, and then conducting validation by experts. The expert validation conducted includes media expert validation and material expert validation of the developed educational game to assess the feasibility of the media before it is used in implementation (Sugiyono, 2019; Suhendrianto, 2017).

Media expert validation was conducted to determine the feasibility level of the digital educational reading board game that has been developed. The results of the media expert assessment of the local wisdom-based Sasak tribe digital educational reading board game, based on quality, effectiveness, and programming aspects, are as follows:

Table 3. Media Expert Validation Results

Assessment Aspects	Validator		Total Score	Maximum Score	Percentage Result	Criteria
Quality	43	44	225	230	97,8%	Very Feasible
Effectiveness	38	40				
Programming	30	30				

Based on Table 3 above, the percentage of the digital educational game's feasibility level is 97.8%, which falls into the very feasible category for use after revisions are made according to the suggestions of two media experts (Suhendrianto, 2017). Media experts point out that some of the key features, including intuitive navigation, clear audio-visual feedback for phonetic learning, the use of age-appropriate language, and meaningful integration of Sasak cultural elements in educational games are in line with the needs of reading skill development as well as the characteristics of elementary school students.

Next, expert validation of the material was conducted to determine the feasibility level of the content in the digital educational game that has been developed. The results of the expert assessment of the local wisdom-based Sasak tribe digital educational reading board game, based on aspects of objectives, content, appearance, language, and motivation are as follows:

Table 4. Expert Material Validation Results

Assessment Aspects	Validator		Total Score	Maximum Score	Percentage Result	Criteria
Objectives	14	15	190	200	95%	Very Feasible
Content	32	34				
Appearance	24	25				
Language	9	9				
Motivation	13	15				

Based on Table 4 above, the percentage of the feasibility level of the digital educational game material is 95%, which falls into the very feasible category for use after revisions according to the suggestions of the two content experts (Suhendrianto, 2017). Content experts highlight that the use of culturally familiar objects and terms strengthens phonological awareness by providing contextual cues that support the spelling and word recognition processes. Based on these results, the digital educational reading board game based on the local wisdom of the Sasak tribe that has been developed can be used in the next stage, which is product testing during the implementation phase.

Implementation

In the implementation stage, after the developed media was revised according to the validator's suggestions, the next step was to directly apply it to students and teachers to assess the practicality of the digital educational game in a real-world context. In this study, the implementation was carried out by applying a digital educational game based on local wisdom to second-grade students at SDN Buwun Mas and asking teachers to observe the use of the educational game and provide assessments of its practicality. Therefore, the implementation stage functions to determine how effectively the media can be used by actual users, both students and teachers (Branch, 2018; Winaryati et al., 2021).

The responses or reactions of second-grade students with a small group of 6 people to the digital educational reading board game based on the local wisdom of the Sasak tribe at SDN 1 Buwun Mas are as follows:

Table 5. Test Results at SDN 1 Buwun Mas

Assessment Aspects	Results	Total Score	Maximum Score	Percentage Result	Criteria
Material	143	402	420	95,7%	Very Practical
Media	116				
Operation	86				
Benefit	57				

Based on Table 5 above, the percentage of student response questionnaires regarding the digital educational reading board game based on Sasak local wisdom is 95.7%, which falls into the very practical category (Suhendrianto, 2017). Next, the responses or reactions of second-grade students with a small group of 6 people to the digital educational reading board game based on the local wisdom of the Sasak tribe at SDN 4 Buwun Mas are presented as follows:

Table 6. Test Results at SDN 4 Buwun Mas

Assessment Aspects	Results	Total Score	Maximum Score	Percentage Result	Criteria
Material	145	411	420	97,8%	Very Practical
Media	118				
Operation	89				
Benefit	59				

Based on Table 6 above, the percentage of student response questionnaires regarding the digital educational reading board game based on the local wisdom of the Sasak tribe is 97.8%, which falls into the very practical category (Suhendrianto, 2017). This percentage indicates that almost all students who tested the product found the educational game is easy to use, interesting, and helpful in understanding early reading materials. This is because digital educational games that combine attractive visuals, activities for arranging letters, and direct interaction, such as educational games, are very effective in early reading learning (Mardhotillah & Rakimahwati, 2021; Prasetya et al., 2024).

During the implementation phase of the digital educational reading board game in second-grade reading lessons, students showed very positive responses. Throughout the learning process, students actively engaged in each activity within the educational game, such as recognizing letters, reading syllables, and forming words. Students appeared focused and enthusiastic when attempting to complete each challenge in the game. These findings align with the opinion of Anggraini (2021) that interactive media with visual and audio elements can enhance students' focus and participation. Next, the responses or reactions of Grade II teachers to the local wisdom-based digital educational reading board game at SDN 1 Buwun Mas and SDN 4 Buwun Mas are as follows:

Table 7. Teacher Response Questionnaire Results

Assessment Aspects	Teacher		Total Score	Maximum Score	Percentage Result	Criteria
	SDN 1	SDN 4				
Material	24	25	148	150	98,6%	Very Practical
Media	20	20				
Operation	14	15				
Benefit	15	15				

Based on Table 7 above, the percentage score of the responses from the second teachers regarding the digital educational reading board game based on Sasak local wisdom is 98.6%, which falls into the very practical criteria (Suhendrianto, 2017). This percentage indicates that teachers consider the educational game easy to use in learning, does not require complicated instructions, and provides real assistance in teaching early reading skills.

Based on observations during the implementation process, both second-grade teachers gave very positive feedback regarding the use of digital educational reading board games based on local wisdom in reading instruction. These findings align with international studies indicating that digital educational games enhance learner motivation and reduce cognitive load through interactive and multimodal design (Plass et al., 2015). The teachers assessed that using educational games helps create a more lively and interactive learning atmosphere because students become more active, enthusiastic, and the learning becomes more effective and enjoyable, in line with the opinions expressed by Anggraini (2021) regarding the advantages of educational games. Additionally, the teachers stated that integrating local wisdom into the media makes students more enthusiastic and easier to understand the meaning of words because they recognize cultural elements close to their daily lives. This aligns with the opinions of Nurchim & Purwanto (2023) and Rahmatih (2020), which emphasize that learning based on local cultural context can increase relevance, emotional connection, and student understanding.

Based on the previous explanation, the overall implementation results indicate that the responses of students and teachers fall into the very practical category. This means that the digital educational reading board game media is not only well received but also capable of improving the quality of early reading learning processes.

Evaluation

The final stage is the evaluation stage. This stage aims to determine the effectiveness level of the developed product after it is applied to students in real learning (Musaddat et al., 2021). The evaluation in this study uses a one-group pretest-posttest experimental design based on the pretest and posttest scores of students on a reading ability performance test during the implementation process (Sugiyono, 2019), as well as the percentage of N-Gain obtained (Gunawan et al., 2017). Several tests were conducted, including normality tests as a prerequisite, hypothesis testing or mean difference tests, and N-Gain tests. In this study, normality tests were conducted on the pretest and posttest reading ability data of students using the Shapiro-Wilk test because the sample size taken was less than 30 respondents per group, with the results shown in Table 8 below:

Table 8. Summary of Normality Test Results

Class	N	Sig.	Conclusion
Pretest A (Experiment)	27	0.469	Normal
Posttest A (Experiment)	27	0.091	Normal
Pretest B (Experiment)	23	0.178	Normal
Posttest B (Experiment)	23	0.087	Normal

Based on table 8 above, the significance values for each group, both Group A (SDN 1 Buwun Mas) and Group B (SDN 4 Buwun Mas), are above 0.05, which means that the data collected are normally distributed. Therefore, it can be concluded that the data in this study are normally distributed (Sukarelawan et al., 2024).

Next, because the normality prerequisite test was met, hypothesis testing was conducted using a T-test, specifically the Paired Sample T-Test, with the help of SPSS 27 for Windows. The T-test was carried out separately in each group. This test was performed to

determine whether there was a significant difference in the use of local wisdom-based digital educational reading board games on students' reading abilities. The results are as follows:

Table 9. Summary of Hypothesis Test Results on Students' Early Reading Ability

Variable	Group	N	t-value	df	Sig.
Students' Initial Reading Ability	Group A	27	-66.703	26	<0.001
	Group B	23	-46.096	22	<0.001

The data in Table 4.9 above shows that there is a significant difference between the results of the pretest and posttest for both Group A and Group B because the significance values obtained are $0.001 < 0.05$. Therefore, based on the hypothesis testing criteria in this study, which states that if the significance value obtained < 0.05 , then H_0 is rejected and H_a is accepted, meaning there is a significant difference in students' reading ability before and after treatment using a digital educational game based on local wisdom (Sukarelawan et al., 2024).

Next, the N-Gain test is used to assess the effectiveness of the developed product in improving students' reading skills. The gain scores are obtained from the results of pretests and posttests conducted on the students overall. The N-Gain test in this study was carried out using the SPSS 27 for Windows application. The results of the N-Gain test found that Group A achieved an N-Gain score of 0.74 with a 'high' category, and Group B achieved a score of 0.76 also in the 'high' category (Hake, 1998). The effectiveness of the digital educational reading board game in developing students' reading skills can be seen from the percentage of N-Gain scores for each group. Below is a summary of the N-Gain percentage test results:

Table 10. Summary of N-Gain Percentage Test Results

Group	N-Gain (%)	Interpretation
A (Experiment)	74,15%	Quite Effective
B (Experiment)	76,37%	Effective

The data above shows that the use of digital educational reading board games is effective in developing students' reading skills, especially in early reading, with a percentage of 74.15% in the quite effective category and 76.37% in the effective category (Sukarelawan et al., 2024). The difference in this category can be influenced by environmental factors, such as students' initial mastery of digital media, classroom learning routines, and variations in teacher facilitation styles. This can be seen during the implementation phase, students at SDN 4 Buwun Mas show greater fluency in operating the mouse and navigating the digital educational game interface, which allows them to engage more efficiently with learning activities. In contrast, a large number of students at SDN 1 Buwun Mas require additional guidance to use the mouse, which affects the speed of gameplay and limits their interaction with the learning content. These findings suggest that students' early digital literacy skills play an important role in shaping the effectiveness of digital game-based learning implementations. This is in line with the opinion of Squire (2011) who stated that contextual and instructional variables play an important role in moderating the effectiveness of game-based learning interventions. Schools with higher levels of digital literacy of students tend to experience smoother implementation processes, resulting in stronger learning outcomes. Therefore, differences in environmental and technological factors should be considered when interpreting variations in effectiveness categories across educational settings.

At this stage of evaluation, the improvement of students' reading ability as shown by the N-Gain results showed that the treatment given to each experimental group, both A and B, was effective in developing the reading ability of second-grade elementary school students. Thus, the digital educational game developed can effectively improve students' reading skills. The improvement in reading ability reflects not only cognitive gains but also increased motivation and engagement. These results are consistent with international research on



Game-Based Learning and Place-Based Education, which emphasizes that culturally responsive digital media can effectively address early literacy challenges (Kafai & Burke, 2015; Sobel, 2013).

Overall, the evaluation stage proves that the digital educational reading board game based on the local wisdom Sasak tribe is effective in improving the early reading skills of second-grade students. By combining the framework of Game-Based Learning and Place-Based Education, the developed media provides pedagogically, culturally relevant, and engaging solutions for early reading teaching, especially in the context of indigenous and rural education. The effectiveness of this media is not only based on improving scores but also on increasing motivation, engagement, and relevance of learning for students. This is in line with the statement of Sukarelawan (2024) that learning media is considered effective if it can bring significant changes in user learning outcomes. Therefore, the evaluation stage in this study shows that the entire educational game development process has succeeded in achieving its main goal, which is to produce decent, practical, and effective media in improving the early reading skills of elementary school students.

Conclusion

Based on the results of expert validation, teacher responses, and classroom implementation, this study concludes that the digital educational reading board game based on the local wisdom of the Sasak tribe is highly feasible, highly practical, and effective for improving second-grade students' early reading skills. The feasibility of the developed media is demonstrated by expert judgments indicating that the game meets high standards in terms of content relevance, instructional design, visual clarity, and functional usability. Furthermore, the practicality findings show that both teachers and students were able to use the game easily in classroom settings and perceived it as engaging, supportive, and beneficial for early reading instruction.

In terms of effectiveness, the implementation of the digital educational game resulted in a meaningful improvement in students' reading abilities, particularly in letter recognition, syllable decoding, and simple word reading. These improvements indicate that the integration of game-based learning principles with local cultural context provides an effective instructional approach for addressing early literacy barriers. Through the integration of Game-Based Learning and Place-Based Education principles, this study contributes to the growing body of evidence that culturally grounded digital learning media is an effective solution for early literacy development. Overall, this study explicitly demonstrates that locally culture-based digital educational media can serve as an effective solution to overcome early reading difficulties, especially in elementary schools located in indigenous and culturally rich environments.

Recommendation

Based on the results of this study, several recommendations are proposed for future research and educational practice. The digital educational game developed through the integration of Sasak local wisdom has shown positive outcomes in supporting early literacy development. Thus, to overcome the early literacy challenges in a more systematic and sustainable manner, it is recommended that local Education Offices support the integration of local wisdom-based digital learning media into formal elementary literacy programs. School principals are encouraged to facilitate the use of culturally responsive digital educational games by providing institutional support, teacher training opportunities, and curriculum enrichment aligned with students' cultural contexts. Such initiatives can strengthen school-



based literacy programs and create more meaningful and engaging learning environments, particularly in indigenous and rural areas.

In addition, future research is recommended to examine the effectiveness of local wisdom-based educational games over a longer period of time. Longitudinal studies would provide deeper insights into the sustainability of students' early literacy skills, learning motivation, and reading comprehension after continuous and prolonged use of culturally responsive digital learning media. This approach is important to understand whether the positive effects observed in this study can be maintained in the long term.

Subsequent studies can also integrate other materials into the educational game that are more relevant to the students' environment and capable of fostering students' interest in the reading learning process. These efforts are expected to enhance the adaptability, instructional value, and sustainability of local wisdom-based digital learning media in addressing early literacy difficulties. Collaboration with elementary school teachers and curriculum developers is highly recommended to ensure that local culture-based digital games are aligned with national curriculum objectives and can be practically implemented in classroom settings. Through these efforts, local wisdom-based educational media can be further developed as an inclusive and effective approach to supporting early literacy learning in diverse educational contexts.

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