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DEVELOPMENT OF MULTIMEDIA-BASED DIGITAL LITERACY LEARNING MATERIALS INSPIRED BY THE LOCAL WISDOM OF THE BUGIS TRIBE

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ABSTRACT
This study aims to develop multimedia-based digital literacy learning materials rooted in the Bugis tribe's local wisdom. This is a research and development (R&D) study using the 4D (Four D) model, which consists of the Define, Design, Development, and Disseminate stages. The subjects of this study were upper-grade teachers and sixth-grade students. The research instruments used in this study were questionnaires and guidelines. The data were analyzed descriptively. The results indicate that the multimedia-based digital literacy learning material rooted in the local wisdom of the Bugis tribe is suitable in terms of content, with an average score of 4.8, and performs very well in terms of functionality, with an average score of 4.71. Furthermore, the pilot test yielded an average score of 4.8 on a small-scale assessment and 4.66 on a large-scale assessment. These findings suggest that the developed material is well-received.

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INTRODUCTION

The rapid pace of technological advancement is forcing the education sector to adapt quickly. Accelerating digital transformation has become a priority in equipping educators to face the Industry 5.0 era. It is reported that 2,500 civil servants and PPPK under the Ministry of Education, Culture, Research, and Technology have been trained in e-learning digital literacy (Pendidikan, n.d.). The Ministry of Religious Affairs, in collaboration with the

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Ministry of Communication and Information Technology, has trained 24,000 teachers and religious counselors in digital literacy (Ayu, 2023). This demonstrates the importance of digital literacy in education.

Aviliani, a senior economist at INDEFA, noted that the digital literacy rate in Indonesia stands at only 62% and ranks the lowest compared to other ASEAN countries, which average 70% (Anom, 2023). Therefore, digital learning tools should be used effectively in schools. Indonesia must be prepared to enter a new phase—one centered on people—to leverage technology, defined as the Society 5.0 era. (Sururuddin et al., 2021). In the face of the digital age, educators have a role and responsibility to create digitally literate learning processes. In this regard, educators must be able to build and enhance digital literacy, particularly among students. Digital literacy is the knowledge and skills required to use digital media, including modern communication tools and the internet, to find, process, evaluate, and utilize information, as well as to create and apply information wisely, intelligently, carefully, and appropriately—and, of course, in compliance with laws and regulations—in order to foster positive communication and interaction in daily life. (Suherdi, 2021).

Digital literacy-based learning media are digital learning tools that can enhance the effectiveness and time efficiency of learning, support distance learning, and require no special maintenance. (Mu'minah & Gaffar, 2020) (Winda & Dafit, 2021). Easy access to a wide range of information and entertainment options provided by these digital literacy-based learning media not only imparts knowledge but also fosters the ability to make wise decisions, supports critical thinking, and promotes responsibility. In the digital age, such skills are no longer optional but essential to upholding norms of appropriateness and responsible behavior in the use of ever-evolving digital technologies.

Various studies have been conducted to develop digital literacy-based learning media, such as the study by Utami & Asri Hardini titled "Development of Digital Literacy Learning Media Based on Educational Games to Enhance Reading Interest in Second-Grade Elementary School Students." The results of the study indicate that the developed learning media make learning more

enjoyable for students by featuring animated content and allowing them to play and learn alongside their peers (Utami & Asri Hardini, 2021). The research results indicate the development of digital literacy multimedia designs using the Powtoon application and a weblog containing computer science learning content.

This is what motivated the researchers to develop multimedia-based digital literacy learning materials that incorporate local wisdom. This multimedia-based learning application was built using two core applications: PowerPoint and Articulate. PowerPoint is a user-friendly application. Almost all computers or laptops have this application, so teachers or instructors can develop interactive learning applications by integrating animation features and interactive elements. PowerPoint has a variety of features that make it easy for users to change its design. PowerPoint, as an interactive learning medium, can increase students' motivation and interest in learning. In addition to being created using PowerPoint, this educational media application was also developed using Articulate. This is because Articulate offers a comprehensive set of features that teachers can use to assess student learning outcomes. The automatic grading and scoring features make it easier for teachers to evaluate students' work. Articulate itself is presented as a website with questions and quizzes for students.

The developed digital literacy media is aligned with local wisdom, ensuring that the integration of technology and culture can be preserved. (Rahyono, 2009) defines local wisdom as the human intelligence of a particular ethnic group, acquired through community experience. Thus, local wisdom can be interpreted as a cultural product born from the experiences of a specific community living in a particular region. Elements included in local wisdom include: folk tales, traditional games, local customs, proverbs, pantuns, regional songs, and traditional rituals passed down through generations. (Nurcahyo & Afryaningsih, 2018).

Digital literacy rooted in local wisdom positively highlights a region's local values within an individual's understanding of literacy. By fostering this form of digital literacy, individuals will not forget their cultural heritage and will continue to preserve it for future generations (Joyo, 2019). Therefore,

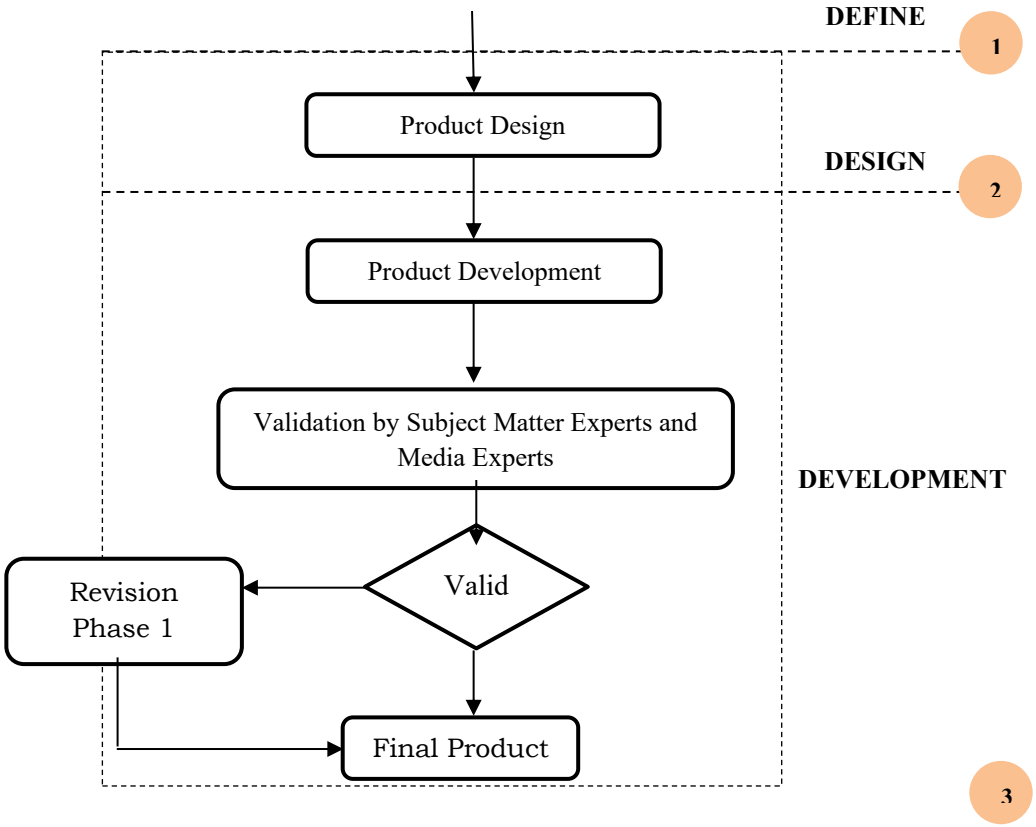
efforts are needed to preserve a region's local wisdom in the face of challenges. In this context, multimedia-based learning applications can serve as an effective alternative solution for teachers to introduce local wisdom through folk tales. The multimedia-based learning applications in question are PowerPoint and Articulate. Through these multimedia-based digital literacy learning applications, it is hoped that engaging learning experiences can be created for students and that teachers will find it easier to design effective and efficient Indonesian language lessons that incorporate local wisdom. Based on the background described above, the research question for this study is: "How can multimedia-based digital literacy learning materials that incorporate local wisdom be developed?"

METHOD

This study is a research and development (R&D) project aimed at producing a multimedia-based digital literacy learning resource that incorporates local wisdom. Research and development is a type of research used to produce a specific product. The development model used is the 4D model. (Maydiantoro, 2021) which consists of four stages: Define, Design, Develop, and Disseminate. However, this study is limited to the development stage. This is due to the researcher's time constraints. This study involved 3 classroom teachers, 26 sixth-grade students, a media expert, and a subject-matter expert.

Data collection was conducted through questionnaires and interviews, using questionnaires and interview guides as instruments. The questionnaires, which consisted of response forms for students, teachers, media, and materials experts, were used to collect data on the practicality and effectiveness of the developed multimedia-based digital literacy learning application integrating Buginese local wisdom. Meanwhile, the interview guides served as supporting instruments to obtain more in-depth information from both teachers and students regarding the potential effects (effectiveness) of using the application product.

The research and development procedures carried out are as follows:



1. Define (Definition)

In this stage, the researcher defines the requirements for the development process. This stage includes: Pre-test Analysis, Learner Analysis, Task Analysis, Concept Analysis, and Learning Objective Analysis

2. Design

In this stage, the researcher begins designing the learning media product. The design stages include: Selection of Instructional Materials, Selection of Format, and Preliminary Design.

3. Develop.

In this stage, the developed product is validated by subject-matter and media experts and supported by user perspectives from both teachers and students. This stage includes: Media Expert Validation Results, Content Expert Validation Results, Educator Feedback Results, and Student Feedback Results.

4. Distribute

This stage has not yet been implemented due to time constraints, so media dissemination has not taken place.

The collected data consists of quantitative and qualitative data. Qualitative data were obtained from interviews with teachers as preliminary information prior to developing the educational media application. Meanwhile, quantitative data were obtained from expert validation of media and materials related to the development of multimedia-based digital literacy educational media. Teacher and student questionnaires were used to assess the quality of the content, materials, and evaluation processes included in the developed educational media application. The survey data will be analyzed descriptively and quantitatively using percentage calculations and data categorization on a five-point scale, based on the categorization guidelines in Table 1 below.

Table 1. Guidelines for Data Categorization Using a Five-Point Scale (Sujidono, 2012)

Score Interval	**Criteria**
$\bar{M} + 1{,}5\ SD < X$	Excellent
$M + 0{,}5\ SD < X \leq M + 1{,}5\ SD$	Good
$M - 0{,}5\ SD < X \leq M + 0{,}5\ SD$	Average
$M - 1{,}5\ SD < X \leq M - 0{,}5\ SD$	Fair
$X \leq M - 1{,}5\ SD$	Poor

Notes:

M: mean

SD: standard deviation

RESULTS AND DISCUSSION

RESULTS

This study resulted in a multimedia-based digital literacy learning application that integrates Bugis culture. Various stakeholders were involved in the development of this application. Media experts and subject matter experts were expected to provide input regarding the application's development, as were users, including both teachers and students. The application was developed using the 4D model as follows.

Define

The initial analysis stage indicates the need to develop more innovative learning media to address problems in the field. Based on the front-end analysis conducted through interviews with educators in Bone Regency, it was found that the learning process is still conventional and monotonous because teachers rely heavily on textbooks and lack awareness of the importance of multimedia in the digital era. In fact, school facilities such as projectors and laptops are quite adequate but have not been utilized optimally. This condition also affects academic performance, as the learner analysis shows that some students still score below the Minimum Mastery Criteria (KKM) in their daily exams.

To follow up on these findings, the planning of materials and application development goals was carried out through task, concept, and learning objective analyses. The task analysis identified teaching materials for the Indonesian Language subject by integrating Buginese local wisdom values into digital literacy learning media. More specifically, the concept analysis focused on folklore and fairy tales. This entire content design was then refined through analysis of the learning objective to determine a clear direction and learning achievement targets for the students.

Design

The media design stage consists of selecting teaching materials, selecting formats, and conducting initial design. In selecting teaching materials, the researcher designed the main materials in the form of folklore or fairy tales that highlight the local culture of the Buginese people, while also preparing evaluation materials in the form of questions or quizzes. Furthermore, in the format selection stage, the researcher integrated reading texts, images, and animations to maximize the functionality and visual appeal of the media so that students become more enthusiastic about learning. The development of this digital literacy media integrated several applications, namely PowerPoint, Illustrator, and Articulate. Finally, in the initial design stage, the researcher arranged and displayed the sequence of the developed application.

Figure 1 *Home Screen*

The app's initial screen will look like the image above. To launch the app, click the Start button. A variety of options will then appear, as shown in the image below.

Figure 2: *List of Options*

The image above shows a variety of options, ranging from learning focus and core content to games and assessments. These options can be selected at random as needed. If you want to view the learning focus, please click on "learning focus." The same applies to the other options when selected. The learning focus screen is shown in the image below.

Figure 3 *Learning Focus Image*

The image above shows only the material to be studied. Both students and teachers have an idea of what will be discussed later. The button at the bottom left returns users to the list of options, as shown in Figure 2.

In addition to the teaching materials, the menu offers other options: games and assessments. These games include educational activities designed to keep students from getting bored or disengaged while using the app. The games presented are as shown in the image below.

Figure 4 *Puzzle Game Images*

Figure 5 *Puzzle Game Answers*

The image above shows one of the games included in the digital literacy learning app under development. This is intended to give users a moment to reflect so they do not get bored while using the app. In addition to games, there is an assessment feature that teachers can use when administering quizzes or exams. The assessment section is shown in the image below.

Figure 6: *Fill in Your Personal Information*

In this section, students write their names and student ID numbers to facilitate the compilation of exam results. In the next section, students can take either a quiz or an exam, as shown in the image below.

Figure 7: *Select a Quiz/Exam*

After selecting the quiz you want to take, a series of questions will appear that you must answer, as shown in the image below.

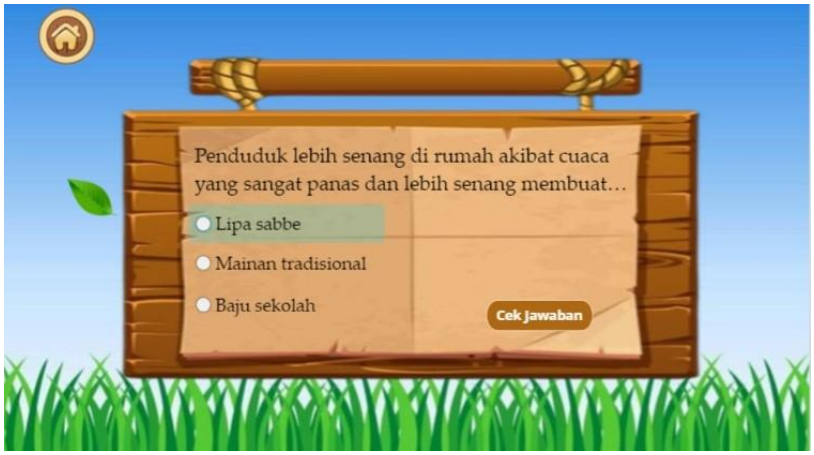


Figure 8 *Answering Questions*

The question above is accompanied by answer choices, with only one correct answer. If the student answers correctly, a notification will appear as shown in the image below.

Figure 9 *Correct Answer*

A notification indicating the correct answer appears as shown in the image below when you answer a question correctly.

Development

In the expert assessment stage, the researcher involved four experts, including material and media experts. Each expert was tasked with filling out a validation sheet prepared by the researcher. Specifically, in the media expert validation stage, the experts assessed several aspects of the developed application, including the application introduction, user control, application display, and the end of the application. The results of the expert assessment are described as follows.

Table 2 Media Expert Evaluation Table

No	Evaluation Aspect	Average Score	Criteria
1	Application Introduction,	4,67	Excellent
2	User Controls,	4,5	Excellent
3	Application Interface	4,67	Excellent
4	Exit Application	5	Excellent
	Average	4,71	Excellent

Based on the media experts' assessment, the app received "very good" ratings across all four evaluated aspects, making it suitable for use. However, media experts have provided several suggestions for improvements,

particularly regarding the interface, where the home icon for returning to the menu list needs to be made clearer. Additionally, the three menu options—Learning Focus, Core Materials, and Evaluation—have been updated to include a fourth option for games, with the games previously located within the Evaluation section moved to a separate section, as shown in the image below.

Before	After
Expert Comments In the dropdown menu, there are three options to choose from, one of which is "Evaluation." It appears that several games are grouped under the 'Evaluation' section; they should be separated from the 'Evaluation' category.	

Figure 10 *Table of Media Experts'*

Subject matter experts evaluated the content developed for multimedia-based digital literacy learning materials rooted in local wisdom, considering criteria such as content quality, language, and presentation. The results of the subject matter experts' evaluation are shown in the table below.

Table 3 Subject Matter Expert Evaluation Table

No	Evaluation Aspect	Average Score	Criteria
1	Content Quality	4,8	Excellent
2	Language	4,6	Excellent
3	Presentation of Material	5	Excellent
	Average	4,8	Excellent

Based on the subject matter experts' assessment, the three evaluated aspects met the criteria for "very good," making the multimedia-based digital literacy learning tool suitable for use. However, the subject matter experts also provided feedback regarding the language used in the learning tool. There is concern that this tool applies only to specific regions and therefore cannot be implemented in areas outside the Bugis ethnic group, particularly the Bugis-Bone region.

Small-Scale Trial

At this stage, the multimedia-based digital literacy learning application was pilot-tested on a small scale with 10 sixth-grade students. The results of the pilot test are shown in the table below.

Table 4 Small-Scale Trial Table

No	Evaluation Aspect	Average Score	Criteria
1	Media Quality	4,8	Excellent
2	Content Quality	4,6	Excellent
3	Evaluation	5	Excellent
	Average	4,8	Excellent

Based on the table above, the multimedia-based digital literacy learning app was well received by users. This is evident from the excellent ratings across the three aspects measured. Most user comments indicated that they were pleased with the app, particularly with the games included in the learning platform. A large-scale pilot test was then conducted involving all sixth-grade students.

Large-Scale Trial

In a large-scale trial, the results of the evaluation—which measured three aspects, including media quality, content quality, and evaluation—are shown in the table below.

Table 5 Large-Scale Trial Table

No	Evaluation Aspect	Average Score	Criteria
1	Media Quality	4,6	Excellent
2	Content Quality	4,4	Excellent

No	Evaluation Aspect	Average Score	Criteria
3	Evaluation	5	Excellent
	Average	4,66	Excellent

Based on the table above, users are satisfied with and interested in the developed educational media. This is evident from the three aspects measured; overall, all were rated as excellent. This demonstrates that the digital literacy learning media based on local wisdom has been well-received by users and is suitable for use. Some users provided comments regarding the game features and the evaluation feature, noting that the games presented are highly interactive while still testing users' insights and knowledge. Additionally, the evaluation feature, which automatically displays scores after completing questions, is highly appreciated by users.

DISCUSSION

This study aimed to develop multimedia-based digital literacy learning materials using PowerPoint integrated with Articulate. The development was carried out using the 4D (Four D) Model, which consists of the Define, Design, Development, and Disseminate stages, as described below. The Define stage involves analyzing and identifying problems and gathering information about the learning materials to be developed. In this stage, there are 5 (five) key steps consisting of front-end analysis, learner analysis, task analysis, concept analysis, and learning objective analysis. Based on the researcher's analysis, most teachers in schools still use student textbooks as the primary medium for learning. The teaching methods used remain conventional. School facilities and equipment, such as projectors and laptops, are adequate, but their use is not yet maximized due to teachers' perception that learning applications are difficult to use.

This makes learning less effective, as evidenced by students' daily test scores, which remain below the minimum passing score. Therefore, the development of learning media is necessary. In this study, the media developed contains Indonesian language subject matter that integrates the local wisdom

of the Bugis tribe, presented in the form of folk tales and stories in accordance with the learning objectives.

During the design phase, the researcher created a multimedia-based digital literacy learning media application incorporating local wisdom, based on the results of a needs analysis. The limited use of learning media by teachers stems from their reliance on school-owned textbooks. Additionally, teachers still lack variety in their use of learning media. (Jannah & Junaidi, 2020). Meanwhile, school facilities are sufficiently adequate, with school-owned laptops and LCD projectors available as part of the school's inventory.

The digital learning materials were developed using several familiar applications, making them highly replicable by teachers. The supporting applications for these digital literacy learning materials are PowerPoint, Illustrator, and Articulate. PowerPoint was chosen because all teachers have computers or laptops equipped with the PowerPoint application. Additionally, PowerPoint's features have become increasingly comprehensive and can now be used to create engaging video or animation-based learning materials, making it a more interactive application. (Fitria & Fitrihidajati, 2023). Meanwhile, Articulate offers a full suite of features, including educational games that keep students engaged through interactive learning activities. The Articulate application can also create quizzes that automatically display students' scores after they complete the quiz. Teachers can make the most of this quiz/test feature, eliminating the need to grade students' work, which consumes time and energy. This makes the developed learning media application more engaging and effective.

During the development phase. Once the multimedia-based digital literacy learning materials have been developed, expert validation is required to assess their suitability in terms of both content and media. In this study, four experts were involved, including two content experts—specifically in the Indonesian language—and two media experts. Based on the validation/assessment by media experts examining four aspects—Application Introduction, User Controls, Application Interface, and Application Conclusion— An average score of 4.71 was obtained, meeting the "very good" criteria. Similarly, the content experts' validation—evaluating three aspects:

Content Quality, Language Quality, and Material Presentation—yielded an average score of 4.8, also meeting the "very good" criteria.

When reviewing the results of the small-scale pilot test of the multimedia-based digital literacy learning app incorporating local wisdom among users—using the criteria of Media Quality, Content Quality, and Evaluation—the app received an average score of 4.8. In contrast, the large-scale pilot test achieved an average score of 4.6. This indicates that, overall, users are satisfied with the developed app and that its use is effective. However, the development of this media has only reached the "develop" stage and has not yet progressed to the "disseminate" stage due to the researcher's limitations.

CONCLUSION

Based on the results and discussion, it can be concluded that the development of multimedia-based digital literacy learning materials that incorporate local wisdom is appropriate for use in both content and medium.

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