

A Flipbook-based Multimedia Learning Object Integrating Local Wisdom in Elementary Education: Design and Expert Validation

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ABSTRACT:

This research proposed the development of a digital e-module using the Ketangerangan Local Wisdom with a digital media-based flipbook for learning local wisdom content for primary schools in Indonesia. A 4-D development process was used for this research, consisting of the define, design, develop, and disseminate stages. Based on the result of the define stage, it is found that there is no digital learning media for learning local wisdom content. In the design stage, a prototype of digital media for learning local wisdom content with elements of interactivity and students' engagement was also developed. Validation results from experts showed that the feasibility of the e-module is high, with a mean of 90.48% from the material validators and a mean of 86.67% from the media validators. A small-scale trial test using the e-module with 30 teachers and 150 students showed the e-module is very practical with a score of 83.25% for teacher response and 83.17% for students' response, indicating that the e-module is feasible, practical, and supportive for engaging students for learning local cultural content. This research is focused on the possibility of using digital media with a flipbook-based digital media for learning in primary schools.

Keywords: e-module, elementary education, flipbook, ketangerangan, local wisdom.

INTRODUCTION

The advancement of a nation is in close connection with the national education system of the particular country. Good education is the main goal of any kind of government. Good education is the basis for the improvements in the qualities of the citizens of the particular country, in this case, the citizens of Indonesia. The right goal of an educational system is to improve the human resource of the particular country in a healthy and continuous manner in all three dimensions: intellectual, psychological, and social. The reality

that the goal of an educational program has been accomplished is the ability of the students to manifest the positive changes in their thoughts, skills, and behavior after the learning experiences (Kandia et al., 2023).

In order to provide an effective learning process, the application of intermediaries is quite necessary in order to deliver knowledge, skills, and values from the teacher to the learners. In this case, intermediaries are referred to as learning media (Lusiana & Maryanti, 2020). Learning media are considered tools that are used in order to transfer

messages from the source to the receiver with the aim of encouraging thinking processes, feelings, attention, and willingness in order to achieve the learning process (Lusiana & Maryanti, 2020). Teachers are in a position to encourage students in learning new things and to simplify complex issues through the application of a combination of learning resources. On the other hand, learning media helps students not to lose interest in the learning materials (Zulfiana & Susanti, 2018). Hence, the application of learning resources improves effectiveness, efficiency, and attractiveness in the learning and teaching process, especially in the learning of science subject. (Ummah & Mustika, 2024).

However, the function of learning media is more and more strategic and significant in terms of quality education. Generally, learning media has three functions of taking roles, namely, assisting teachers in conversing on weaknesses in subject mastery and saving time, assisting learners in accelerating mastery and developing mastery, and developing the quality of the process of teaching and learning. In cases where results of learning did not meet specified standards, media has an important function in developing remediation of quality and quantity of easier learning (Ramli, 2012). Besides, more creative and innovative learning media would inspire curiosity among students, increasing critical and analytical capabilities (Rosalianisa et al., 2023). Media, therefore, is no longer just for transmission but a very essential element for developing an interesting and interactive teaching and learning process (Fitriya et al., 2023).

In line with this, it is necessary that the above-stated active learning environment be integrated using "Local Content," which refers to the learning activities that provide competency in line with the qualities and potential of the region. In line with this statement above, it is noteworthy to refer to the Indonesian Minister of Education and Culture regulation No. 79 of 2014, which refers to local content as learning material that involves regional potential and uniqueness. This is intended to provide exposure to students regarding social and cultural values, to provide functional competency, and to provide concern regarding environmental issues. This learning material includes elements involving local cultures, histories, and wisdom that play an important role in the identity of Indonesia. Thus, local content is assumed to provide benefit in the daily life of the student (Verrysaputro & Subekti, 2023).

Local content is a set of knowledge, values, and culture that are passed down from generation to generation in a community, which serve as guidelines for living within the social context (Geertz, 1983; Rahyono, 2017). In the context of education in Indonesia, local wisdom is applied through a local content curriculum that is designed to address the regional characteristics, which include the need for a better implementation of education that supports good character development (Mulyasa, 2013). This is supported by national policies, such as Permendikbudristek Number 12 of 2024, in which the development of local contents in the Merdeka Curriculum is written through the significant role of local governments that stress the need to incorporate local culture into the learning process. A culturally relevant educational system is a significant approach to enhance effective learning by supporting cultural sustainability (Kemendikbudristek RI, 2024).

In this context, Ketangerangan is considered to be a local expression of wisdom that represents the cultural identity of the people of Tangerang. It is considered to be a complex construct that comprises historical consciousness, the religious and moral components of the culture of the people of Tangerang, the linguistic components of the culture of the people of Tangerang, the social components of the culture of the people of Tangerang, and the artistic components of the culture of the people of Tangerang that celebrate the lives of the people of Tangerang. It is not considered to be the expression of disparate cultural practices but the expression of the convergence of a value system that regulates human behavior and socialization of the people of Tangerang. This is consistent with the national educational agenda to develop students who are socially engaged and morally and culturally knowledgeable (Republik Indonesia, 2003).

In pedagogy, Ketangerangan is made up of major elements such as the history of Tangerang, religious practices, language, arts, customs, and other practices that are part of the local culture. All the elements of Ketangerangan cover the cognitive, affective, and behavioral dimensions of learning. Thus, Ketangerangan is a holistic learning approach for local subjects in primary schools. This learning approach is contextual. It is flexible to fit the region where it is used because it has a cultural orientation that is adaptable for language use despite being based on Ketangerangan. Thus, learning through Ketangerangan is focused on character development, understanding culture, and the

development of 21st-century skills. It is through the development of Ketangerangan as a unique cultural and learning construct that a theoretical foundation for integrating it into digital learning media can be developed. This is because it is essential that Ketangerangan is integrated not only as information about its cultural context but also systematically developed into learning objectives about digital learning media such as a digital flip book

The significance of local content is again emphasized by the significance of character education. Local content has a crucial role in shaping the character of students in accordance with the values of the community, such as cooperation and diversity. This fits well with the idea of Ki Hajar Dewantara, which says that in dealing with other nations, the nation of Indonesia must not lose its own character; education is the "cradle of the nation's culture." Local content supports the character of the nation by using the values of the community as a protection mechanism against the effects of globalization. Nevertheless, there is a huge gap between the ideals of education and the reality at present. While it is argued that the most crucial indicator of the success of education is noble character, moral decay is observed in all ages. The rising number of juvenile delinquents indicates that the present generation of youth is one that is lacking in noble morals (Sepriya & Hariati, 2024). It also faces the risk of degradation through the use of profanity and the lack of respect shown to elderly people that may lead to the loss of traditions inherited from their ancestors (Anggraeni, 2023). Thus, moral value education in primary education from an early age is essential to help them become good citizens in the future (Siregar & Fadila, 2024).

Thus, moral value education in primary education at an early age is essential to guide them to become good citizens in the future. In this study, Tangerang Regency is given priority because it is a plural society with many ethnic groups, including Sundanese, Javanese, Chinese, Arabs, Europeans, and Betawi. Geographically, Tangerang Regency is at the intersection of the Kingdom of Pajajaran, the Sultanate of Banten, and the VOC. There are many cultural diversities due to linguistic and cultural differences, which reflect the values of the culture of the people (Rustam, 2024). In order for students to live in the customs order, the school must also contribute to the preservation of this culture in content that is local. This study is carried out for the first time with the aims of developing an e-module with flipbook digital media, especially for learning Local Wisdom "Ketangerangan" at Phase A of the

Primary School level. The e-module is well-designed with the incorporation of local cultural, religious-moral, or developmental appropriateness of the visual-interactive elements. Unlike previous studies on digital media learning for the enhancement of values and practices of local wisdom, this study did not only focus on the testing of the product's feasibility based on the contribution of the subject matter but also went deeper into the exploration of the responses not only of the teachers but also of the students as direct respondents of the local subject matter classroom situation. Thus, this research provides more valid data on the impact of digital media learning on local wisdom learning within the primary school system of Indonesia.

The research gaps identified above provided the basis for the formulation of the objectives of the current research, which is to "design and examine the feasibility of the digital flipbook e-module incorporating Ketangerangan wisdom into primary education of Phase A." In particular, the research of the present paper is based on the process of developing the digital flipbook e-module, the feasibility test of the developed prototype by expert validation of the content, media, and instructional part of the module, as well as the result of the teachers and students after the prototype has been used to learn the local content of the study subjects within the context of value education of Ketangerangan. Moreover, the research of the present paper is based on the views of the teachers and students on the assistance that digital flipbooks can offer to the students to actively participate in the learning process to understand the value of Ketangerangan. Based on the well-articulated objectives of the research, it is clear that contributing to the theory and practice of the design and development of culturally rooted digital learning media at the primary level of Indonesian schools can be achieved.

METHODOLOGY

In this research, an R&D approach is employed by using the 4-D model suggested by (Thiagarajan et al., 1974): Define, Design, Develop, and Disseminate. The product developed in this study was a Ketangerangan Flipbook, specifically designed for Grade 4 elementary school students in Tangerang Regency. The 4-D development model consists of four systematic stages: Define, Design, Develop, and Disseminate, as illustrated in Figure 1.

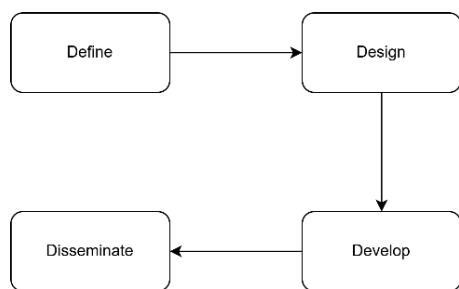


Figure 1. Flow of 4-D Model

The reason for selecting this model is that it is very structured and commonly used for the development of instructional materials. Taking into account the nature of this study, the development and validation of this research were conducted in the context of product development, where effectiveness is measured by perceived support for understanding and engagement rather than learning outcomes.

At the Define phase, the learning needs and contextual issues in teaching Ketangerangan local wisdom have been recognized through classroom observation and semi-structured interviews with elementary school teachers and students in Tangerang Regency. The analysis involved front-end, learner, concept, and task analyses to create development-oriented learning objectives. It was found that there were very few suitable digital materials at an age that combines local wisdom into a structured yet interesting and relevant format for Phase A students (Grades 1-2).

The next stage is design stage. This phase aimed to produce a prototype of the Ketangerangan Flipbook that is pedagogically sound, engaging, and culturally contextualized. The process included formulating learning objectives aligned with national curriculum guidelines and cultural content requirements; structuring interactive flipbook elements that incorporate narratives, images, and activities reflecting Ketangerangan traditions; and incorporating results from field data and theoretical references to ensure content relevance and learning feasibility (Akker, 1999). During the design stage, a first prototype of an electronic, digital flipbook-based e-module was created. Design requirements were to consider 'alignment with learning objectives', 'cognitive characteristics of elementary students', and to apply multimedia learning

principles'. Since the students' attention span is short, the content had to be broken down into small coherent pieces with multimedia support and some interactivity to prevent information overload.

This stage involved the development of the expert validation and field testing. The validation was carried out through the use of three types of validators: a content expert with experience in the field of Tangerang's history and culture, a digital learning media expert with experience in the design and evaluation of learning media, and an elementary learning practitioner with experience in teaching. The validators were selected based on the application of purposive sampling criteria, which considered the validators' educational background, work experience, and relationship with the study context. The validation tool was a set of structured questionnaires with five-point Likert scales (1 = very infeasible, 5 = very feasible), which examined the content's accuracy, language's clarity, presentation's quality, design's attractiveness, and usefulness. In addition, the qualitative comments were used in combination with the quantitative result of the validation. Small-scale experiments were carried out with 30 elementary school teachers and 150 students from various schools in Tangerang Regency, Kelapa Dua District. The participants in this study were selected based on the method of purposive sampling, which is based on the context of learning content. The responses from teachers and students were based on the questionnaires, easiness to use, visual attractiveness, and usefulness in helping to gain insight into the values of the people of Ketangerangan. The equation for the percentage calculation of the validation test results is as in the equation below (Abror et al., 2020):

$$p = \frac{f}{n} \times 100\%$$

Description:

P = Validation Presentation

f = Obtained Score

n = Maximum Score

The results of the above equation calculations are then interpreted based on the feasibility test criteria in Table 1.

Table 1. Feasibility criteria

Percentage	Category
76% - 100%	Highly Feasible
56% - 75%	Feasible
40% - 55%	Less Feasible
0% - 39%	Not Feasible

The Disseminate Phase was carried out on a small scale through teacher forums and dissemination of academic work to familiarize participants with the validated electronic module and to gain early feed-back prior to widespread dissemination.

This study was undertaken involving human participants, including teachers and elementary school students, and was conducted in an ethical manner consistent with standards of research in fields of education. Ethics clearance was done with the concerned authority within the researchers' institution, and permission was formally sought and granted by the schools. Informed consent was, therefore, collected from all participating teachers and from the parents and/or authorized persons of participating children prior to conducting data collection procedures. Participants were informed of the nature of the study, the process to be followed, and their right to withdraw from participating in the study at any given time. Anonymity and confidentiality of data were ensured by assigning unidentifiable codes and by using data for purposes of conducting research only.

In this research, there are no claims of causal improvement in the results of learning. The presented data are only regarding evidence of the feasibility, applicability, and perceived efficacy of the developed digital flipbook-based e-Module. Future studies using experimental and quasi-experimental designs are recommended regarding the assessment of the results of learning.

RESULTS

The findings are presented in terms of the 4-D model's developmental stages, specifically needs identification, design outcomes, and expert validation and user response. In keeping with the scope of the study, effectiveness is reported in terms of perceived effectiveness and learning support, rather than learning outcomes. In the Define stage, the analysis of needs identified significant gaps in the implementation of learning content in Ketangerangan in elementary education. Front-end analysis, which involved observations in elementary

schools, found that there is a lack of standardized learning modules specifically designed to teach Ketangerangan to Phase A students. Interviews with 46 elementary teachers confirmed that, although there is a mandate to teach Ketangerangan, its implementation is lacking, particularly in terms of significant constraints such as a lack of learning media, socialization of the curriculum, and teachers' lack of confidence in teaching Ketangerangan. Teaching is therefore superficial and introductory, which limits its potential to contribute to character building and value formation. This is in keeping with the problem identification purpose of the Define phase in the 4-D model.

Moreover, analysis of learners revealed that learners in Phase A (Grades 1-2) exhibit characteristics that are typical for early concrete operational development and display high curiosity levels, imitation capacity, and short attention spans. These characteristics were critical in informing key decisions in the learning system design, especially with regard to short learning units and the need for interactive and visually appealing learning materials.

Concept analysis was also crucial in developing a conceptual framework that represented Ketangerangan as a learning concept with three integrated dimensions: a cognitive cultural dimension that includes both physical and non-physical cultural attributes; an affective spiritual dimension that includes religious values and moral integrity; and a socio-ecological dimension that includes the connection and interplay between culture and environment. These dimensions were further hierarchically structured to range from identity recognition to value application in daily life. Task analysis was also critical in identifying that learners need to develop basic competencies that include recognizing and identifying local cultural attributes and elements, appreciating cultural values embedded within them, and practicing these values in social interactions.

On the basis of these results, the Design stage developed a digital flipbook-based e-module with a uniform instructional design, such as learning

outcomes, key materials, activities, projects, summaries, and reflective exercises. The e-module was developed with visual illustrations, QR-coded videos, and relevant cultural projects to facilitate experiential learning. The design focused on usability, age appropriateness, and cultural appropriateness rather than instructional innovation. The picture of flipbook design can be seen in the Figure 2.



Figure 2. Flipbook Local Wisdom Ketangeran

At the Develop stage, the quality and usability of the e-module were assessed through expert validation and small-scale field testing. The content validation by the subject-matter expert showed a feasibility index of 90.48%, which falls under the category of very feasible, indicating a high degree of correspondence between content accuracy, cultural appropriateness, language clarity, and learning objectives. The media validation showed a feasibility index of 86.67%, also under the category of very feasible, indicating that the visual aesthetic, layout, readability, and usability of the

technical media are acceptable for elementary digital media.

Notably, these outcomes show that the designed e-module is highly feasible, usable, and supportive of learning, and not focusing on improving learning outcomes. Thus, these outcomes offer confirmation that the learning module based on a digital flipbook of material related to “Ketangeran” can be used within the classroom and support student involvement and understanding, but, of course, a more detailed experiment/quasi-experimental study needs to be conducted to check outcomes related to learning achievement.

User responses also gave further insight into the practicality and effectiveness of the e-module. The responses from students ($n = 150$) gave an overall percentage of 83.17%, which indicated that students saw the e-module as attractive, practical, and effective in helping them learn and understand the content of Ketangeran. On the other hand, teacher responses ($n = 30$) gave an overall percentage of 83.25%, which indicated that teachers saw the e-module as practical, useful, and engaging for students. Teachers also indicated that the flipbook format was useful in helping students understand abstract cultural concepts and that students were motivated, though they saw some constraints in terms of devices and internet connectivity.

Table 2. Expert Validation Results

Expert	Percentage	Category
Material	90.48%	Very Feasible
Media	86.67%	Very Feasible

Table 3. Student Assesments Result

Aspect	Percentage	Category
Practicality	82.85%	Very Feasible
Effectiveness	81.06%	Very Feasible
Attractiveness	85.60%	Very Feasible
Overall	83.17%	Very Feasible

Table 4. Teacher Assessments Result

Aspect	Percentage	Category
Practicality	82.67%	Very Feasible
Effectiveness	81.75%	Very Feasible
Attractiveness	85.33%	Very Feasible
Overall	83.25%	Very Feasible

DISCUSSION

This research aimed to design and investigate a digital flipbook-based e-module for delivering Ketangerangan local wisdom to Phase A elementary school students. The results of the high feasibility scores from content and media experts suggest that the designed e-module has fulfilled the necessary criteria of being relevant to the curriculum, culturally valid, and designed appropriately. While these results confirm the product validity, they also imply that Ketangerangan can be conceptualized as a defined construct for learning, which includes cultural knowledge, moral-religious values, and socio-cultural practices. This is particularly important for the existing body of research on learning based on local wisdom, which conceptually focuses on cultural preservation but does not provide much insight into operationalizing learning instructions for early-grade students. The match between content organization and Phase A cognitive characteristics highlights the significance of developmentally appropriate design in operationalizing local wisdom for formal learning materials.

From a design point of view, the flipbook format seems to facilitate learners' engagement through a number of interrelated but distinct mechanisms. To begin with, the way content is segmented in small, visually guided chunks seems to be informed by a design principle of micro-chunking, which is particularly appropriate in the case of Phase A students, given their short attention spans and developing reading skills. This design principle is consistent with a broader multimedia learning theory, which posits that segmenting and signaling are effective strategies to minimize extraneous cognitive load and facilitate information processing (Clark & Mayer, 2016; Mayer, 2020). Another possible mechanism that could explain learners' engagement is that, through their use of visual and color cues, the design of the flipbook could have facilitated learners' affective engagement, as suggested by the high levels of attractiveness reported by students and teachers alike. Instead of merely serving a cosmetic purpose, these visual cues in the flipbook could be

considered representational supports that ground complex cultural constructs in more tangible and everyday visual experiences that learners are more likely to be familiar with.

The validation test, which was carried out based on the opinions of experts in the field, indicated a percentage of 90.48%. This figure can be classified within the category of Very Feasible. This figure also aligns with other researchers who applied the 4D method in their study, such as (Mahendri et al., 2023) in creating a flipbook on the topic of algorithms and programming fundamentals, and also the study conducted by (Awaliyah et al., 2023) in creating a flipbook on the topic of temperature and heat-conducting materials, which indicated a very Appropriate rating for the material being presented. From the content standpoint, the opinions of experts in the field indicated that the content was highly matched with the basic competencies and indicators of the local curriculum in Tangerang Regency. The content being presented in the flipbook on the topic of Ketangerangan was also indicated to be highly matched with the cognitive development level of elementary school students. From a linguistic point of view, subject matter experts assessed that the language used was easy to understand and matched the cognitive level of elementary school students. The sentences used in the module were also assessed as having met the correct conventions of the Indonesian language, without any ambiguity of meaning. Based on the presentation aspect, learning subject matter experts assessed that the presentation of practice questions was in accordance with the material and learning objectives presented. The references used in the module are also considered appropriate, so the presentation of the learning material contained in the module is good enough. Learning material experts also assessed that this Ketangerangan flipbook could be used by the students to understand the concepts of Ketangerangan local content well. Based on the learning material presented in the current flipbook, the flipbook is considered reusable.

The percentage of the validity test result, as determined by the media experts, was 86.67%, and

the category was Very Feasible. The scores obtained by the media expert validators are consistent with the findings of the research carried out by (Kusumaningsih et al., 2025) on the development of character education flipbooks to enhance the religious character of students. Similarly, the research used the Heyzine application to assist in the creation of the flipbooks and obtained a very Appropriate category for the type of media used for the research. Based on the opinions of the learning media experts, the size of the Ketangerangan flipbook complies with the ISO standards for the size of the learning media, while the cover of the flipbook, as assessed by the learning media experts, shows that the cover contains illustrations that describe the content of the learning media, with appropriate proportions of the fonts and colors used, making the cover of the flipbook look very attractive. The design of the content in the flipbook was also considered very good. The choice of images or illustrations used in the module was an effective aid to the content. The color variation, font choice, text and image arrangement, and line and letter spacing in the flipbook were good, making the flipbook attractive to students. Media experts concluded that, as a learning tool, this flipbook is easy to handle and can be reused. Since the validity test result scores were rated "very feasible" by all validators, the Ketangerangan flipbook is ready for practicality testing. Multimedia flipbooks are recommended for development. This is because multimedia can be accessed using gadgets and laptops (Wibowo, 2019). Flipbooks are innovatively designed to create interest and enhance student engagement in learning, which will have an impact on the learning results of the students. Flipbooks are learning media that can be used to teach individual or group students. They are also useful and easy to increase student enthusiasm and interest in learning since they can visualize concepts taught in the lessons into 3-dimensional images. The learning media of flipbooks can assist students to be more active and make learning interesting and easy to remember, particularly for elementary school students since they are still in the concrete stage of thinking and everything the teacher explains or transmits to the students needs to be clearly explained. The flipbooks are designed based on the material to be taught by the teacher according to the learning process of the students. There are various kinds of flipbook software that can be downloaded for free and used offline by anyone who wants to use or apply it (Hardiansyah & Mulyadi, 2022).

Based on the results of the tests conducted on students, the Ketangerang local content e-module had very positive results with a practicality value of 82.85%, effectiveness of 81.06%, and attractiveness of 85.60%. On the whole, this e-module can be categorized as Very Practical and ready for use without the need for major revisions. In terms of practicality, the e-module is considered easy to understand, facilitates independent learning, and is able to enhance students' knowledge of Ketangerang local content, with the highest score reaching 92.93%. This is consistent with the view that practical learning materials should be easy to use and learn independently by students outside the classroom (Arsyad, 2019). In terms of effectiveness, the e-module is considered responsive, free from errors, and the instructions are easy to follow. Meanwhile, the attractiveness dimension received the highest score, with students feeling enthusiastic and motivated to learn, mostly because of the attractive visual display and pleasant learning environment. An attractive visual display of multimedia can greatly enhance student motivation and understanding (Mayer, 2020).

Based on the results of the assessment, the Ketangerang local content e-module scored very high in all dimensions of the assessment, with an average percentage of 82.67% in practicality, 81.75% in effectiveness, and 85.33% in attractiveness. The scores obtained by the e-module indicate that it belongs to the Very Practical category, which means that the e-module has met excellent quality standards and is ready for mass implementation in schools without needing any changes. The attractiveness dimension scored the highest, which shows that the e-module has succeeded in providing a fun and engaging learning experience for students. Teachers assessed the e-module as very practical because of the appropriateness of the material to the basic competencies, ease of understanding, and the ability of the material to increase students' knowledge of the content of the local material. The appropriateness of the material to the learning objectives is a significant aspect of the quality of the learning medium (Arsyad, 2019). With regard to the effectiveness of the e-module, it was assessed as user-friendly, responsive, and having no major technical barriers, while with regard to the attractiveness of the e-module, the teachers highly appreciated the attractive visual design of the e-module, the harmonious combination of colors, and the ability to create a pleasant learning atmosphere by means of the visual design of the e-module, as

the repetition of colors has a significant impact on the user's comfort and interest (Lohr, 2008).

The reactions of students and teachers also indicate that the e-module is more supportive of perceived understanding and engagement than actual learning outcomes. Both students and teachers emphasized ease of use, clarity of instructions, and motivational appeal as important strengths. The results are consistent with existing literature that indicated digital flipbooks can improve perceived usefulness and learning comfort, especially in early-grade classrooms where motivation and emotional safety are critical to learning readiness. However, as per the design of the study, these results should be considered as an indication of usability and perceived effectiveness rather than actual academic achievement.

In terms of context, the results are most relevant to Phase A elementary school classrooms that are using local content in the Indonesian curriculum, especially in situations where teachers are working under constraints related to limited teaching resources and uneven curricular socialization. The flipbook format provides an effective means of providing culturally grounded content in a standardized yet flexible format. However, its effectiveness may be dependent on basic technological availability and teacher support. The teachers' feedback suggests that while the module is useful for teaching, its effective use is still dependent on guided use and explanation, especially for students who are developing literacy skills.

However, it is worth pointing out some limitations. First, the application of questionnaires is always connected with the risk of a social desirability effect, especially for younger students. Second, some technical difficulties, like the quality of internet connection and loading speed, can also affect the experience of the participants, especially for schools with poor technological infrastructure. Third, the research did not apply objective methods to measure the results of the learning process. Therefore, the conclusions of the research are limited to the aspects of feasibility, usability, and learning support.

Nevertheless, there are some limitations to consider. In spite of these limitations, there are some implications that can be derived from the findings of the research. For one, it can be inferred that digital flipbook-based modules can be considered as a medium through which local wisdom education can be made possible in early-

grade levels, especially if content segmentation, use of visual aids, and linguistic simplification are considered. Future studies can be conducted to improve on the limitations of this particular research by employing an experimental or quasi-experimental design to examine the outcomes of learning and to look into the effect of particular multimedia aspects on retention and value internalization.

Overall, it can be concluded that a digital flipbook-based local wisdom education can be considered pedagogically viable and contextually appropriate for Phase A learners. Although further studies are needed to support claims on improving learning outcomes, it can be established that there is a basis to consider culturally appropriate digital media in elementary education in Indonesia and similar contexts

CONCLUSION

This study aims to present the development process of an e-module using a flipbook medium, which incorporates Ketangerangan local wisdom as a medium for delivering local content for elementary schools. The findings from the needs analysis revealed a limitation on the availability of contextual learning materials, which are suitable for the development needs of elementary students, so that the delivery of local content is not optimal. The development of the flipbook e-module, through the application of the 4-D development model, resulted in a visually oriented media approach suitable for the pedagogical needs of elementary school students. The validation findings, through the involvement of subject matter experts, media experts, and education practitioners, revealed that the product was found to be within the acceptable to highly acceptable category. Findings from the trial, although limited, revealed a high level of practicality, attractiveness, and effectiveness, as perceived by teachers and students.

In general, the local wisdom-based Ketangerangan e-module flipbook is deemed to be feasible and practical as a learning support tool for local content used in elementary schools. This product is deemed to have the potential to facilitate a more context-based and relevant learning for the digital generation, as well as to promote the appreciation of local wisdom. Further research is recommended to test its implementation and to conduct a stronger evaluation to objectively examine its impact on learning outcomes.

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AUTHOR DECLARATION

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