



The Urgency of Developing Locality-Based E-Modules to Improve Literacy of Elementary School Students

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Abstract

21st century education demands a more adaptive, creative, and contextual learning approach, especially in improving student literacy. This study aims to examine the urgency of developing locality-based differentiated e-modules as an effort to improve elementary school student literacy. Based on an analysis of the needs of students and teachers through questionnaires and interviews, it was found that students and teachers need learning media that are more interesting, relevant to the surrounding environment, and can be adjusted to individual learning styles and abilities. Differentiated e-modules based on local wisdom have the potential to meet these needs by providing a more personal and contextual learning experience. These findings indicate that the development of locality-based differentiated e-modules is very important in order to improve student literacy, enrich learning experiences, and prepare students to face increasingly complex educational challenges. Therefore, the development of technology-based learning media needs more attention in efforts to improve the quality of elementary education in Indonesia. The level of student needs is 76.4 which is included in the need category, and the level of teacher needs is 83.3 which is included in the very need category.

Keywords: *E-Module; Differentiated; Locality; Literacy*

Introduction

The development of digital technology in education presents a significant opportunity to create innovative learning media that are responsive to student needs. One relevant approach to addressing this challenge is the development of differentiated e-modules, digital learning materials designed to accommodate the diversity of student characteristics, abilities, interests, and learning styles (Tomlinson, 2020). Differentiated learning is considered an effective approach for improving learning outcomes because it places student needs at the center of the learning process (Widyawati & Rachmadyanti, 2023; Anwar & Sukiman, 2023). In the elementary school context, literacy skills are a fundamental aspect that must be improved from an early age, considering that literacy is not limited to reading and writing but also encompasses the ability to think critically, understand information, and apply knowledge in various aspects of life (Hobbs, 2018; Aryani & Purnomo, 2023).

Examining the importance of literacy for students requires optimization efforts, especially considering that literacy levels in Indonesia are still below international standards. This is understood through the 2022 Programme for International Student Assessment (PISA) report, which shows that Indonesian students' literacy levels have improved, ranking 68th out of 81 countries. This achievement is positive, but overall, it remains below international standards. This implies the importance of developing more innovative and relevant learning strategies to improve student literacy (OECD, 2022; Ministry of Education and Culture, 2023). These findings demonstrate the need for learning innovations that can foster students' interest and understanding of texts in a meaningful and contextual way.

One relevant strategic approach is the integration of local wisdom into learning materials. Local wisdom not only enriches learning content with cultural and social values relevant to students' lives but also increases their relevance and engagement in the learning process (Mulyasa, 2021; Anggraini & Kusniarti, 2020). The use of local context in teaching materials in the form of learning modules can bridge the gap between the teaching material and students' everyday realities, thereby facilitating understanding and increasing literacy retention (Utami et al., 2021). On the other hand, digital learning integrated with local values requires systematic, needs-based design. Needs analysis is a crucial stage in developing learning materials to align with real-world conditions, including student characteristics, learning difficulties, and teacher capacity in utilizing technology (Nafiah & Wuryandani, 2024). Therefore, digital learning materials (e-modules) must be designed to consider these needs to comprehensively address the literacy challenges faced by students.

E-modules are developed with confidence in their advantages, including flexibility in access, multimedia integration, and the ability to quickly update and adapt content to meet student needs (Fitria & Muthi, 2024). Through the use of technologies such as animation, video, interactive simulations, and automated evaluation features, e-modules can make learning more engaging and meaningful (Triyono, 2021). The use of e-modules also supports student-centered learning, as students are at the center of the learning process. This allows students to learn at their own pace, style, and needs, as is characteristic of differentiated learning.

Therefore, the urgency of developing locally differentiated e-modules lies in their ability to address two key challenges in primary education today: suboptimal student literacy levels and the limited use of contextual learning materials integrated with technology. Through the development of adaptive, contextual, and locally valued e-modules, learning in primary schools is expected to become more meaningful, effective, and empowering.

Method

This research is part of the initial stage of learning materials development, namely the needs analysis phase. The aim is to gather in-depth information regarding the current state of literacy learning and the potential for developing differentiated, local-based e-modules. This research uses a quantitative descriptive method focused on needs exploration based on percentage values, supported by actual learning conditions in elementary schools. Respondents in this study were elementary school teachers and students at Peninggalan Public Elementary School, Musi Banyuasin Regency. Three teachers served as active respondents, along with thirty fifth-grade elementary school students. An additional informant, the school principal, was interviewed to confirm the research findings.

Research data was obtained through semi-structured interviews with teachers and the principal to obtain information regarding learning difficulties, experiences, and needs. Observation techniques were used to observe the ongoing learning process. A questionnaire was used to determine teachers' and students' perceptions of the learning process and the need for learning materials to improve literacy. Each technique used to collect data has an instrument designed according to the e-module development needs indicators, including learning difficulties, student literacy skills, the effectiveness of learning media, the

use of local wisdom, differentiated learning, and the integration of digital learning. The questionnaire used refers to the following grid:

Table 1. Needs Analysis Questionnaire Grid – Students

Aspect	Indicator	Question
Learning Needs	Material Difficulty	1 – 2
	Learning Methods	3 – 4
Learning Media Needs	Media Use	5 – 6
	Advantages and Disadvantages	7 – 8
Differentiation in Learning	Learning Styles	9 – 10
	Learning Material Needs	11 – 12
Local Wisdom	Utilization of Local Wisdom	13 – 14
	Student Interests	15 – 16
Student Literacy	Level of Understanding	17 – 18
	Constraints	19 – 20
Expectations	Ideal Criteria	21 – 22
	Expectations	23 – 24

Source: Modification by Raharjo (2020); Rosilia et al., (2020)

Table 2. Grid of Needs Analysis Questionnaire – Teachers

Aspect	Indicator	Question
Learning Needs	Material Difficulty	1 – 2
	Material Needs	3 – 4
Learning Media Needs	Learning Media Needs	5 – 6
	Advantages and Disadvantages	7 – 8
Differentiation in Learning	Differentiated Learning	9 – 10
	Challenges	11 – 12
Local Wisdom	Utilization of Local Wisdom	13 – 14
	Benefits of Local Wisdom	15 – 16
Student Literacy	Student Literacy	17 – 18
	Barriers	19 – 20
Expectations	E-Module Criteria	21 – 22
	Expectations	23 – 24

Source: Modification by Raharjo (2020); Rosilia et al., (2020)

Data analysis was carried out by referring to quantitative analysis which calculated the percentage of the level of need.

$$NA = \frac{\text{total score obtained}}{\text{maximum score}} \times 100$$

Table 3. Interpretation of Needs Analysis Questionnaire Results

Range	Category
< 20	Not really needed
21 - 40	Not needed
41 - 60	Somewhat needed
61 - 80	Needed
81 - 100	Strongly needed

Result and Discussion

Based on a questionnaire completed by thirty students regarding their perceptions of the need for digital-based learning materials (e-modules), the final average score was 76.4, falling into the "need" category. This indicates that, in general, students require the development of learning media in the form of locally differentiated e-modules. The average score for each statement indicates a relatively high need for several key aspects, namely the use of engaging digital media, varied and engaging learning, materials that can be tailored to students' abilities, and the relevance of the material to daily life and the surrounding environment.

Furthermore, a needs questionnaire was administered to three elementary school teachers to identify the urgency of developing locally differentiated e-modules to support learning and improve student literacy. The data processing results showed a total score of 240 with an average value (NA) of 83.3, falling into the "Highly Needed" category. The average scores indicate teachers' needs for various aspects that support the implementation of e-module-based learning integrated with a differentiated approach and local content. The statement with the highest mean (4.0) reflects teachers' very high need for learning materials contextualized to students' local environments; digital learning media that facilitate access and variation in teaching; a flexible approach to adapting learning to students' styles and abilities; and support for developing interactive and innovative e-modules. Statements with a low mean (≤ 2.3) indicate that teachers perceive technical constraints or readiness to use technology as still a challenge, although the need remains. All three teacher respondents scored NA above 80, which falls into the "Very Needed" category. This reflects that all teachers have a very positive perception of the urgency of developing e-modules as a more effective, adaptive learning solution that aligns with the characteristics of elementary school students.

Based on this data, it is understandable that teachers recognize the importance of learning modules that are responsive to differences in student abilities (differentiation); they need learning media that incorporate local values that can enhance students' connection to the material; and demand learning innovations supported by the use of digital technology relevant to 21st-century needs. The results of the teacher needs questionnaire analysis indicate a very high urgency in the development of locally-based, differentiated e-modules. This learning medium is believed to be able to increase teaching effectiveness, empower student literacy in a more contextual and personalized way, and facilitate teachers in implementing inclusive, innovative, and meaningful learning. To understand the level of need for each aspect contained in the questionnaire, it is visualized in the following figure.

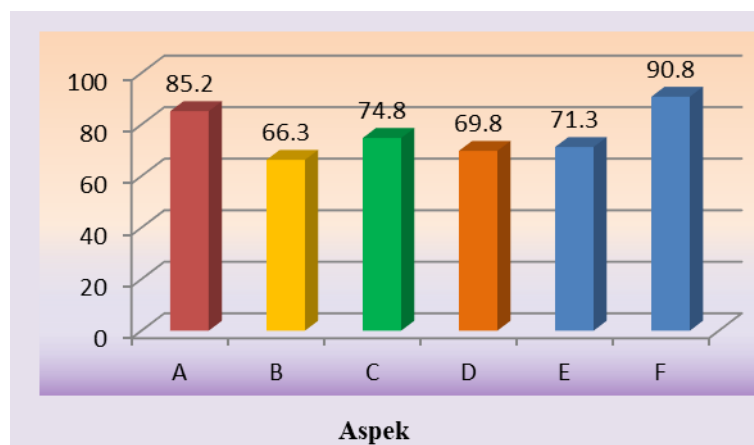
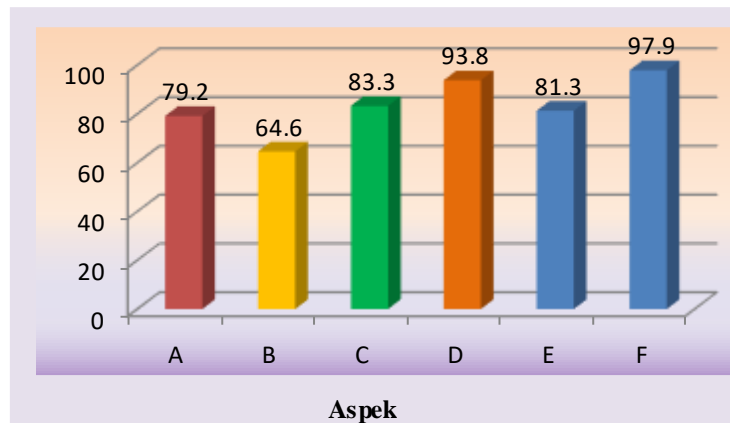


Figure 1. Student Needs Value

Aspect	Description	Value
A	Learning Needs	85,2
B	Media Use	66,3
C	Differentiation in Learning	74,8
D	Local Wisdom	69,8
E	Literacy	71,3
F	Expectations	90,8

The data illustrates various aspects of the learning context. The highest score was for Expectations (90.8), indicating a very high expectation that the developed e-modules would optimize the learning process and outcomes. This was followed by Learning Needs (85.2), reflecting that students' needs for the use of e-modules in the learning process had been fairly well identified. Differentiation in Learning scored 74.8, indicating that efforts to adapt learning to individual student needs were underway, but still had room for improvement. Literacy scored 71.3, indicating that students' literacy skills were considered quite good but not yet optimal. Local Wisdom scored 69.8, indicating that the integration of local wisdom elements into learning had been implemented but was not optimal, thus requiring digital teaching materials that incorporate local wisdom. Meanwhile, the lowest score was for Media Use (66.3), indicating that the current use of learning media still needs to be improved to be more varied and relevant to student needs. Furthermore, the questionnaire on the level of teacher needs for each aspect is visualized in the following figure.

**Figure 2. Student Needs Value**

Aspect	Description	Value
A	Learning Needs	79,2
B	Media Use	64,6
C	Differentiation in Learning	83,3
D	Local Wisdom	93,8
E	Literacy	81,3
F	Expectations	97,9

This data shows an overview of learning conditions based on six main aspects. The highest score is for Expectations (97.9), indicating that expectations for improving the quality of learning are very high in relation to the digital teaching materials (e-modules) being developed. Local Wisdom ranks second highest with a score of 93.8, indicating that local cultural elements have been very well integrated into the learning process. This demonstrates an awareness of the importance of preserving local values in education. Differentiation in learning scored 83.3, indicating that an approach that considers individual student needs has been implemented quite well. Literacy was at 81.3, indicating that students' literacy

skills and activities are considered good and support the learning process. Learning Needs recorded a score of 79.2, indicating that most students' learning needs have been recognized and responded to well by teachers and schools. Meanwhile, Media Use received the lowest score, at 64.6, indicating that there are still limitations or challenges in optimally utilizing learning media, hence the need for digital teaching materials. Overall, this data shows positive learning conditions, especially in terms of expectations, local wisdom, and learning differentiation. The use of media still needs improvement to support a more effective and engaging learning process.

The findings in the questionnaire regarding teachers' needs were also confirmed in in-depth interviews. Teachers indicated that they face various complex challenges in the learning process. One of the most common major difficulties is the difference in students' understanding levels in the classroom. Teachers revealed that there is a significant gap between students who quickly grasp the material and those who are slow or lack focus. To address this issue, teachers tend to use varied learning approaches, such as providing re-explanations in simpler language and using visual media such as pictures to help students grasp the content.

Regarding student comprehension, teachers stated that students generally have difficulty comprehending long reading passages and summarizing the text's content. Difficult vocabulary is also a particular obstacle. Teachers identified low reading interest, limited vocabulary mastery, and a lack of engaging learning media as key factors affecting students' understanding of the material. Regarding the use of learning media, teachers generally used conventional media such as textbooks, pictures, and whiteboards. Although visual media such as images are considered quite effective in attracting students' attention, their effectiveness in enhancing comprehension is still less than optimal. Interestingly, teachers who have never used e-modules in their lessons have a positive view of their potential. They believe that e-modules, with their interactive features and engaging visual displays, can increase student engagement in the learning process.

Regarding the need for differentiated learning, teachers have attempted to implement this strategy by providing assignments tailored to students' abilities. For example, students with higher abilities are given more complex challenges, while students with lower abilities are given additional support. Teachers believe that differentiated learning is crucial because each student has a different learning style and level of understanding. However, teachers also revealed challenges in implementation, such as time constraints and difficulties in designing appropriate learning materials for each group of students. Strategies teachers consider effective in adapting learning to student needs include grouping students based on learning style or ability level, and providing a variety of materials such as text, images, and practical assignments.

In the context of utilizing local wisdom, teachers have integrated elements of local culture into learning, such as through folktales, traditional foods, and traditional games. Teachers stated that this integration makes the teaching material feel closer to students' daily lives, making it easier to understand. A local wisdom-based approach is also considered capable of increasing students' enthusiasm for learning while fostering a love for regional culture. The potential for utilizing local wisdom, such as folktales, traditional games, and Musi Banyuasin cultural values, has not been optimally explored in learning. However, integrating local wisdom into learning media can provide meaningful learning experiences and improve students' cultural literacy (Yuliana, 2021). Teachers stated that learning material will be easier for students to understand if it is linked to their real-life experiences and daily lives. To optimize the use of local wisdom, teachers recommend that the material be packaged in an engaging manner and integrated directly into the learning content.

Students' ability to understand material through text and images is also a concern. According to teachers, this ability varies widely, but in general, students understand material more easily through images than through long texts. The biggest challenges in improving student literacy are low reading interest and limited reading materials appropriate to the local context and student abilities. Teachers recommend the use of contextual reading, visual and interactive approaches, and the habit of daily reading as efforts to improve literacy skills.

Regarding the development of e-modules for differentiated learning, teachers stated that ideal digital modules should be flexible, interactive, easily accessible, and able to adapt content to students' ability levels. Important features for e-modules include audio, video, practice questions with feedback, simple narrative text, and formative assessment. Teachers have high hopes for the development of e-modules based on local wisdom, which can not only improve students' understanding of the material but also foster a sense of pride in local culture. For implementation, teachers recommend initial training for educators, then gradually implementing e-modules in classroom learning activities and as homework, with adjustments made to students' abilities and circumstances.

The results of this study indicate that the development of differentiated e-modules based on local wisdom is effective in improving student literacy in public elementary schools. The developed e-modules not only contain teaching materials tailored to student characteristics (through a differentiated approach of content, process, and product), but also incorporate local values and narratives relevant to students' daily lives. This provides a learning context closer to the students' socio-cultural environment, thus making it easier for them to understand the reading content and being motivated to learn.

These findings align with research developing local wisdom-based e-modules, demonstrating that integrating local wisdom can increase student engagement and strengthen contextual understanding of concepts (Barokah, 2025). Local wisdom acts as a bridge between learning materials and students' real-life contexts. These findings are also supported by research showing that differentiated learning can improve student learning outcomes and literacy by accommodating differences in learning styles, interests, and academic readiness (Kamalia, 2023). The combination of a differentiated approach and local content has been shown to strengthen student engagement in the learning process.

More specifically, these research findings also confirm those of studies that state that e-modules designed with attention to local potential and the characteristics of elementary school students can improve reading comprehension and functional literacy skills. Integrating local culture makes it easier for students to understand the meaning of reading material because it relates to their own life experiences. These e-modules integrate learning content tailored to students' needs, interests, and learning styles, and incorporate elements of local wisdom relevant to the socio-cultural context. The implementation of a differentiation approach helps address the diverse characteristics of students, while the integration of local values strengthens the connection between learning materials and students' daily experiences.

These findings align with research conducted by Saputra et al. (2020), which states that learning media based on local wisdom can increase student engagement in the learning process and foster a sense of belonging to local culture. This engagement is a crucial aspect in improving student literacy, particularly in reading, writing, and understanding information related to local life. Students concluded that utilizing local culture in learning media makes them more active and enthusiastic because they feel connected to the material being studied. Furthermore, other research on the development of thematic e-modules using a differentiation approach indicates that differentiation of content and processes in digital modules can reach students with diverse abilities and significantly improve student learning outcomes in basic literacy (Putri & Rahmawati, 2021). This supports the effectiveness of using a differentiation strategy in providing growth space for students from diverse backgrounds.

Kurniasih & Anggraeni (2022) also emphasize the importance of local context-based literacy. Students stated that "learning modules that highlight local narratives can be an effective means of developing text comprehension because students are able to relate information to their own experiences." Unlike several previous studies that only emphasize one aspect, such as differentiation or local wisdom, this study integrates both approaches simultaneously in the form of a systematically and interactively designed e-module. This research has an original contribution that enriches the approach to developing teaching materials in the digital era, especially in order to comprehensively improve student literacy. Therefore, this research enriches the scientific repertoire related to the development of innovative teaching materials that are adaptive to the local context and individual needs of students.

Conclusion

Based on an analysis of student needs and the relevance of contextual learning, it can be concluded that the development of locally differentiated e-modules is urgently needed in the elementary school education system. The results of the questionnaire analysis indicate that the majority of students feel the need for learning materials that are more engaging, varied, and relevant to their local environment and culture. Locally-based e-modules can accommodate differences in student learning styles and abilities and provide a more meaningful learning experience by connecting the subject matter to everyday life.

The use of digital technology in the form of e-modules also has significant potential to increase student learning motivation. By utilizing e-modules designed to suit local needs, students can experience more personalized, effective, and contemporary learning. The diversity of content within e-modules also allows for a more flexible and adaptive learning approach, both in terms of material delivery and evaluation of learning outcomes. Overall, the development of locally differentiated e-modules will not only improve student literacy but also contribute to creating a more relevant, engaging learning experience and increasing student active engagement in the learning process. Therefore, this step needs to be implemented immediately in an effort to advance the quality of basic education, especially in facing the challenges of 21st century education.

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