



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

Mian Anita^{1*}, Syarifuddin¹, Mochamad Amri Santosa¹

¹ Universitas Sriwijaya, Palembang, Indonesia

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Corresponding Author:

Mian Anita

06032622428011@student.unsri.ac.id

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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. This research employed a quantitative descriptive method focused on exploring needs based on percentage values, supported by the actual learning conditions in elementary schools. 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; Literacy; Local Wisdom

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 (Ahmad et al., 2024; Leong, 2025). Differentiated learning is considered an effective approach for improving learning outcomes because it places student needs at the center of the learning process (Anwar & Sukiman, 2023; Bhardwaj et al., 2025). 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 to various aspects of life (Dwi Aryani & Purnomo, 2023; Hobbs & Tuzel, 2017). Examining the importance of literacy for students requires optimization efforts, especially given that literacy rates in Indonesia remain below international standards. This is understood through the 2022 Programme for International Student Assessment (PISA) report, which shows that the literacy level of students in Indonesia has increased, reaching 68th place out of 81 countries. This achievement is positive, but overall, it is still below international standards. This means that it is important to develop more innovative and relevant learning strategies to improve student literacy (Afikah et al., 2022). These findings demonstrate the need for learning innovations that can foster students' interest and understanding of texts in a meaningful and contextual manner.

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One relevant strategic approach is the integration of local wisdom into learning materials (Novalina Indriyani et al., 2022). 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 (Chowdhury & Alzarrad, 2025; Niman, 2025). The use of local context in learning materials in the form of learning modules can bridge the gap between the learning material and students' daily lives, thereby facilitating understanding and increasing their absorption of literacy materials (Marsila et al., 2025; Sariwedani et al., 2025). 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 ensure they are aligned with real-world conditions, including student characteristics, learning difficulties, and teachers' capacity to utilize technology (Bakker & Mostert, 2024; Nafiah & Wuryandani, 2024). Therefore, the design of digital learning materials (e-modules) must take these needs into account to comprehensively address the literacy challenges faced by students. E-modules are developed with the belief in their advantages, including flexibility in access, multimedia integration, and the ability to quickly update and adapt content to meet student needs (Afonso et al., 2025; Contrino et al., 2024; Strielkowski et al., 2025). Through the use of technologies such as animation, video, interactive simulations, and automatic evaluation features, e-modules can make learning more engaging and meaningful (El-Sabagh, 2021; Jamil & Isiaq, 2019; Yao et al., 2025).

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 current elementary education: the suboptimal level of student literacy and the minimal use of contextual learning materials integrated with technology. Through the development of adaptive, contextual, and locally valued e-modules, learning in elementary schools is expected to become more meaningful, effective, and empowering.

Method

This research employed a quantitative descriptive method focused on exploring needs based on percentage values, supported by the 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 principal, was interviewed to confirm the research findings.

Research data was obtained through semi-structured interviews with teachers and the principal to obtain information on learning difficulties, experiences, and needs. Observation techniques were used to observe the ongoing learning process. Questionnaires were used to determine teachers' and students' perceptions of the learning process and the need for learning materials to improve literacy. Each data collection technique employed instruments tailored to e-module development needs indicators, including learning difficulties, student literacy skills, the effectiveness of learning media use, the use of local wisdom, differentiated learning, and the integration of digital learning.

Result and Discussion

Based on the questionnaire filled out by thirty students regarding their perceptions of the need for digital-based teaching materials (e-modules), the results obtained from the analysis carried out were that the average for each statement in the student needs questionnaire was 3.0 for P1; then P2 was 3.6; P3 was 3.6; P4 was 3.5; P5 was 2.3; P6 was 2.5; P7 was 2.5; P8 was 3.3; P9 was 2.6; P10 was 3.2; P11 was 3.2; P12 was 3.1; P13 was 2.8; P14 was 2.5; P15 was 3.0; P16 was 2.8; P17 was 2.3; P18 was 3.0; P19 was 2.5; P20 was 3.5; P21 was 3.5; P22 was 3.7; P23 was 3.7; and P24 was 3.7. The final average score was 76.4, which falls into the "need" category. This indicates that, in general, students require the development of learning media in the form of locally-based 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 connection between the material and daily life and the surrounding environment.

Furthermore, a needs questionnaire was administered to three elementary school teachers to identify the urgency of developing locally-based 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, which falls into the "Very 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 (≤ 2.30) 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 need 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 listed in the questionnaire, it is visualized in the Figure 1.

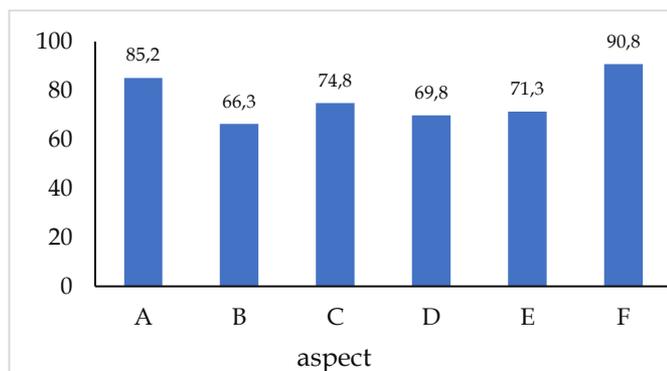


Figure 1. Student Needs Value

The data illustrates various aspects of the learning context. The highest score was for Expectations (F), at 90.80, indicating a very high expectation that the developed e-modules would optimize the learning process and outcomes. This was followed by Learning Needs (A), at 85.20, reflecting that students' needs for the use of e-modules in the learning process had been fairly well identified. Differentiation in Learning (C) had a score of 74.80, indicating that efforts to adapt learning to

individual student needs were underway, but still had room for improvement. Literacy (E) was at 71.3, indicating that students' literacy skills were considered quite good but not yet optimal. Local wisdom (D) received a score of 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 (B), at 66.3, indicating that the current use of learning media still needs to be improved to be more varied and relevant to students' needs. Next, the questionnaire on the level of teacher needs in each aspect is visualized in the following image.

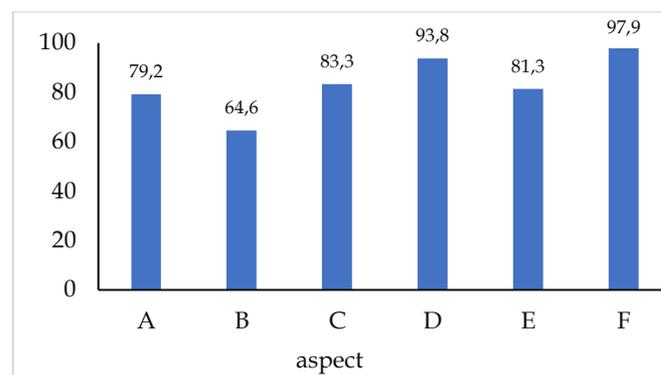


Figure 2. Need Value (Teacher Perception)

This data shows an overview of learning conditions based on six main aspects. The highest score is in expectations (A) at 97.90, indicating that expectations for improving the quality of learning are very high related to the digital teaching materials (e-modules) developed. Local wisdom (D) is in second place with a score of 93.8, indicating that local cultural elements have been very well integrated into the learning process. This shows an awareness of the importance of preserving local values in education. Differentiation in learning (C) received a score of 83.30, indicating that an approach that considers the individual needs of students has been implemented quite well. Literacy (E) is at 81.30, meaning that students' literacy skills and activities are classified as good and support the learning process. Learning needs (A) recorded a score of 79.20, indicating that most students' learning needs have been recognized and responded to well by teachers and schools. Meanwhile, the use of media (B) received the lowest score, namely 64.6, indicating that there are still limitations or challenges in optimally utilizing learning media, therefore the need for digital teaching materials. Overall, this data indicates positive learning conditions, particularly in terms of expectations, local wisdom, and learning differentiation. The use of media still needs to be improved 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 (Jabri et al., 2025; Leite et al., 2022). One of the most common difficulties is the difference in students' understanding levels in the classroom. Teachers revealed that there is a significant disparity 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 subject matter. Regarding the use of learning media, teachers generally use conventional media such as textbooks, pictures, and whiteboards. Although visual media such as pictures are considered quite effective in attracting students' attention, their effectiveness in improving understanding is still less than optimal (Wooley et al., 2022; Zou & Teng, 2023). Interestingly, teachers who have never used e-modules in their learning have a positive view of their potential. Teachers 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 high 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 texts, images, and practical assignments (Gligorea et al., 2023; Taş & Minaz, 2024). 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 effective in increasing students' enthusiasm for learning and fostering a love for regional culture. The potential for utilizing local wisdom, such as folklore, traditional games, and the cultural values of Musi Banyuasin, has not been fully utilized in learning. However, integrating local wisdom into learning media can provide meaningful learning experiences and improve students' cultural literacy (Hikmawati et al., 2025; Udiyana & Arnyana, 2022).

Teachers stated that learning materials are more easily understood by students if they relate them to their real-life experiences and everyday lives. To optimize the use of local wisdom, teachers recommend that the materials be packaged in an engaging manner and integrated directly into the learning content. Students' ability to comprehend 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 interest in reading and the limited availability of reading materials appropriate to the local context and students' abilities (Mirata et al., 2020). 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 the ideal digital module should be flexible, interactive, easily accessible, and able to adapt the content to the students' ability levels. Important features that e-modules need to have include audio, video, practice questions with feedback, simple narrative text, and formative assessment (Morris et al., 2021; Pardo et al., 2025).

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 (Santosa et al., 2025). For implementation, teachers suggest that training be conducted first for educators, then the use of e-modules is carried out gradually in classroom learning activities and as homework, with adjustments to the abilities and conditions of students. 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 more closely aligned with students' socio-cultural environments, enabling them to more

easily understand reading material and motivate them to learn. These findings align with research developing e-modules based on local wisdom, which demonstrates that integrating local wisdom can increase student engagement and strengthen contextual understanding of concepts (Novita Barokah, 2025).

Local wisdom acts as a bridge between subject matter and students' real-life contexts. These results 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 (Rachmadhani & Kamalia, 2023). The combination of a differentiation approach and local content has been proven to strengthen student engagement in the learning process. More specifically, the results of this study also confirm those stating 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 (Hadianto et al., 2022). This e-module combines learning content tailored to students' needs, interests, and learning styles, and includes 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 the learning material and students' daily experiences.

These findings align with research conducted by Mulatsih et al. (2023); Yulianto et al. (2023), which states that learning media based on local wisdom can increase student engagement in the learning process and foster a sense of belonging to regional 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 made them more active and enthusiastic because they felt connected to the material being studied. Furthermore, other research on the development of thematic e-modules using a differentiation approach found that content and process differentiation in digital modules was able to reach students with diverse abilities and significantly improve student learning outcomes in basic literacy (Hamid et al., 2025). This supports the effectiveness of using a differentiation strategy in providing space for growth for students from diverse backgrounds. Fatmawaty et al. (2024); Ramli et al. (2025) also emphasize the importance of locally 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 improve student literacy comprehensively. Therefore, this research enriches the scientific treasury related to the development of innovative teaching materials that are adaptive to the local context and the 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 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 a more relevant, engaging learning experience and increase 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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Author Contributions

M. A., is a researcher who contributed directly to the implementation of field research, in the preparation of instruments and analysis and reporting of research results was carried out by S., M. A. S.

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Conflicts of Interest

The authors declare no conflict of interest.

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