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DEVELOPING A DIGITAL FLIPBOOK FOR FACILITATING READING ACTIVITY IN AN INCLUSIVE CLASS

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ABSTRACT

Utilizing the ADDIE (Analysis, Design, Development, Implementation, Evaluation) model, the study addresses the challenges faced by inclusive students in accessing reading media as material by incorporating accessibility features like sign language, subtitles, visuals, and animations. The research employed various instruments, such as a guide for interviews aimed at assessing needs, a separate interview guide for educators, another for students, a journal maintained by the researcher, a tracking sheet for product development progress, evaluations by content experts, assessments by media experts, and a questionnaire evaluating practicality. The digital flipbook was evaluated by content experts who rated it 4.75 out of 5, and media design experts who scored it 4.60 out of 5, both indicating a "very good" category. Additionally, the practicality of the digital flipbook was assessed by students and teachers, yielding scores of 4.6875 and 4.625, respectively, falling into the "very good" category. The study concludes that the digital flipbook is an effective media for enhancing the reading comprehension of inclusive students. It is user-friendly, engaging, and effectively improves comprehension. Given its high level of validity and practicality, the digital flipbook can serve as a model for other inclusive learning environments and has the potential to enhance the quality of inclusive education in Indonesia.

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INTRODUCTION

Reading is widely recognized as one of the most fundamental skills underpinning academic success, lifelong learning, and meaningful participation in society. According to Mo (2019), in global large-scale assessments, reading literacy is defined not merely as the ability to decode text but as the capacity to understand, interpret, and use written information in ways that enable individuals to achieve personal goals and engage fully in society a concept emphasized in the Programme for International Student Assessment (PISA) framework developed by the Organisation for Economic Cooperation and Development (OECD). Despite this recognized importance, international assessment results reveal persistent global

challenges in reading proficiency. For example, according to Yuli (2025), PISA data have consistently shown that many countries score below the OECD average in reading, pointing to the need for stronger literacy development strategies worldwide. Similarly, the Progress in International Reading Literacy Study (PIRLS), which assesses reading comprehension skills of fourth-grade students across more than 60 education systems, highlights trends and variations in early reading achievement internationally.

In the digital age, the notion of literacy has expanded. As stated by Yuli (2025) and Arjaya et al. (2023) digital literacy has emerged as an essential competency, defined as the digital ability to locate, evaluate, interpret, and create information. This expanded literacy is key to navigating the vast array of online texts and multimedia and to engaging with information critically and ethically in digitally mediated environments. High-impact educational research further situates these literacies within broader skill sets required for success in the twenty-first century. According to Laar et al. (2020), Digital literacy fosters critical thinking, communication, collaboration, and problem-solving, aligning with frameworks for 21st-century skills, where such competencies are essential for academic and professional success. Thus, in the context of today's interconnected, technology-rich environments, reading and digital literacies are deeply intertwined and indispensable for knowledge acquisition, critical engagement with information, and the development of advanced cognitive skills that support communication and problem solving in both academic and real-world contexts

However, for deaf and mute students, digital literacy can be a challenge due to the limitations in their ability to access and process information. Students with disabilities, such as deaf and mute students, face a significant challenge, especially when it comes to English texts. As stated by Wikaningtyas. (2023), Mute students require special tools or media in learning, such as using oral language, pictures or symbols, and sign language, because mute students find it easier to understand learning through practice or direct learning that has visuals. The limitations in perception and production of sounds and spoken language, combined with the complexities of the English language, can make it difficult for these students to access and understand written materials (Zaenuri & Maemonah,2021). This is in line with the opinion of Fillah et al. (2023), The way deaf people communicate with other people is through sign language. This can affect their ability to understand the full meaning of the text. The lack of accessible reading media, limitations in communication, and inadequate support resources can hinder the learning process and create barriers to academic success

In Indonesia, the issue of declining interest in reading is a pressing concern, particularly in inclusive classrooms where students with disabilities learn alongside their peers. "In inclusive education, everyone is a valuable part of being together,

whatever their differences" (Asep et al. 2021). As stated by Stuab and Peck (1995), Placing all children with differences in regular courses is known as inclusive education. According to Sigh (2024) and Jardinez & Natividad (2024), an inclusive education system serves all students, including those with disabilities. There are some previous studies about inclusive education, first a study from Carvalhais (2025), reported that teachers' self-efficacy and positive attitudes toward digital technology were significant predictors of technology use in reading and writing instruction in inclusive classrooms, suggesting that professional readiness influences literacy support. Second, according to Ultabaini (2024), Descriptive research on reading profiles of slow learners in inclusive schools highlighted specific strengths and weaknesses (e.g., receptive vocabulary vs. reading fluency), pointing to the need for differentiated instruction tailored to learner profiles. Based on this, reading activities in inclusive classes are a challenge in themselves, due to the differences in abilities and learning styles among students, including students with special needs. This is in line with the opinion of Supena et al (2021), that students with learning difficulties often make school very difficult. Some factors that cause reading activities to be a problem in inclusive classes include differences in reading ability, which makes it difficult for teachers to present appropriate material for all students.

Therefore, to address these challenges, this study aims to develop a digital flipbook as a multimode learning media for English language teaching in an inclusive classroom at SD N 2 Bengkala. SD N 2 Bengkala is an inclusive elementary school where students have diverse learning needs. However, English language teaching in the inclusive classroom still faces several problems. Teachers mostly use printed textbooks and conventional methods that are not designed for students with different abilities. As a result, some students, especially those with special educational needs, have difficulty understanding English reading materials and vocabulary. In addition, the learning media used in the classroom are limited and do not support multimodal learning. There is a lack of visual, audio, and interactive elements that could help students learn English more easily. The use of digital learning media is also still minimal, even though digital literacy is important in today's learning environment. Because of that, there is a need for inclusive and engaging learning media that can support English teaching for all students. This study develops a digital flipbook as a multimodal learning medium to help improve English learning in the inclusive classroom at SD N 2 Bengkala.

According to Ramadhina and Pranata (2022), the characteristic advantage of digital flipbook media compared to other media is that it can display or present a different appearance, combining text displays with images, videos, or sounds, which makes the learning module more attractive. The flipbook is designed to cater to the needs of deaf and mute students, incorporating sign language animation, GIF animation, audio, video, and quizzes to facilitate reading activities. The development of the flipbook is

guided by the ADDIE approach (Analyze, Design, Develop, Implement, and Evaluate), which ensures that the media is tailored to the students' needs and is effective in enhancing their reading skills.

This study tried to figure out the exact kinds of English reading materials needed by sixth graders who go to a school that includes everyone at SD N 2 Bengkala, to decide how to design the digital flipbook made for sixth graders in a school that includes everyone at SD N 2 Bengkala, to find out if the digital flipbook made for sixth graders in a school that includes everyone at SD N 2 Bengkala has correct content, to find out if the digital flipbook meant for sixth graders in a school that includes everyone at SD N 2 Bengkala is useful. By looking at these goals, this study aims to add to what we know about inclusive learning and to give educators and instructors helpful ideas on how to create interesting and easy-to-use learning materials for students with special needs, especially when it comes to teaching English as a second language in Indonesia. Therefore, the purpose of this study is to create and confirm a digital flipbook intended to improve reading comprehension for sixth graders in inclusive classroom settings, especially for those with special needs, such as deaf or mute students.

METHODS

Research Design

This research adopts the Research and Development (R&D) methodology using the ADDIE model as the instructional design framework (Sugiyono, 2013). The ADDIE model, as proposed by Branch (2009), consists of five systematic stages: Analysis, Design, Development, Implementation, and Evaluation. This model is widely used in educational research because it provides a structured and flexible process for developing instructional media that meet learners' needs at SD N 2 Bengkala.

Data Source

The data sources in this study are SDN 2 Bengkala, eight of sixth-grade students, one classroom teachers and one sign language teachers, Merdeka Curriculum Unit Six module, the developed digital flipbook, and expert evaluators. The sixth-grade students deaf and mute students and teachers are participants who used the digital flipbook and provided feedback on its practicality. The Merdeka Curriculum Unit Six module guided the development of the digital flipbook. The digital flipbook itself is the media developed in this research. Expert evaluators assessed the content validity and media validation of the digital flipbook. These data provide information on the effectiveness and practicality of the digital flipbook in improving the reading skills of inclusive students.

Data Collection

The data collection methods in this study include: Interviews, which were conducted with classroom teachers and sign language teachers to gather information

about their challenges in teaching English and strategies they use to enhance students' reading interest. Second document analysis was conducted to collect data on the English curriculum and learning materials at SDN 2 Bengkala, next was expert Judgment. Expert judgment was conducted by two experts to assess the validity of the research instruments. The last one was Questionnaires, which were administered to teachers and students to gather data on the practicality of the digital flipbook as an English learning medium. Furthermore, the research instruments used in this study included an interview guide to collect data on students' and teachers' needs in English language learning. Second is the researcher's journal, which is to identify the design of the digital Flipbook as an English learning material for inclusive class students at SD N 2 Bengkala.

Next is the Product Development Progress Sheet used to monitor the development process of the digital flipbook. Subsequently, a form for expert evaluation of the product was utilized to ascertain the content's accuracy and the quality of the digital flipbook's media aspects, specifically designed as an English learning tool for students in inclusive classrooms at SD N 2 Bengkala. The research tools' accuracy was assessed via the inter-rater agreement technique and quantified utilizing the Content Validity Index (CVI) in accordance with Gregory's methodology. The last one is the Practicality Questionnaire, used to gather data on the practicality of the digital flipbook as an English learning medium. The Practicality Questionnaire uses Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Attitude Toward Using, and Acceptance of E-learning Systems because these factors are based on the Technology Acceptance Model (TAM 3) adoption from Davis et al. (1989).

Data Analysis

Data analysis in this study was conducted through several stages, including qualitative and quantitative analysis. Qualitative analysis was performed using the Miles & Huberman (2014), An interactive model, which consists of three stages: data reduction, data display, and conclusion drawing/verification. Qualitative data analysis was used as the main approach in this study because it allows the researcher to understand the process, context, and experiences involved in developing and implementing the digital flipbook in an inclusive classroom. Qualitative data from interviews, observations, and document analysis provide detailed information about learners' needs and the suitability of the media, which cannot be fully explained by numerical data. Quantitative analysis was used only as a supporting method to measure instrument validity and product quality. Qualitative data were obtained from interviews, observations,and document analysis. Quantitative analysis were measured using the Content Validity Index (CVI) by Gregory, (2015). Data obtained from product experts, including content experts and media experts, as well as practicality questionnaires, were analyzed by calculating the mean score for all aspects used to evaluate the product's quality (Nurkencana & Sunartana, 1992). The mean

score was then categorized using a predetermined category table.

FINDINGS AND DISCUSSION

Findings on Reading Media for Inclusive Students

Based on the analysis of curriculum documents, lesson plans, learning resources, assessment documents, and interviews with teachers and students, this study conducted the following types of needs analysis, first Learner Needs Analysis, to identify students' characteristics, learning difficulties, and preferred learning modalities in an inclusive sixth- grade classroom. Second, Learning Media Needs Analysis, to determine the type of reading media required, including visual elements, audio support, and interactive features suitable for inclusive learning. Last, Assessment Needs Analysis, to identify appropriate assessment formats, such as multiple-choice and true/false questions, that support students' reading comprehension.

Design and Development of Digital Flipbook

The digital flipbook for 6th-grade inclusive students at SD N 2 Bengkala is Created using Canva, Hear Me, Natural Reader, Wordwall, and Heyzine, this flipbook enhances reading comprehension and engagement for inclusive student and this digital flipbook designed with Visuals, Audio, Interactive elements, Content, and some Activities that a lign with the curriculum Merdeka module. The screenshot and link of the digital flipbook can be seen in the Table 1, and the conclusion of the design and development can be seen in Table 2.

Table1. Digital Flipbook and Link.

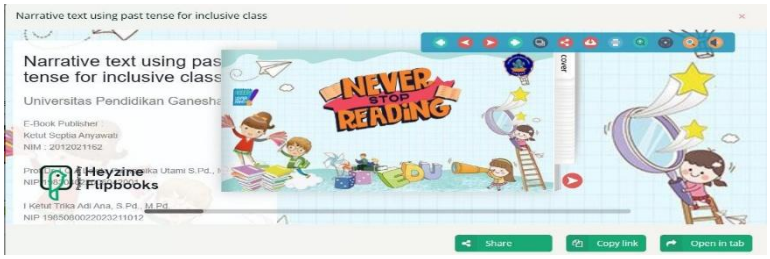
Aspect	Picture and link
Digital Flipbook	
Link	https://heyzine.com/flip-book/dc431644b9.html

Table 2. Design and Development of Digital Flipbook

Aspect	Description
Design	1) Incorporates visual elements (images, sign language, text) 2) Interactive features (videos, GIFs, quizzes) 3) Narrative texts using past tense and Pancasila values 4) Aligns with Merdeka Curriculum and learning objectives

Develop-ment	1) Canva, Hear Me, Natural Reader, Wordwall, and Heyzine 2) Front cover, unit explanation, audio narration, sign language interpretation, and interactive elements 3) Designed to be visually appealing and accessible for deaf an mute students 4) Includes quizzes and activities to reinforce learning and engagement
Objective	Enhance English reading comprehension and promote inclusive education for students with diverse learning needs

Content Validity of Evaluation

Through the evaluation of content expert judgment and media, the results show that the digital flipbook has a clear structure, easy-to-understand language, and a responsive design. The integration of Pancasila values and interactive features, such as effective quizzes, supports more engaging and relevant learning for inclusive students. However, some aspects, such as usage instructions and visual design, still need improvement to enhance their effectiveness. The conclusion of the content validity can be seen in below.

Table 3. Content Validity of Evaluation

Aspect	Score	Description
Content Expert Judgment	4.75/5	Clear structure, Pancasila moral values, easy-to-understand language, relevant examples, high interactivity
Media Expert Judgment	4.60/5	Easy access, responsive design, effective quizzes, and helpful feedback

Practicality of Digital Flipbook

The practicality of the digital flipbook for 6th-grade inclusive students at SD N 2 Bengkala has been evaluated through student and teacher questionnaires based on the Technology Acceptance Model (TAM). The results show that the digital flipbook is highly practical and effective in supporting learning. The interactive features, such as videos, GIFs, and quizzes, enhanced student engagement and motivation. The overall average score is 4.6875 (students) and 4.625 (teachers), indicating that the digital flipbook is "Very Good" and highly practical for 6th-grade inclusive students at SD N 2 Bengkala. The conclusion of the practicality of digital flipbook can be seen in Table 4.

Table 4. Practicality of Digital Flipbook

Aspect	Student Score	Teacher Score	Description
Perceived Ease of Use	4.625/5	4.5/5	Intuitive navigation, clear instructions
Perceived Usefulness	4.875/5	4.0/5	Improved comprehension, facilitated learning
Attitude	4.625/5	5.0/5	Engaging, motivating, enjoyable
Acceptance of E-learning Systems	4.625/5	5.0/5	Well-received, confidence in applying concepts

Discussion

This study has several limitations. First, it focuses only on the development of a digital flipbook as an English learning medium for sixth-grade deaf and hard-of-hearing students in an inclusive classroom at SDN 2 Bengkala. The flipbook includes sign language animation, GIFs, audio, video, and quizzes, and is limited to narrative texts related to Pancasila values based on Unit Six of the Merdeka Curriculum. Second, this study uses the ADDIE model but only evaluates the usability of the digital flipbook. Finally, the study was conducted in only one inclusive school, SDN 2 Bengkala. Therefore, the results may not be generalizable to other schools. Future research is recommended to test and adapt the digital flipbook in different educational settings to examine its wider applicability.

The development of the digital flipbook for 6th-grade inclusive students at SD N 2 Bengkala has successfully addressed the challenges faced by deaf and mute students in accessing English reading materials. The incorporation of visual elements, audio support, and interactive features has enhanced student engagement and motivation, aligning with the findings of previous studies that emphasize the importance of multimedia resources in inclusive education (Ramadhina & Pranata, 2022).

This research demonstrates that using digital flipbooks can really help students with different learning needs understand what they read better. When experts looked at the content, they gave it high scores of 4.75 out of 5 for the quality of the material and 4.60 out of 5 for how well it was put together, which means the digital flipbook is made in a good way and helps students learn what they're supposed to. This lines up with earlier studies that show how important it is to make sure digital learning tools are easy for everyone to use (Wikaningtyas , 2023).

The assessment of practicality by both learners and educators also produced favorable outcomes, demonstrating mean grades of 4.6875 and 4.625, correspondingly. The positive practicality results from learners and teachers indicate that the digital flipbook is easy to use, engaging, and useful for supporting reading activities. These findings are consistent with previous studies in inclusive classrooms, especially for deaf and hard-of-hearing students. From the Technology Acceptance Model (TAM) perspective (Davis et al., 1989), this study positions itself as an R&D study focused on development and practicality, confirming earlier research that accessible and interactive digital media can support inclusive English learning. However, because the study was conducted in one school with a limited sample, the findings cannot be generalized. Future research should involve broader samples and examine the long-term effectiveness of the digital flipbook on students' reading comprehension. Additionally, the long-term effectiveness of the digital flipbook in improving reading comprehension should be investigated in future research.

The implications of this study are significant for educators and policymakers. The digital flipbook can serve as a model for developing inclusive learning media that cater to the diverse needs of students. The findings of this study highlight the importance of incorporating accessibility features and interactive elements in digital learning media to enhance student engagement and motivation. Future research directions may include investigating the effectiveness of the digital flipbook in different educational settings.

CONCLUSION

The results gleaned from this research imply that the digital flipbook could be used as an example for creating learning resources that are accessible to all and address the various requirements of students. The incorporation of accessibility features and interactive elements in digital learning media can enhance student engagement and motivation. However, some limitations of this study should be acknowledged, and future research should involve larger and more diverse populations to increase generalizability. Overall, this study contributes to the development of inclusive education theory and offers practical insights for teachers and educators on creating accessible and engaging learning media for students with special needs. The digital flipbook has the potential to enhance the quality of inclusive education in Indonesia and serve as a model for other inclusive learning environments.

SUGGESTION

Based on the findings of this study, several suggestions can be made:

1) First, the implementation of digital flipbooks should be expanded to other inclusive schools to examine their effectiveness and practicality across diverse educational contexts.
2) Furthermore, the integration of gamification elements and the development of more interactive features, such as augmented reality and virtual reality, should be explored to increase student engagement and motivation
3) Equally important, teachers need adequate training and continuous support to effectively implement digital flipbooks in inclusive classrooms. Finally, accessibility features must be carefully designed to ensure that digital flipbooks can be used by students with different types of disabilities, including visual and hearing impairments.

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