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Developing Interactive Hybrid Book for Teaching English to the Fourth-Grade Students in Inclusive Classrooms

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Abstract

This study focuses on developing an interactive hybrid book for teaching English to fourth-grade students in inclusive classrooms at SDN 2 Bengkala. The hybrid book integrates digital and print media to accommodate students' diverse learning needs, particularly those with hearing impairments. Utilizing the ADDIE model, the study followed five phases: Analysis, Design, Development, Implementation, and Evaluation. The book incorporates multimodal content, including sign language videos, text captions, high-contrast images, and interactive elements to enhance engagement and accessibility. The research employed a qualitative descriptive method, gathering data through observations, interviews, and expert validation. The results indicate that the hybrid book significantly improves students' reading comprehension and engagement by offering interactive features such as quizzes, drag-and-drop exercises, and real-time feedback. Teachers found the book effective in facilitating English learning and inclusive classroom interactions. The study also identified challenges, including limited digital resources and the need for ongoing technological adaptation, which were addressed by ensuring offline accessibility and expert content validation. This research contributes to the field of inclusive education by providing an accessible learning tool that supports diverse student needs. The findings suggest that hybrid books can enhance literacy development and engagement in inclusive classrooms. Future research should explore integrating AI-driven personalized learning and gamified content to further optimize student learning experiences. The study underscores the importance of inclusive educational materials in fostering equitable learning opportunities.

Keywords: *hybrid book, inclusive education, interactive learning, English literacy, assistive technology*

INTRODUCTION

Reading plays a crucial role in expanding one's knowledge. Interest in reading has a significant impact on language learning, both in Indonesian and English, as it helps develop literacy skills acquired in school (Ismayilli Karakoç et al., 2022). English, as a foreign language in Indonesia and an official language in many countries, enhances communication and career opportunities. Regular reading of English books can help students think more naturally in the language while also improving grammar, writing, and speaking skills (Mustafa et al., 2022).

Stimulating students' reading interest requires engaging materials, such as books with illustrations, to prevent boredom (Permatasari & Wienanda, 2023). Reading literacy is essential for knowledge growth and fostering daily reading habits. However, the modern dominance of

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digital content has shifted literacy habits, with young people preferring internet-based reading due to its variety (Żerebecki & Opree, 2022).

Digital literacy represents progress in Indonesia's education system, leveraging technological advancements for learning (Dida et al., 2021). Technology provides students with tailored reading materials suited to their age, even in informal settings such as video games, animated cartoons, and Korean dramas. However, some schools, particularly in rural areas, still implement traditional teaching methods, prohibiting smartphones to avoid classroom distractions (Rukmini et al., 2023). Limited access to digital devices in remote schools further hinders digital literacy integration (Olanrewaju et al., 2021). Schools should be equipped with adequate facilities, including computers and media tools, to support digital education (Alam et al., 2023; Malik, A.R. 2019). Several studies have demonstrated that engaging learning materials can enhance students' interest in reading (Wu et al., 2023).

The first study examined the implementation of literacy movements for children with special needs in inclusive elementary schools. The collected data was analyzed through data reduction, data presentation, and conclusion drawing (Heru Santosa & Supadi, 2023). The school literacy movement prioritizes a supportive social environment and a comfortable, literacy-friendly physical setting. It follows three stages: preparation, development, and learning. However, challenges such as limited access to non-learning books, teachers' lack of literacy knowledge, inadequate reading corners, and low motivation among deaf students hinder its success (Hamzah, 2023). Solutions include providing additional reading materials, organizing teacher training workshops, improving reading corner facilities, and collaborating with parents to foster literacy habits both at school and home (Kurniastuti et al., 2023).

The second study focused on the use of e-books to enhance students' reading interest in junior high schools, using a two-cycle counseling approach (PTBK) (Wirdiyana et al., 2024). Each cycle included four stages: planning, action implementation, observation, and reflection. Data was collected through tests, observations, and interviews, then analyzed both qualitatively and quantitatively. The third study explored strategies to increase public reading interest through digital libraries (Riady et al., 2023). Using a literature review approach, it analyzed sources such as journals and books without a specific research location. The findings emphasized the importance of fostering reading habits from an early age by making books accessible at home and establishing regular reading routines. Additionally, schools and governments can support reading interest by developing libraries with diverse book collections. The fourth study investigated the use of pop-up book media to boost reading interest (Rahifa, 2023). The findings highlighted various library service strategies, including promotional efforts through library websites, OPAC (Online Public Access Catalog) services for easier access to reading materials, and customer service improvements such as enhancing library facilities to be more visually appealing. Additionally, improving librarian performance through seminars and educational events further supports literacy development. The fifth study analyzed reading difficulties among children with special needs in elementary schools (Wulandari & Setiawan, 2023). It identified key challenges and emphasized the need for tailored interventions by teachers and parents to support students' reading development.

SDN 2 Bengkala, an inclusive school for deaf and mute students in Bali, was established in 2007. It integrates deaf students into mixed-grade classes with two teachers per class, one using sign language and the other teaching orally to facilitate communication. However, conventional literacy methods often fail to meet the specific needs of mute children, requiring adapted approaches. Reading interest in mute children is typically developed through visual literacy and written text comprehension (Erlidawati, 2023). However, due to

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communication limitations, traditional methods may not be fully effective. Using sign language, visual aids, and assistive technology like text-reading software can enhance their reading experience (Grøver et al., 2023). Additionally, books with engaging illustrations and relatable content can boost motivation.

Technology is crucial in fostering reading interest (Sari et al., 2023; Malik, A.R. 2023). Tools such as audiobooks, text-to-speech software, and multisensory learning combining visuals, videos, and sign language can significantly improve comprehension (Theresia & Recard, 2021). Collaboration between general and special education teachers is key to creating an inclusive learning environment. A tailored approach that integrates suitable teaching strategies, engaging reading materials, and assistive technology can bridge the gap between reading interest theories and practical application (Erlidawati, 2023). This ensures equal literacy opportunities for mute students.

This study also explores the potential of e-books to enhance reading comprehension for deaf students, particularly in English literacy. Given SDN 2 Bengkala's limited resources, e-books could provide an effective alternative to traditional materials, fostering a more inclusive and engaging learning experience.

METHOD

This study employed a research and development (R&D) approach using the ADDIE model, which consists of five systematic phases: Analysis, Design, Development, Implementation, and Evaluation. The primary objective was to develop an interactive hybrid book for teaching English to fourth-grade students in inclusive classrooms at SDN 2 Bengkala. The hybrid book was designed to accommodate students with diverse learning needs, particularly those with hearing impairments, through the integration of digital and printed learning materials.

In the Analysis phase, the researchers conducted preliminary observations and interviews with teachers and students to identify the specific needs of learners in inclusive classrooms. These data helped to assess current literacy challenges, teaching practices, and the accessibility gaps in available learning materials. Insights gathered informed the pedagogical and technological requirements of the hybrid book, emphasizing the necessity of integrating multimodal content and inclusive design.

The Design phase involved outlining the structure, content, and format of the hybrid book. The focus was on ensuring accessibility and interactivity. Key design elements included the use of simple and high-contrast visuals, large and readable fonts, captioned texts, and sign language video support. The content layout followed a logical sequence starting from learning objectives to reading materials and interactive activities catering to students with various learning preferences such as visual, auditory, and kinesthetic modalities.

The Development phase translated the design plan into a functional product. The researchers selected user-friendly platforms such as Canva and FlipHTML5 to create the digital format of the hybrid book, allowing customization for accessibility features like text-to-speech, adjustable fonts, and sign language integration using tools like HandTalk. Educational content was created in alignment with the fourth-grade English curriculum, focusing on daily activities, vocabulary development, and reading comprehension. The book incorporated interactive elements such as quizzes, drag-and-drop exercises, and clickable images. This phase also included internal testing to ensure all multimedia components functioned effectively across different devices and operating systems.

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During the Implementation phase, the hybrid book was introduced and used in the classroom at SDN 2 Bengkala. The implementation involved both general and special education teachers who collaboratively guided students in using the hybrid book. Students were observed during reading sessions, and both students and teachers provided feedback on the functionality, accessibility, and overall effectiveness of the learning tool. The hybrid book was used both online and offline, ensuring access for students with limited digital connectivity.

The Evaluation phase consisted of two components: formative and summative evaluation. Formative evaluation occurred throughout the design and development stages through expert reviews and revisions based on teacher feedback. Summative evaluation was conducted after the classroom implementation, involving user satisfaction surveys and comprehension assessments. These evaluations measured the hybrid book's impact on student engagement, reading comprehension, and inclusivity. The results demonstrated improved student participation and learning outcomes, validating the efficacy of the hybrid book in addressing diverse educational needs.

Data for the study were collected through multiple qualitative methods, including classroom observations, semi-structured interviews with teachers and students, and documentation analysis. Expert validators in the fields of inclusive education and instructional design were also consulted to ensure the product met educational standards. Thematic analysis was used to interpret qualitative data, focusing on recurring themes related to accessibility, engagement, and learning effectiveness. Ethical considerations were strictly followed, including obtaining informed consent from participants and maintaining confidentiality throughout the study.

FINDINGS AND DISCUSSION

FINDINGS

1. Design of Flipbook for Inclusive class

The design of a flipbook for an inclusive class aims to support the learning process for all students, including those with disabilities. It should provide clear and concise content that is easy to follow, using visual aids, interactive elements, and accessible language to cater to diverse learning styles, such as auditory, visual, and kinesthetic. The flipbook is intended for fourth-grade students, with particular attention to students with visual impairments, hearing impairments, learning disabilities, and mobility issues. It should feature high-contrast text, easily readable fonts, sign language videos, text captions, and simplified language, ensuring accessibility for all students. The content should be organized with a brief introduction, followed by main topics presented in small, digestible chunks, with interactive activities such as quizzes and questions to engage students. A glossary should also be included for students who may need extra help with vocabulary.

The flipbook's design elements include vibrant images and illustrations aligned with the content, as well as symbols and icons for easier navigation. The text should be written in simple and straightforward language, avoiding complex sentences and jargon. Accessibility features should include multimedia support, such as audio clips and videos with sign language interpretation, and text-to-speech functions. The navigation should be intuitive, with large, clearly marked buttons and arrows, and the flipbook should be accessible on multiple devices, such as tablets and computers. To accommodate students with limited internet access, the flipbook should also function offline. Teachers should collaborate in giving feedback about the flipbook's effectiveness, while students should also have an opportunity to provide feedback

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to improve the design. The flipbook can integrate assessment tools such as embedded quizzes or activities after each section to gauge student comprehension, offering a range of assessment formats like multiple-choice, fill-in-the-blank, or short-answer questions, supporting both formative and summative assessments.

2. Product Layout

The product layout for the inclusive flipbook should begin with a cover page featuring the title in clear, large fonts and an engaging image related to the content. The title and illustration should have high contrast for easy readability by students with visual impairments. Following the cover, a table of contents should provide navigation with large, accessible buttons linking to each section, ensuring easy organization into labeled topics like Introduction, Main Topics, and Assessments, with options for text-to-speech for better accessibility. The introduction page should clearly state the purpose of the flipbook with simple, concise language and supportive visuals. For accessibility, the text should be large with high contrast, and an audio description should be available for students with visual impairments.

The content pages should have clear headings for each topic, with text broken into smaller, digestible paragraphs. Visual aids, such as images, diagrams, and icons, should support the text, while interactive elements like clickable buttons or drag-and-drop activities should engage students hands-on. The design should feature high-contrast text and background, captioned images, and options for text-to-speech or narration. Interactive quizzes and activities should be presented with clear instructions and questions, featuring multiple-choice or drag-and-drop tasks that offer instant feedback. These interactive elements should also have audio support and simple navigation features, especially for students with reading difficulties or motor impairments. A summary page should briefly recap the main points, accompanied by visuals or icons to highlight the key takeaways. The glossary page should list key terms alphabetically with simple definitions and images to aid understanding, alongside a text-to-speech option for each term. The teacher's feedback section should allow space for comments or suggestions, with clear text and a consistent format. The end of module page should include navigation options to move between sections, with intuitive icons and text labels. Lastly, settings and customization options should be available for students to adjust font size, color contrast, and audio preferences to suit their individual needs, ensuring a fully personalized and accessible learning experience.

Table 1. The Interactive Flipbook layout for Teaching Reading for Daily Activities Topic

Section	Description
Cover Design	Engaging and colorful visuals to capture attention. The title and main theme of the Flipbook are clearly displayed for easy recognition.
Introduction Page	Provides a clear introduction to the Flipbook's content, explaining how to use it and providing navigation instructions in simple language.
Learning Objective	Simple and straightforward goals of the lesson presented with accompanying images to ensure clarity and understanding of what the students will learn.
English Reading Activities	A variety of activities focusing on vocabulary building, sentence comprehension, and reading exercises, with interactive quizzes to reinforce learning.

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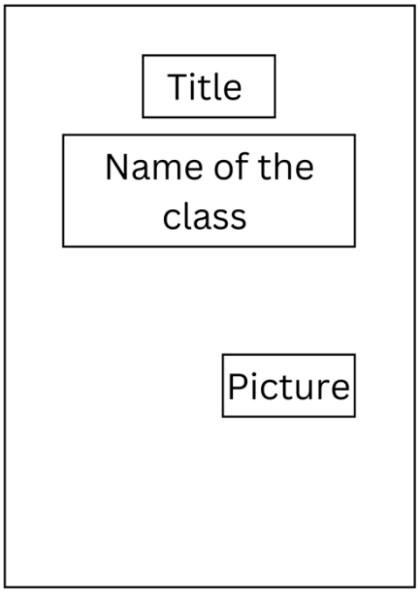
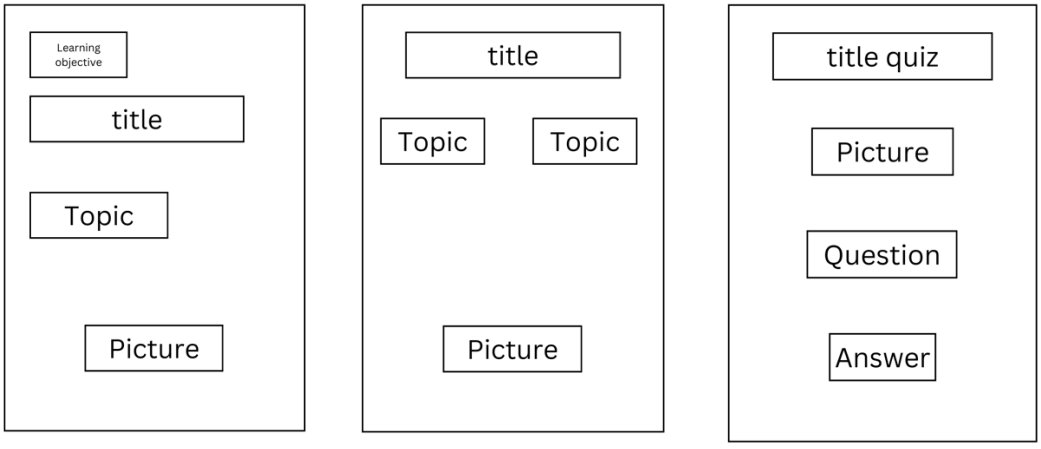
Sign Language Integration	Incorporates HandTalk for real-time sign language translation of key words and phrases, ensuring inclusivity for students with hearing impairments.
Interactive Element	Engaging exercises like clickable questions, image-based tasks, and activities that allow for hands-on learning and participation.
Audio Narration	Optional clear English narration with subtitles in both English and Indonesian, along with synchronized sign language for better accessibility.
Back Cover	Provides developer information, copyright details, and contact information for further inquiries.

a. Cover Design



b. Content Design



3. Development

The development of English learning materials for an inclusive flipbook requires careful planning and execution to ensure that the final product meets the needs of all students, including those with visual or hearing impairments. This stage focuses on translating the design concepts into a fully functional product that incorporates interactive elements, multimedia

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features, and accessibility tools. The development process involves multiple stages, including content creation, integration of accessibility features, and testing for functionality and user engagement.

The development of English learning materials involves several key steps:

1. Platform Selection and Account Setup
   The first step in the development process is selecting the appropriate platform or software to create the flipbook. This could be a specialized e-learning tool, a multimedia platform like Canva, or flipbook-specific software. It is important to choose a platform that offers a variety of customization options, such as font size, color contrast, and the ability to incorporate multimedia elements like audio, video, and interactive quizzes. After selecting the platform, an account is created to access all of the available tools and templates. This step ensures that the flipbook can be fully customized to meet the needs of students with varying learning preferences.

2. Designing the Layout and Structure
   Once the platform is set up, the next step is to design the layout and structure of the flipbook. The layout must be user-friendly and accessible to all students, especially those with disabilities. Key components, such as the cover page, table of contents, content pages, and navigation buttons, should be clearly organized. Visual hierarchy should be emphasized, with large, high-contrast text and easily distinguishable sections. The structure of the flipbook should ensure smooth navigation for students, allowing them to easily move between sections, access interactive elements, and review their progress.

3. Content Creation and Integration
   After the layout is finalized, the content creation phase begins. This involves writing clear, concise, and engaging English learning material that aligns with the learning objectives. The content should be organized into digestible segments, with simple language and accompanying visuals to reinforce key concepts. Text should be formatted with high contrast for readability and should be complemented by relevant images, diagrams, and videos. For students with hearing impairments, the content should include sign language integration, using tools like HandTalk to provide video explanations of key vocabulary and phrases. The flipbook should also include interactive exercises such as quizzes, drag-and-drop activities, and comprehension questions that allow students to actively engage with the content.

4. Incorporating Accessibility Features
   Accessibility is a key focus in the development of the flipbook. Features such as text-to-speech, adjustable font sizes, and color contrast settings are essential for students with visual impairments. In addition, sign language video integrations can be embedded to support students who are deaf or hard of hearing. Audio narration should be provided in clear, simple English with subtitles in both English and Indonesian to ensure that all students, regardless of their primary language, can understand the material. For students with reading difficulties, the flipbook should offer the option to have text read aloud, providing additional support for comprehension.

5. Testing and Refining Interactive Elements

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Once the content is integrated into the flipbook, it's time to test and refine the interactive elements. This involves checking that all quizzes, drag-and-drop exercises, and navigation buttons work as expected. The flipbook should be designed to provide instant feedback on quizzes and exercises, which helps reinforce learning and correct misunderstandings in real time. Testing should also ensure that the text-to-speech, sign language integration, and audio features are functioning properly. It is important to test the flipbook on various devices, including laptops, tablets, and smartphones, to ensure it is accessible across different platforms.

6. Finalizing Accessibility Options
   The final step in the development process is to ensure that all accessibility options are working seamlessly. This involves reviewing and adjusting the accessibility features, including the ability to toggle between different font sizes, color contrasts, and audio narration options. The goal is to create a flipbook that can be easily customized to suit the individual needs of students, whether they have visual, auditory, or cognitive impairments.

4. Drafting

The drafting phase is a crucial part of the development process, where initial ideas and designs come to life. It involves setting up an account on the chosen platform, designing the flipbook cover, and organizing the content. Each step ensures that the flipbook is functional, visually appealing, and aligned with the learning goals. Below is a more detailed breakdown of the steps involved:

a. Create an Account

Creating an account is the first step in the drafting process, as it provides access to the tools and features necessary for creating the flipbook.

1) Choosing the Platform: Select a platform or software to create the flipbook. Popular tools include Canva, Adobe InDesign, or FlipHTML5. These platforms offer a range of customizable templates and options for creating interactive and visually appealing content.
2) Account Registration
   Visit the website of your chosen platform and click on the "Sign Up" or "Create an Account" button. Provide your name, email address, and create a secure password. Some platforms might offer a free trial or have specific plans for educators or students, so choose the most suitable option.
3) Accessing the Dashboard
   After registering, log in to your account. You will be directed to the platform's dashboard, where you can start a new project. Look for the option to create a new flipbook or interactive document. Once you've accessed the dashboard, you can explore available templates or start from scratch, depending on your preference.
4) Customization and Tools
   Familiarize yourself with the platform's tools and features. Most platforms allow you to customize fonts, colors, layouts, and interactive elements. Take some time to adjust the settings to fit the inclusive needs of your audience, such as enabling features for high contrast, large fonts, or text-to-speech.

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b. Making the Cover Design

The cover design is an essential aspect of the flipbook, as it is the first thing students will see. It must be visually appealing, clearly indicate the learning theme, and provide easy navigation for all users.

1) Selecting a Template or Layout
   Most platforms offer pre-designed cover templates. Select one that is simple yet eye-catching. Look for templates that allow for easy text and image integration. Ensure the design is adaptable to your needs, including space for a title, images, and any necessary information about the flipbook.
2) Designing the Visuals
   The visuals should be engaging but not overwhelming. Choose colors that align with the educational theme and are suitable for students with different visual needs. High-contrast colors, like dark text on light backgrounds or light text on dark backgrounds, ensure readability for students with visual impairments. Consider using relevant, fun images or icons that reflect the content and encourage curiosity.
3) Title and Key Informatio
   Include a clear title on the cover page that immediately indicates the flipbook's purpose, such as “English Learning Flipbook for Inclusive Classrooms.” Make sure the font is large, bold, and legible. Add additional text if necessary, such as the grade level or a brief description of the content.
4) Navigation Elements
   If applicable, place small, easy-to-understand navigation icons or arrows on the cover to guide students on how to move forward or backward in the flipbook. These should be simple and visible for all students, including those with mobility or cognitive impairments.
5) Including Interactive Features
   In some cases, interactive elements can be embedded on the cover. For example, you might want to include a button that explains the flipbook’s purpose or an audio clip introducing the flipbook. Ensure that these features are clearly labeled so students can use them easily.

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Figure 1. Making The Cover
(Source: Own Observation Results)

c. Content Design

Once the cover is complete, the next step is to design the content pages. This stage requires careful planning to ensure that the material is accessible, engaging, and educational.

1) Organizing Content into Sections
   Break the content into clearly defined sections or topics. Each section should align with the learning objectives and be easy to navigate. For example, sections might include: Vocabulary, Sentence Structure, Reading Comprehension, and Interactive Quizzes. Use headings or subheadings to clearly define each topic.
2) Selecting and Formatting Text
   The text should be simple, concise, and accessible for all students. Use short sentences and clear language to convey key concepts. Make sure to adjust the font size and style for readability—use larger fonts and avoid overly complex fonts. Ensure that all text is high-contrast against the background to assist students with visual impairments.
3) Including Visuals
   To support the text and engage visual learners, add relevant images, diagrams, or illustrations that correspond with the material. For example, you can use pictures of objects, actions, or scenarios when teaching vocabulary. Ensure that the images are high-quality and clear, and that they complement the content.
4) Incorporating Interactive Elements
   Create interactive content such as quizzes, drag-and-drop exercises, or clickable buttons. For example, a vocabulary section might feature a drag-and-drop exercise where students match words to images. These elements should be easy to use and provide instant feedback, helping students learn and stay engaged. Ensure that the interactivity is simple enough for students with cognitive or motor difficulties to navigate.
5) Sign Language and Audio Integration

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For inclusive learning, integrate sign language videos for key vocabulary and concepts. Use a platform like HandTalk or similar services to provide sign language explanations. Additionally, offer audio narration for each section, reading the content aloud to students. This can be especially helpful for students with reading difficulties or those who are auditory learners. Ensure the audio is clear and offers subtitles in both English and the local language (such as Indonesian).

6) Accessibility Features

Always check that the content design includes accessibility options. For example, the flipbook should allow students to adjust font sizes, toggle high contrast modes, or activate text-to-speech functions. The interactive elements should be easy to activate, even for students with limited dexterity. When designing quizzes and exercises, ensure there are multiple answer formats (such as multiple-choice, text, and image-based questions) to accommodate different learning styles.

Figure 2. Content of the Book
(Source: Own Observation Results)

5. Revising

Once the draft of the flipbook is completed, it's essential to revise it thoroughly to ensure it is error-free and all components work effectively. The first step in the revision process is content revision, where you review the text for clarity, accuracy, and simplicity. The language used should be age-appropriate for the target audience, and all learning objectives must be clearly addressed. Additionally, ensure that images are relevant and support the text meaningfully. The next step is an interactivity check, where you test all interactive elements such as quizzes, drag-and-drop exercises, and clickable components to ensure they function as intended. It's also important to verify that accessibility features, including text-to-speech, audio narration, and sign language options, are working correctly and that translations or explanations are clear and accurate. Finally, usability testing should be conducted with a small group of students or teachers. Gather feedback on the accessibility and overall user experience of the flipbook, focusing on areas where students might encounter difficulties or confusion. Based on

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this feedback, make necessary adjustments to improve the user experience and ensure the flipbook is fully accessible and effective for all learners.

6. Final Product

After completing the revisions and testing the flipbook for accessibility and functionality, the final product is ready for use. The process begins with a final review, where all elements of the flipbook are checked for any remaining errors, formatting inconsistencies, or technical issues. It is important to ensure that the design is polished and that all interactive components, such as quizzes and navigation tools, are functioning smoothly. Once the final version is ready, the next step is to export and distribute the flipbook. It can be exported in various formats such as PDF or HTML, depending on the platform and intended use. The finalized flipbook is then shared with teachers, students, and other stakeholders, ensuring it is available to everyone who will benefit from it.

After the flipbook has been used in a classroom setting, it's crucial to gather feedback from both teachers and students. This feedback helps assess the effectiveness of the flipbook in promoting learning and inclusivity. Any issues or areas for improvement are noted, allowing for updates or improvements to be made in future versions of the flipbook. This continuous feedback loop ensures that the product evolves to better meet the needs of students and educators. Below are some images showcasing the final product:

Table 2. Final Product

Aspect	Description	Picture
Cover Design	The cover features a clean, visually appealing layout with the title, key theme, and vibrant images that reflect the educational purpose.	

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Interactive Elements	The flipbook includes interactive components like quizzes, drag-and-drop exercises, and clickable images or symbols that engage students and enhance learning.	
Leaning Content	Clear, age-appropriate language and relevant images support the learning objectives. The content is easy to navigate and provides step-by-step guidance.	
Pancasila Values	Throughout the flipbook, the Pancasila values are emphasized: **Humanity, Unity, Democracy, Justice,** and **Social Welfare** are embedded in both content and interactive elements, guiding students toward understanding the national values.	

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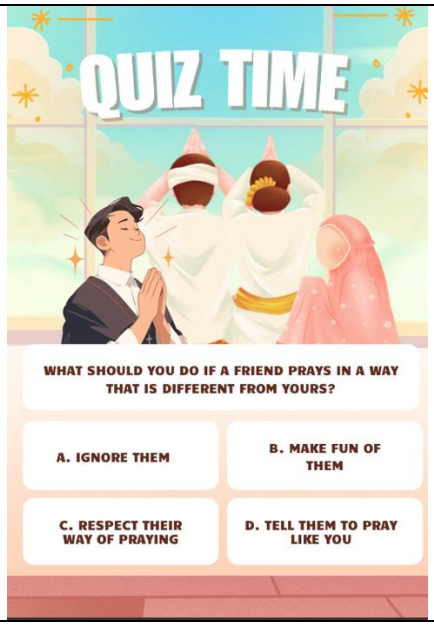
Quiz Time	Fun and engaging quiz sections at the end of each lesson or chapter that test students' understanding through multiple-choice questions, drag-and-drop, and other formats.	

Discussion

The development of the hybrid book at SDN 2 Bengkala reflects the effective application of Universal Design for Learning (UDL), offering multimodal access through visual, auditory, and interactive elements to accommodate diverse learning needs (Navas-Bonilla et al., 2025). The integration of sign language videos and high-contrast captions enhances comprehension for students with hearing impairments, aligning with inclusive design practices that support sensory and cognitive diversity. Interactive components such as quizzes, drag-and-drop exercises, and real-time feedback promote active learning and significantly improve knowledge retention (Vega-D'Elia et al., 2025).

The inclusion of assistive technologies like text-to-speech features, adjustable font sizes, and customizable contrast modes extends accessibility for students with reading difficulties or visual impairments. This supports findings on assistive tools enhancing adaptive learning environments (Bugaj, 2023). The provision of an offline version also addresses digital inequity, ensuring that students in underserved areas have access to learning materials regardless of internet availability (Togni, 2025).

Collaboration between general education and special education teachers during the design phase ensured the pedagogical relevance of the content. This aligns with current research on collaborative instructional design in inclusive settings (Navas-Bonilla et al., 2025). Furthermore, expert validation of the content enhanced accuracy and ensured that the book adhered to inclusive education standards (Bugaj, 2023).

Looking forward, the incorporation of advanced technologies such as adaptive artificial intelligence and gamification has the potential to optimize personalized learning experiences. Recent studies indicate that AI-driven platforms can provide more inclusive learning through automated content adaptation and improved learner engagement (Togni, 2025; Vega-D'Elia et al., 2025). Thus, the hybrid book is not merely a learning tool but also an innovative model for scalable inclusive education practices.

CONCLUSION

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The development of an interactive hybrid book for fourth-grade students in inclusive classrooms at SDN 2 Bengkala has demonstrated significant potential in enhancing English literacy and supporting diverse learning needs. Utilizing the ADDIE model, the study successfully followed a systematic process from needs analysis to product evaluation, resulting in a multimodal instructional tool that integrates both digital and print formats. The hybrid book's design, featuring sign language videos, high-contrast visuals, text-to-speech functions, and interactive elements, effectively addressed the challenges faced by students with hearing impairments and other learning difficulties.

The findings from classroom implementation and expert validation revealed that the hybrid book not only improved students' reading comprehension and engagement but also fostered more inclusive learning interactions. Teachers reported that the book was accessible, user-friendly, and adaptable to varied instructional contexts. Moreover, students responded positively to the interactive features, which provided immediate feedback and accommodated different learning styles. The integration of assistive technologies further strengthened the book's inclusivity, making it a practical solution for classrooms with limited digital infrastructure through its offline functionality.

This research contributes to the field of inclusive education by offering a replicable model for developing accessible learning materials that combine technological innovation with pedagogical sensitivity. The hybrid book serves not only as a tool for improving literacy but also as a medium for promoting equity in educational access. Future studies are encouraged to explore the integration of artificial intelligence and gamified content to further personalize learning experiences and enhance engagement. Overall, this study underscores the importance of inclusive, interactive educational resources in creating equitable and meaningful learning opportunities for all students.

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