



Interactive Videos for Facilitating Reading Activity in an Inclusive Class

Komang Ksatria Narayana, Universitas Pendidikan Ganesha, Indonesia
I G A Lokita Purnamika Utami, Universitas Pendidikan Ganesha, Indonesia
I Ketut Trika Adi Ana, Universitas Pendidikan Ganesha, Indonesia

Abstract

Despite growing attention to inclusive education, there is still limited empirical research on the development and validation of interactive multimodal English learning videos that integrate sign language and visual supports for deaf-mute and regular students within the Merdeka Curriculum at the elementary level. This study aims to develop interactive videos as multimodal learning materials for teaching English to fourth-grade students in an inclusive classroom. Using the ADDIE instructional design model (Analysis, Design, Development, Implementation, Evaluation), the research enhances reading interest and comprehension among deaf-mute and regular students through sign language integration, visual aids, and interactive exercises. Needs analysis revealed that inclusive students require visually engaging, adaptive materials. The videos align with the Merdeka Curriculum, featuring clear visuals, structured narration based on Pancasila values, and inclusive learning support. Instruments used include interview guides, researcher journals, development progress sheets, expert judgments, and practicality questionnaires. Expert validation showed high scores: 4.625 (content expert) and 4.75 (media expert), categorized as very good. Practicality tests scored 4.3 (students) and 4.75 (teachers), indicating high effectiveness. Results show that interactive videos improve accessibility, engagement, and reading comprehension for students with special needs. Challenges include limited technology access and the need for teacher training. The study concludes that multimodal learning significantly benefits inclusive education and recommends further research on scalability and long-term impact.

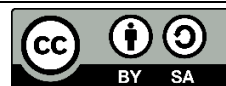
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Corresponding: ksatria@undiksha.ac.id

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1. Introduction

Reading is an essential language skill that supports critical thinking, vocabulary development, and cultural understanding (Haleem et al., 2022; Nitiasih et al., 2022; Rahmanita et al., 2021). However, Indonesia still struggles with low reading interest, especially among students, including those in inclusive classrooms (Marmoah et al., 2022). This study was conducted at SDN 2 Bengkala, a school in Bali that includes deaf-mute students. At SD N 2 Bengkala, deaf students face several challenges in reading and writing. These include limited



access to appropriate learning resources, communication barriers, and difficulty in understanding English texts. Many schools, including SD N 2 Bengkala, do not have enough learning tools, particularly technological aids, to support the needs of deaf students (Wijayanti et al., 2025). These students face challenges in reading English due to a lack of engaging, visual-based learning materials that match their needs. At SD N 2 Bengkala, deaf students face several challenges in reading and writing. These include limited access to appropriate learning resources, communication barriers, and difficulty in understanding English texts. Many schools, including SD N 2 Bengkala, do not have enough learning tools, particularly technological aids, to support the needs of deaf students.

Previous research has shown that using videos as learning media can help students understand certain topics more easily (Kurniawati et al., 2019; Ponticorvo et al., 2020; Puspita et al., 2019). However, most of these studies only focused on regular classes and did not involve students with special needs. They also did not explore the use of videos for teaching English as a Second Language in inclusive classrooms. At SDN 2 Bengkala, there are still limited resources that can encourage reading interest among deaf-mute students. Traditional materials often do not match with their learning needs. Therefore, this research seeks to fill the gap by creating learning media that provides a better and more engaging learning experience that meets their needs. This research focuses on developing multimodal learning materials through videos to help increase reading interest among students in inclusive classrooms. The aim is to enhance English language learning using video media, especially for students with different learning needs.

As a solution, this research proposes the use of interactive videos that combine visuals, text, and sign language to enhance comprehension and engagement. Videos can support different learning styles, allow self-paced learning, and foster inclusivity (Ahmad & Khasawneh, 2023; Utami et al., 2023). While previous studies highlight the benefits of video media, they rarely address its impact in inclusive English classrooms. In response to these challenges, this study focuses on the development of interactive video English as learning materials aimed at improving reading interest and comprehension in the inclusive classrooms at SDN 2 Bengkala.

Reading and video are closely connected through both cognitive learning theories and empirical findings, particularly within multimodal and inclusive learning contexts. From a theoretical perspective, multimedia learning theory explains that learners comprehend texts more effectively when verbal information (written words) is supported by visual representations, as this integration helps reduce cognitive load and facilitates meaning construction (Cahyaningati & Lestari, 2018). Similarly, dual coding theory suggests that combining textual input with visual elements, such as images, animations, and sign language in videos, strengthens memory retention and comprehension by activating multiple cognitive channels simultaneously (Clark & Paivio, 1991). Empirically, studies have demonstrated that video-supported reading instruction improves students' reading comprehension, vocabulary development, and motivation by providing contextual cues and visual scaffolding that aid text interpretation (Ashcroft et al., 2018; Li & Chu, 2021). This connection is particularly significant for deaf-mute students, as video-based materials offer accessible linguistic input through visual cues and sign language, enabling them to bridge written text and meaning more



effectively. Consequently, integrating video into reading instruction not only enhances engagement but also supports inclusive learning by accommodating diverse sensory and cognitive needs.

The findings of this study are expected to contribute to the development of theories related to inclusive education, particularly in the context of reading instruction for students with special needs. This research supports the idea that teaching and learning processes must be tailored and individualized to accommodate diverse learners in inclusive classrooms. Teaching students with special needs alongside their peers in general education settings presents unique challenges. It requires not only strong pedagogical competence but also a deep understanding of the students' specific needs. This includes the ability to design and implement specialized learning materials and strategies. Therefore, it is necessary to provide learning materials and strategies that are specifically designed to meet their unique educational needs. In response to these challenges, this study focuses on the development of interactive video English as learning materials aimed at improving reading interest and comprehension in the inclusive classrooms at SDN 2 Bengkala.

To clarify the concept, the term interactive video in this study refers to video-based learning media that actively involves learners through embedded instructional and responsive features, rather than passive video viewing (Bonafini et al., 2017). In the context of teaching reading in inclusive classrooms, an interactive video is defined as a digital learning video that integrates visual illustrations, written text, sign language interpretation, subtitles, narration, animations, and interactive elements such as pause points, guiding questions, and comprehension prompts. These features allow students to control the learning pace, revisit key content, and respond to reading-related tasks, thereby promoting active engagement and deeper comprehension.

2. Method

The research conducted in this study employs the Research and Development (R&D) method. According to Sugiyono (2017), the R&D research method is utilized to produce specific products and assess their effectiveness. R&D is a process that involves steps for developing a new product or refining an existing one in a way that is accountable and measurable. In the context of education, R&D is applied to create and validate educational products. This study adopts the R&D approach because it enables the development of educational media tailored to specific student needs and the evaluation of its practicality and effectiveness. To carry out the development, the researcher uses the ADDIE model, which stands for Analysis, Design, Development, Implementation, and Evaluation (Branch, 2009). The ADDIE model was chosen for its structured, systematic nature, which simplifies the development process while maintaining a focus on product quality and effectiveness.

In the Analysis phase, a comprehensive needs analysis is conducted to identify existing problems, learning gaps, and instructional requirements related to reading instruction in inclusive classrooms. This phase begins with a document analysis of current teaching materials, including annual programs, semester plans, learning modules, and student activity sheets, to evaluate their suitability for inclusive English learning, particularly for deaf-mute students. The analysis focuses on the extent to which these materials accommodate diverse learning needs,



provide visual support, and align with the Merdeka Curriculum. In addition, semi-structured interviews are carried out with English teachers and students to explore challenges encountered during reading activities, such as limited student engagement, communication barriers, and difficulties in understanding English texts. Classroom observations are conducted to examine real teaching–learning practices, student interactions, and the use of existing media during reading instruction. Furthermore, documentation gathering, including photographs, lesson plans, and school profiles, is used to provide contextual evidence and support the design and development of appropriate learning media. The findings from this phase serve as the foundation for developing interactive video-based reading materials that are visually engaging, accessible, and responsive to the needs of students in inclusive classrooms.

In the Design phase, the interactive video is conceptualized based on the needs identified. This involves creating a learning scenario, developing visual and audio components, drafting expert validation blueprints, and selecting elements such as sign language, text translation, images, animation, and narration to enhance comprehension. Evaluation instruments such as validation questionnaires and practicality tests are also designed during this stage. The Development phase brings the design to life through the creation of an interactive video. This includes integrating multimedia features such as illustrations, sign language, and interactive elements like quizzes and games to maintain student engagement. Media experts and inclusive education specialists validate the product, followed by revisions based on their feedback.

In the Implementation phase, the developed interactive video is tested on fourth- grade students at SDN 2 Bengkala. Teachers use the video during lessons, and trials are conducted with inclusive students to gather feedback. Observations and questionnaires are employed to assess reactions and identify challenges in the classroom. Finally, in the Evaluation phase, the effectiveness of the interactive video in improving reading comprehension is assessed. This includes evaluations from experts regarding content and media quality, as well as practicality tests to determine ease of use and applicability. Teachers and students who have used the media participate in this phase. The findings from this evaluation inform the final revisions, ensuring that the product can be effectively implemented in inclusive classrooms.

The study is conducted at SDN 2 Bengkala, a school that integrates students with special needs and typical learners. The research subjects consist of one sixth-grade teacher, one sign language teacher, and eight sixth-grade students. The object of the study is the interactive video developed for inclusive reading instruction. The participants include sign language teacher, and students.

To collect data, several methods are used. Structured interviews are conducted with teachers to explore the challenges they face and their strategies for engaging inclusive learners in reading. The data collection methods used in this study included interviews, document analysis, expert judgment, and questionnaires. Structured interviews were conducted with inclusive classroom teachers at SDN 2 Bengkala to identify the challenges they face in teaching English and to explore strategies for increasing students' reading interest. Document analysis was carried out by reviewing existing learning materials, textbooks, and curriculum documents to evaluate current teaching practices and identify areas that require improvement. Expert judgment was sought from education specialists to validate and provide feedback on the

development of interactive learning materials suitable for students with special needs. In addition, close-ended questionnaires were administered to teachers and fourth-grade students before and after the implementation of interactive videos to collect their perceptions and measure changes in reading interest. Document checking is carried out using existing curricula, textbooks, and teaching resources, supported by photographic documentation. Expert judgment is sought from educational professionals, particularly in developing media suited for students with special needs. Questionnaires are distributed to teachers and students to obtain feedback on the usability and appeal of the interactive video. Close-ended questionnaires assess reading interest and perceptions of media features before and after using the product. Various research instruments are employed. An interview guide is used to systematically gather information on inclusive classroom practices, preparation, media usage, and student reading interest.

3. Findings

This study aimed to develop interactive video media to support reading activities in an inclusive fourth-grade classroom at SDN 2 Bengkala. The development process followed the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation), with a focus on integrating multimodal features such as sign language interpretation, visual aids, and interactive exercises to accommodate the needs of both regular and deaf students.

Table 1. Content Validity Expert Judges Result

Description	Score	Reason
Clear and Systematic Structure	5	The material is well-structured, with clear definitions, keywords, examples, and moral values.
Context and Moral Values	4	Integration of Pancasila values in daily activities enhances the material's relevance
Language Accessibility	5	The use of simple and clear language, along with translations, improves readability.
Examples	5	The provided examples are relevant to students' daily lives, making the material easier to understand.
Interactivity	4	Quizzes and interactive activities are available, but more variety could further enhance engagement.
Visual Design	5	The layout of text and images is well-arranged for readability and comprehension.
Grammar Explanation	5	The grammar explanations are clearly structured, helping students better understand the rules.
Quiz Section	5	The quiz section effectively reinforces students' understanding through diverse exercises.



The results from the content validity assessment are presented in Table 4.6, which shows that the average score from the content expert was 4.625 (out of 5), and the average score from the media expert was 4.75. Based on the interpretation criteria, both scores fall into the category of "Very Good", indicating that the materials are appropriate in terms of content relevance, instructional design, and media quality. The expert validation confirms that the interactive video meets academic standards and is suitable for inclusive classrooms. Furthermore, the practicality of the interactive video was evaluated through questionnaires distributed to both students and teachers. As shown in Table 1, the average score from students was 4.3, indicating that the students found the video easy to understand, engaging, and useful in helping them comprehend the reading material. Meanwhile, the teachers gave an average score of 4.75, which suggests a strong level of agreement that the video was effective, easy to implement, and supportive of differentiated learning. These scores demonstrate that the media is not only theoretically valid but also practically applicable in real classroom settings. The positive responses from both experts and users align with the results of the needs analysis, which indicated that students in inclusive classes—especially those with hearing impairments—require materials that are visually engaging and provide multimodal representations of information. The inclusion of sign language in the videos was particularly appreciated by the deaf students, as it allowed them to access the content in a format aligned with their primary mode of communication.

In terms of product development, the interactive video was designed based on themes from the Merdeka Curriculum, including daily activities and narrative texts. These topics were chosen because they are familiar and relevant to students' lives, making it easier for them to engage with the content. The video incorporated animations, subtitles, narration, and quizzes to support students' reading comprehension. Visual design elements were created using Canva and integrated with multimedia platforms to ensure responsiveness and accessibility on various devices.

The development process also involved several iterations of expert feedback and revisions. In this study, the involvement of one teacher as the evaluator was intentionally designed to focus on key acceptance constructs, namely Perceived Ease of Use, Perceived Usefulness, Attitude Toward Using, and Acceptance of E-learning Systems. The selected teacher was the English teacher who directly implemented the interactive video in the inclusive classroom and therefore had sufficient experience to evaluate how easily the media could be operated during instruction (Perceived Ease of Use), how effectively it supported reading instruction and student engagement (Perceived Usefulness), and how positively the teacher perceived the integration of the video into daily teaching practices (Attitude Toward Using).



During the initial trial phase, some technical and content-related issues were identified, such as unclear visuals or mismatch between sign language and narration. These were subsequently addressed, and the final product reflected improvements based on this formative evaluation process. This iterative approach ensured that the product was not only functional but also aligned with pedagogical and accessibility standards.

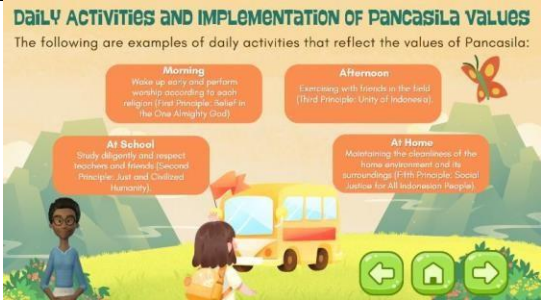

Table 2 Practically for The Interactive Video Comparison by Teacher

Description	Expert Score	Reason
Perceived Ease of Use	5	The teacher found the navigation intuitive and the instructions clear.
Perceived Usefulness	4	The videos effectively improved the teacher's comprehension of key concepts and facilitated teaching tasks.
Attitude Toward Using	4	The teacher enjoyed using the media and was motivated to engage with the content.
Acceptance of E- learning Systems	5	The videos were well-received, with the teacher demonstrating confidence in applying the concepts learned.

The results indicate that the teacher experienced minimal difficulty in using the media, with a full score of 5 for ease of use, suggesting that the interface and guidance provided were clear and user-friendly. The perceived usefulness scored 4, reflecting that the media significantly helped in both understanding the material and delivering it to students, although there may still be room for improvement in optimizing instructional value. A score of 4 in attitude toward using shows a positive disposition and willingness to continue using the media, indicating engagement and motivation. Finally, a perfect score of 5 for acceptance of the e-learning system demonstrates the teacher's high level of confidence and readiness to integrate the interactive video into classroom teaching practices.

Table 3 Final Product

Description	Picture
Introduction Screen: Displays the title of the video and learning objectives to provide students with an overview of the lesson.	
Examples of vocabulary that are often used in Daily Activity materials	

Explanation of Pancasila Value in Daily Activity	
Visual aids that utilize animation and sign language to support students who are mute and deaf.	

The product developed can be accessed through <https://daily-activity.my.canva.site>. After completing several stages, the final product is an Inter-active English Learning Video on Pancasila values in daily activity material specifically designed for inclusive students in fourth-grade, following the principles of the Merdeka Curriculum. This Interactive Video is designed with attractive visuals to create a fun and interactive learning experience for students in inclusive class. Despite the successful development and implementation, the study also identified several challenges. One of the most prominent obstacles was the limited technological infrastructure in the school, which affected the consistency of implementation. Some classrooms lacked adequate equipment, such as projectors or speakers, which are essential for delivering interactive content effectively. Additionally, there was a need for further teacher training, especially in the area of inclusive digital pedagogy. Teachers expressed willingness to use technology but noted that they needed more guidance in operating the tools and understanding how to adapt instruction for deaf students using digital media.

The findings suggest that interactive videos serve as a promising instructional tool for inclusive education. They offer a flexible, engaging, and inclusive way to present learning materials, especially for students with disabilities. In the context of SDN 2 Bengkala, the interactive video helped bridge the communication gap between deaf and hearing students, promoted collaborative learning, and fostered a more inclusive classroom environment.

4. Discussion

The development and implementation of interactive videos in an inclusive fourth- grade classroom at SDN 2 Bengkala demonstrated strong effectiveness in enhancing student engagement and reading comprehension. The needs analysis showed that inclusive class students, especially those with hearing and speech impairments, require visually engaging and



interactive learning media. The sign language assistant emphasized the need for pictures, sign language, subtitles, and multimodal features. Students also preferred interactive videos with cartoons, bright colors, animations, sound, and daily activity themes. This indicates that traditional materials are insufficient, and interactive videos better support reading activities in inclusive classrooms.

The interactive video was developed using the ADDIE model, integrating text, images, animations, videos, sign language, subtitles, and interactive features. Media experts rated it 4.75 (“very good”), noting its clarity, relevance, and usability. The design aligns with the Merdeka Curriculum, incorporates Pancasila values, and supports both regular and special needs students. Content experts gave an average score of 4.625 (“very good”), confirming that the structure, examples, language, and interactivity were suitable for inclusive learning. The content also clearly supported reading skills development, even though interactivity and moral value integration scored slightly lower. The content and media validation results, with average scores of 4.625 and 4.75 respectively, confirmed that the developed videos were of high quality and aligned well with learning objectives and inclusive education principles. Practicality assessments also showed high usability and effectiveness. Students rated the practicality at 4.3, while teachers rated it 4.75, indicating that the videos were easy to use, engaging, and beneficial in classroom instruction. Additionally, teacher feedback based on the Technology Acceptance Model (TAM) showed high scores in perceived ease of use (5), usefulness (4), positive attitude (4), and system acceptance (5), demonstrating strong acceptance and sustainability of the media.

From a broader perspective, this study strengthens the theoretical and practical understanding of video-based reading instruction within inclusive education, particularly for learners with hearing impairments. Multimodal learning theory emphasizes that reading comprehension is enhanced when learners are provided with integrated verbal and visual inputs, allowing them to construct meaning through multiple cognitive pathways. In the context of inclusive classrooms, videos play a critical role by transforming abstract written texts into concrete, visually supported representations. As highlighted by Choi and Yi (2016), the combination of words and visuals facilitates deeper comprehension by supporting meaning-making processes, especially for learners who face linguistic or sensory barriers. For deaf-mute students, video-based reading materials that include sign language, subtitles, and visual illustrations function as essential scaffolding that bridges written English and conceptual understanding.

The effectiveness of the developed interactive video also reflects the core principles of Universal Design for Learning (UDL), which promotes flexibility in instructional design to accommodate learner diversity. By offering multiple means of representation (text, sign language, visuals, and narration), engagement (interactive elements and animations), and expression (guided activities and comprehension checks), the video-based materials ensure equitable access to reading instruction for both deaf-mute and hearing students (Priyadharsini & Mary, 2024). Empirically, these findings support prior research indicating that video-



enhanced reading instruction can increase students' motivation, attention, and comprehension by making texts more accessible and meaningful (Padmadewi et al., 2024; Supariani et al., 2021). However, unlike earlier studies that often addressed only one modality or focused on regular classrooms, this study offers a more comprehensive and inclusive approach by integrating multiple supportive features into a single cohesive learning medium.

Moreover, the development process itself highlights important pedagogical implications for inclusive education. Challenges such as accurately translating English texts into sign language and managing technical constraints in video design platforms required collaborative, iterative problem-solving involving teachers, content experts, and media developers. These challenges are consistent with previous findings that inclusive media development demands both pedagogical sensitivity and technical adaptability. Despite these limitations, the final product demonstrated high effectiveness, practicality, and alignment with the Merdeka Curriculum. Consequently, this study not only responds to the gap identified by Tan and Wijaya (2020) regarding the scarcity of inclusive, video-based English reading materials, but also provides a replicable model for future multimedia development aimed at improving reading comprehension and engagement in inclusive educational settings.

5. Conclusion and Suggestion

The results of this study highlight the importance of multimodal learning materials in inclusive classrooms. The integration of sign language, engaging visuals, and interactive exercises significantly improved students' comprehension and reading interest. The findings support the idea that digital learning tools, particularly interactive videos, can be highly beneficial for students with special needs. Additionally, teachers and students responded positively to the developed materials, emphasizing their practicality and ease of use. However, the study also identified some limitations, such as the need for improved technological infrastructure and broader generalizability of findings to other inclusive classrooms. Based on the research findings, it is recommended that teachers incorporate multimodal learning materials, especially interactive videos, to improve engagement and comprehension in inclusive classrooms. Future research should investigate the long-term impact of these tools on literacy skills and explore their use in various educational settings. Schools are encouraged to enhance their technological infrastructure to ensure equal access to interactive learning. Additionally, future learning materials should include more diverse features like gamification, real-time feedback, and personalized learning paths to meet students' different needs.

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