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Developing a Flip PDF-Based Interactive Module to Enhance Self-Care Skills for Students with Intellectual Disabilities

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Abstract: This study aims to develop an interactive teaching module using the Flip PDF Corporate Edition application and evaluate its validity, practicality, and effectiveness in enhancing self-care abilities among students with intellectual disabilities. The research employed a Research and Development (R&D) method, following the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). The trial subjects comprised teachers and students from SLBN 1 Pariaman and SLBN 2 Pariaman, West Sumatera. Data collection involved validation questionnaires, practicality observation sheets, and pretest-posttest assessments. Descriptive statistics were used to analyze validation and practicality test results, while the Wilcoxon signed-rank test evaluated the difference between pretest and posttest scores. The results indicated that the module was highly valid, with an average score above 80%, and practical, with positive responses from teachers and students. The Wilcoxon test revealed a significant improvement between pretest and posttest scores ($p = 0.018$), demonstrating the module's effectiveness in enhancing self-care abilities. Therefore, the module is suitable for use as a learning medium in special self-care education programs.

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Introduction

Education is a fundamental right of every citizen without exception. This principle is firmly mandated in Law Number 20 of 2003 on the National Education System, which stipulates that every citizen has the right to obtain quality education in accordance with their interests and abilities (Fauzi F et al., 2021). At the global level, this commitment is reinforced by Sustainable Development Goal (SDG) 4, which emphasizes inclusive and equitable quality education (Mustakimah et al., 2023) Inclusive education requires not only integration but also adaptive services that respond to the unique characteristics of students with disabilities (Nurfatimah et al., 2022).

Despite global and national commitments to inclusive education, significant challenges remain in adapting learning methods to the needs of students with intellectual disabilities. (Muslim et al., 2021) note that Indonesia still faces gaps in achieving SDG 4 targets, particularly regarding inadequate facilities, limited teacher competencies, and low accessibility in several regions. Similar findings by (Ginting et al., 2025). emphasize the scarcity of specialized teachers, the lack of appropriate learning media, and the limited use of pedagogical approaches responsive to the unique characteristics of these students. As a result, many inclusive practices remain uniform and fail to address individual needs, especially for students who struggle with abstract concepts, communication, and cognitive tasks. These conditions highlight the urgency of developing adaptive, engaging, and accessible learning

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innovations that can bridge the gap between the general curriculum and the specific abilities of students with intellectual disabilities (Muslim et al., 2021).

In Indonesia's national education system, the curriculum is defined as a set of plans and arrangements concerning objectives, content, learning materials, and methods used as a guideline for implementing learning activities (Law No. 20 of 2003 on the National Education System). The curriculum serves as the primary guideline in the educational process to ensure that the direction and learning outcomes align with the needs of students and the demands of contemporary development. The curriculum plays a vital role in the field of education. Without a clear and well-directed curriculum, the educational process would lack a definitive course. One of the key components in curriculum implementation is instructional material (Hidayat et al., 2025)

According to (Juwandi et al., 2023)instructional material is a set of learning resources that adheres to the curriculum in use, aiming to achieve the predetermined competency standards and basic competencies. In the context of teaching and learning, instructional material is an essential component that must be designed comprehensively. This includes clear learning objectives, appropriate media, methods, and learning resources, all of which contribute to a conducive learning environment, making the learning process more optimal and meaningful.

Teaching modules and teaching materials both support the learning process but differ in scope and function. A teaching module is a structured, self-contained learning package that includes objectives, content, activities, assessments, and media, designed to guide students through one or more lessons systematically (Juwandi et al., 2023). In contrast, teaching materials are supporting resources such as texts, videos, worksheets, or assessment tools that reinforce students' understanding of specific topics (Handayani et al., 2021). Modules serve as a comprehensive guide for teachers and students, while materials provide flexible components that can be adapted according to learning needs (Magdalena et al., 2020).

According to data from the Ministry of Education and Culture (Kemdikbud) in 2018, approximately 1.6 million children with special needs in Indonesia have not received adequate access to education (Andriyansa et al., 2021). Furthermore, children with intellectual disabilities are at a higher risk of experiencing difficulties in understanding academic materials and developing self-care and independence skills (Lubis et al., 2023). Based on preliminary studies and classroom observations conducted by the researcher at SLB Negeri 2 Pariaman, it was found that the use of teaching modules for the special self-care program for students with intellectual disabilities is still limited. Teachers rely mostly on textbooks and student phases as the basis for developing self-care teaching modules; some only create drafts without a complete and structured module. The current implementation of the self-care program at SLB Negeri 2 Pariaman has not met expectations, as the available modules are incomplete and lack detailed instructional content.

SLB Negeri 2 Pariaman is a state special needs school located in Pariaman City, serving students with various disabilities, including visual impairments, intellectual disabilities, hearing impairments, physical disabilities, and students with communication, social interaction, and behavioral challenges (such as autism). Given these varied learning barriers, instructional strategies must be tailored to meet the individual needs of students. Therefore, innovation and improvement are needed to create a learning experience that is both effective and enjoyable for students with special needs. Interactive teaching materials can serve as self-directed learning tools by integrating various media elements such as text, images, audio, video, and animation into modules that allow user-controlled navigation. These features make learning more engaging and adaptable to the needs and characteristics of

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students with intellectual disabilities. The Flip PDF-based e-module is specifically designed to increase learning motivation and support the development of self-care skills. Therefore, this study aims to improve self-care programs for students with intellectual disabilities through the development of an interactive module using the Flip PDF Corporate Edition application. (Azman et al., 2022).

Flip PDF Corporate Edition is a software application with extensive features designed to assist in the development of engaging instructional content. Unlike traditional text-based resources, this application allows the integration of audio, images, video, and animations, resulting in more interactive and less monotonous learning experiences. It enables the creation of flipbook-style e-modules, simulating the appearance of a physical book, while offering multimedia enhancements such as embedded offline/online videos, voice narration, and visual materials for content explanation (Oktaviani, 2023)

Previous research on interactive multimedia learning has predominantly focused on children with physical or sensory disabilities, while studies addressing intellectual disabilities remain limited and rarely utilize digital formats. This gap highlights the need for more specific research that supports the self-development skills of children with intellectual disabilities by integrating technology and involving both teachers and parents in the learning process. At the contextual level, observations at SLB in Pariaman City and Padang Pariaman Regency revealed that digital instructional formats, particularly those developed with Flip PDF Corporate Edition, have not been implemented. This emphasizes the novelty of applying Flip PDF technology in this setting to create interactive modules that address the specific needs of students with intellectual disabilities.

Interactive Multimedia-Based Learning Theory for Intellectual Disabilities. Cognitive Load Theory (CLT): by John Sweller, explains that human working memory capacity is limited. Effective multimedia learning design. Interactive multimedia-based learning that combines various media elements with interactive features that allow users to actively participate in the learning process (Rochaendi et al., 2024). Dual Coding Theory (DCT) by Allan Paivio, this theory states that information is processed and stored in two different but interconnected systems: the verbal system (language) and the non-verbal system (visual imagination) (Evi Khoirun Nisa et al., 2022). Cognitive Developmental Theory (Piaget and Vygotsky): While students with intellectual disabilities may experience different cognitive developmental stages, the basic principles of how individuals learn and interact with their environment remain relevant (Marinda, 2020). Flip PDF learning modules can be designed with students' ZPD in mind. Social Learning Theory (Bandura): Learning occurs through observation, imitation, and modeling. Students learn by observing others perform a skill and then imitating them. Flip PDF modules can include video demonstrations of the steps for correctly performing self-help tasks. Interactive features can allow students to practice these skills in a safe and controlled environment. Behavioral Theory (Behaviorism - Skinner): emphasizes the role of reinforcement and punishment in shaping behavior. Learning occurs through associations between stimuli and responses (Herpratiwi, 2016). Flip PDF modules can be designed to provide positive feedback (reinforcement) when students successfully complete tasks or answer questions correctly.

Although various studies have developed interactive multimedia-based learning materials for general education and special needs, most research still focuses on children with physical or sensory disabilities. Studies that specifically develop adaptive digital learning modules based on Flip PDF for students with intellectual disabilities in the context of self-care skills are still very limited. This emphasizes the novelty of the present research, as it focuses on developing an interactive Flip PDF module specifically designed to enhance self-

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care programs for students with intellectual disabilities an area that has received limited scholarly attention compared to other forms of special education. The objective of this study is to design, develop, and evaluate the validity, practicality, and effectiveness of the interactive module in improving self-care skills among students with intellectual disabilities at SLB Negeri 2 Pariaman. It is expected that the implementation of Flip PDF Corporate Edition will bridge the technological gap in special education, enabling the use of interactive instructional modules to support learning. The findings from (Oktaviani, 2023) demonstrated that e-modules developed with Flip PDF Corporate were highly feasible and practical for use in elementary schools. Moreover, the study recommended that teachers consistently utilize such e-modules to support the effective implementation of the "Merdeka Curriculum" in primary education.

Research Method

This study employed a development research approach using the ADDIE model, which includes five stages: Analysis, Design, Development, Implementation, and Evaluation. The research was conducted at SLBN 2 Pariaman, a public elementary school for children with special needs located in West Sumatera (Cahyadi, 2019). The total number of students with intellectual disabilities at the school is 7; however, this study focused on seven fifth-grade students who had not yet mastered the ability to button and unbutton their clothes independently an important component of self-care skills. These students were selected based on initial classroom observations that indicated the need for targeted intervention.

The instruments used for data collection included a questionnaire developed by the researcher to assess the validity, practicality, and effectiveness of the developed learning module. The instruments included structured interviews with teachers, students, and parents, as well as direct classroom observations. Data collection techniques included interviews, questionnaires, and observations during the module development and implementation phases. To ensure validity and practicality, this module first underwent expert validation by material and media experts, followed by limited trials with teachers and students before full implementation. Qualitative data obtained from observations, interviews, and documentation were analyzed using descriptive qualitative methods. Quantitative data obtained from questionnaires were statistically analyzed using the Wilcoxon Signed Rank test to determine the significance of changes before and after the intervention. The integration of qualitative and quantitative approaches aims to provide a comprehensive evaluation of the module's effectiveness. The credibility of the research findings was enhanced through triangulation of data sources and methods, involving input from teachers, parents, and the students themselves.

Results and Discussion

Based on preliminary observations at SLB Negeri 2 Pariaman, the implementation of the self-care program, particularly in the topic of wearing buttoned shirts, was found to be suboptimal. Teachers relied on textbooks or incomplete lesson plans, with minimal use of interactive media. This reduced students' motivation, active participation, and independence in daily tasks. The learners were fifth-grade SDLB students with mild to moderate intellectual disabilities. With below-average cognitive abilities, they struggled with abstract concepts, sequential memory, and fine motor skills such as fastening buttons. They therefore required concrete, multimodal learning media involving images, videos, animations, and audio, in line with Dual Coding Theory (Paivio) and Cognitive Load Theory (Sweller). Approaches adapted to visual and kinesthetic learning styles were essential.

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The goal of developing this module was to improve students' independence in self-care, especially putting on buttoned shirts. Objectives included recognizing clothing types, distinguishing buttoned from non-buttoned shirts, and practicing the steps of wearing and removing them independently. The module was designed for flexible use by teachers and students through Flip PDF Corporate Edition, which integrates text with multimedia elements (images, videos, audio, and animations) to support greater engagement. The analysis showed that students with intellectual disabilities need a module that is both comprehensive and tailored to their cognitive development and learning styles. The Flip PDF–based module is an innovative solution to these challenges, promoting more effective outcomes in self-care learning.

In the design phase, a prototype was developed with specific, measurable objectives aligned with student needs. The materials were structured gradually, from recognizing clothing to buttoning practice, using simple language and visual illustrations. Flip PDF features allowed integration of interactive elements such as audio, video, hyperlinks, and animations. The design emphasized clarity and readability through contrasting colors, large fonts, and a clean layout.

The module structure included cover, interactive table of contents, objectives, concept map, materials, practice/assessment, and glossary. Navigation buttons and hyperlinks enabled easy access across sections, while assessments used observation sheets to measure students' ability to follow buttoning steps. The developed module featured an engaging layout with illustrative images, clear contrasts, and simple design to aid focus. It also included a mind map to show topic connections and embedded instructional videos demonstrating step-by-step procedures. These videos were particularly useful for students with difficulties in reading or abstract comprehension, helping improve retention and understanding.

Other interactive features embedded in the module include clickable audio icons, allowing users to listen to verbal instructions or explanations. Furthermore, a glossary of terms is provided to define key vocabulary and important concepts used throughout the module, thereby enriching students' understanding and supporting vocabulary development:

Figure 1. Design of the Front Page or Module Cover

Figure 2. Content Page Design 1

After the product development was completed, the next step was to conduct a product evaluation through expert validation. In this case, the validation involved three categories of

experts: subject matter expert, media expert, and language expert. These experts assessed the module using a questionnaire prepared by the researcher.

The subject matter expert for this product was Mr. Nofri Hendri, S.Pd., M.Pd., a lecturer in Educational Technology at the Faculty of Education, Universitas Negeri Padang (UNP). The validation process was conducted on June 10, 2025. The results of the media expert validation are presented in the following table:

Table 1. Results of Media Expert Validation

No	Evaluated Aspect	Percentage	Category
1	Visual Design and Readability	92%	Very Valid
2	Quality of Interactive Media	93%	Very Valid
3	Navigation and Accessibility	100%	Very Valid
	Average	**94%**	**Very Valid**

Based on Table 1, the media validation results, which cover aspects such as visual design and readability (92%), quality of interactive media (93%), and navigation and accessibility (100%), yielded an average score of 94%, categorized as Highly Valid. This indicates that the developed interactive teaching module is appropriate for use as an instructional medium to support the special self-development program for students with intellectual disabilities. In addition to quantitative data, the experts also provided qualitative feedback in the form of suggestions and comments. The validator's suggestions are as follows: reduce the spacing between fonts on the cover page, remove the NIP text, include a mind map on the opening page of each chapter as commonly found in both printed and electronic modules, ensure interactivity is provided for each unfamiliar term or concept and in assessment sections especially in multiple choice tests and consider differentiating the color scheme of the cover from the module's inner content.

This finding aligns with Hayati et al. (2025), who stated that expert validation is crucial as the initial step in ensuring the quality of learning media before classroom implementation. Similarly, Sabat et al. (2025) emphasized that validated media serve as a reference for teachers in designing more effective instructional strategies. The next step was the validation by the content expert. The content expert for this product was Dr. Rahmahtrisilvia, M.Pd., a lecturer at the Faculty of Education (FIP) UNP. The validation process was conducted on June 13, 2025. The results of the content expert validation are presented in the following table:

Table 2. Content Expert Validation Results

No	Assessed Aspect	Percentage	Description
1	Content Feasibility	82.5%	Very Valid
2	Language Appropriateness	82.5%	Very Valid
3	Relevance to Socio-Cultural Context	90%	Very Valid
	Average	**84%**	**Very Valid**

Based on Table 2, the results of the content validation which include content feasibility (82.5%), language appropriateness (82.5%), and relevance to the socio-cultural context (90%) yield an average score of 84%, categorized as Very Valid. This indicates that the developed interactive learning module is suitable for use as a learning medium to support the self-development program for students with intellectual disabilities. The validation results were not limited to quantitative data but also included qualitative feedback and suggestions from the expert validator. These suggestions included: the Competency Achievement (CA) displayed was not the achievement of the specific element but seemed to reflect a general phase-level CA; it was not aligned with the clothing-related element and thus required revision. Additionally, the learning objective was limited to only one, while the listed

activities and materials were extensive. It was also noted that sources were unclear, and a glossary was absent.

Next is the validation of the linguist. The linguist of this product is Dr. Dadi Satria, M.Pd. He is a lecturer in Indonesian Language at UNP. The validation process was carried out on June 12, 2025. The results of the validation by the material expert are as follows:

Table 3. Results of Validation by Linguist

No	Assessed Aspect	Percentage	Description
1	Straightforward	80%	Quite Valid
2	Communicative	84%	Very Valid
3	Diagnostic and Interactive	80%	Quite Valid
4	Developmental Appropriateness	80%	Quite Valid
5	Language Rules	73,3%	Quite Valid
6	Use of Terms, Symbols	80%	Quite Valid
Average		**80%**	**Quite Valid**

Based on Table 3, the results of the validation test by language experts, an average percentage of 80% was obtained with a fairly valid category. The aspects assessed include straightforwardness, communication, interactivity, developmental suitability, language rules, and the use of terms and symbols. Although most aspects were declared quite valid, the communication aspect received the highest score of 84% and was included in the very valid category, while the language rules aspect received the lowest score of 73.3%. In general, these results indicate that the module is suitable for use but still requires improvement, especially in the application of language rules to be more effective in supporting the learning process. The assessment data are not only in the form of numbers, but also in the form of suggestions and comments from expert validators. The suggestions and comments from the validator are to improve the module according to the notes given, before continuing to the next stage of research.

After the product is declared feasible based on the validation results by experts, the next After the product was declared feasible based on expert validation, the next stage was a practicality trial conducted with 22 students with intellectual disabilities at SLBN 2 Pariaman. The purpose of this trial was to assess the usability and practicality of the interactive module as a learning medium. Data were collected using a questionnaire assisted by accompanying teachers:

Table 4. Results of the Interactive Teaching Module Practicality Test

No	Indikator	Total Score	Maximum Score	Percentage	Description
1	Theme Relevance	503	550	91,5%	Very Practical
2	Presentation Quality and Learning Strategies	508	550	92,4%	Very Practical
3	Ease of Use	202	220	91,8%	Very Practical
Average		**1213**	**1320**	**91,89%**	**Very Practical**

As shown in Table 4, the module achieved an overall score of 1213 out of 1320 (91.89%), which falls into the *Very Practical* category. Across indicators, the module scored 91.5% for *Theme Relevance*, 92.4% for *Presentation Quality and Learning Strategies*, and 91.8% for *Ease of Use*. These results indicate that the Flip PDF-based interactive module is easy to use, relevant to the learning content, and effective in supporting classroom learning for students with intellectual disabilities. Although a small number of responses fell into the *Quite Practical* category, the overall findings consistently demonstrate that the module meets the criteria for practicality and is highly suitable for classroom implementation. These findings are consistent with Kumalasani, (2018), who stated that interactive learning media can be

considered practical when teachers find it easy to operate and implement in class. Similarly, Arsyad (in Irawan & Hakim, 2021) emphasized that practicality enhances the smooth delivery of instructional content. More recent studies also reinforce this conclusion: Ferdiani (2024) reported that the practicality of interactive e-modules lies in their ability to reduce teachers' workload and improve the creative thinking skills of deaf students, while Dhuha & Puji Astutik (2025) highlighted that digital media fosters more consistent student engagement in inclusive learning environments. Research by Alfirah & Gustiana (2024)further confirms that the use of interactive digital media in special schools helps overcome communication barriers and increases active student participation.

After the interactive learning module based on Flip PDF Corporate Edition was developed and declared feasible and practical based on the validation and practicality test results, the next step was to conduct an effectiveness evaluation to determine the extent to which this module can achieve learning objectives and provide a positive impact on students. The test used was the Wilcoxon Signed Rank Test to determine whether there is a significant difference between the pretest and posttest scores after students use the developed product. The results of the effectiveness test are as follows:

Table 5. Uji Wilcoxon Signed Rank Test

Test Statistics[a]	
	Post_Test - Pree_Test
Z	-2.375[b]
Asymp. Sig. (2-tailed)	.018
a. Wilcoxon Signed Ranks Test	
b. Based on negative ranks.	

The Wilcoxon Signed Rank Test analysis results shown in Table 5 show a significance value of 0.018 (<0.05), indicating a statistically significant difference between the pretest and posttest results. Therefore, it can be concluded that the interactive teaching module based on the Flip PDF Corporate Edition application can significantly improve student learning outcomes. These results also support previous findings that showed an increase in average scores after using the product.

These results support the findings of Sari et al. (2024, who emphasized that interactive digital learning media significantly enhance students' learning motivation, socio-emotional skills, and memory through engaging forms of interaction. Likewise, Izmi et al. (2023) highlighted that the effectiveness of digital media is optimized when its design aligns with the learning styles of students with special needs, particularly visual and kinesthetic modalities, which served as the basis for the design of this module. The Flip PDF Corporate Edition module, which integrates multimedia elements such as animations, practice videos, and instructional audio, was proven to assist students in understanding and independently rehearsing the material. This is further supported by Fachrurrazi & Kinasih, (2022), who asserted that digital media provide students with broader, more varied, and less teacher-dependent learning opportunities.

Discussion

This study demonstrates that the interactive teaching module developed using the Flip PDF Corporate Edition is both valid, practical, and effective in improving the self-care abilities of students with intellectual disabilities. These findings are consistent with previous studies (Sari et al., 2024; Alfirah & Gustiana, 2024) which highlight that interactive digital media supports better engagement, motivation, and comprehension among students with special needs. The integration of multimedia elements such as videos, audio icons, and mind maps provides concrete learning experiences that align with the visual and kinesthetic

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learning styles of students with intellectual disabilities, making abstract concepts more accessible.

Conceptually, this study reinforces the view that digital-based learning media are not only technical innovations but also pedagogical tools that enable differentiated instruction, as emphasized by Hayati et al. (2025) and Sabat et al. (2025). By incorporating expert validation and teacher feedback, the module development process ensures that the content and design are adaptive to learners' needs while remaining practical for teachers to implement. The implications of these findings extend beyond the classroom level. First, the module can serve as a model for integrating technology into self-care programs in special schools, thereby supporting the realization of inclusive and adaptive education. Second, teachers are encouraged to use similar interactive media to scaffold independence skills systematically, while also collaborating with parents to ensure continuity of learning at home. Third, this approach provides evidence for policymakers and curriculum developers that digital modules can effectively complement the "Merdeka Curriculum" by addressing diverse cognitive needs in inclusive education settings.

Conclusion

Based on the results of the study, it can be concluded that the development of interactive teaching modules based on the Flip PDF Corporate Edition application was carried out systematically, the module was developed with a visual, kinesthetic, and audio-visual approach that is in accordance with the characteristics and learning styles of students with intellectual disabilities. The module design is arranged interactively by utilizing hyperlink features, learning videos, instructional audio, and a glossary of terms to facilitate navigation and understanding. The validation results show that the module has a very valid level of feasibility, with an average percentage of 94% from media experts, 84% from material experts, and 80% from language experts. The results show that the module has a practicality level of 91.89% with the Very Practical category. The results of the effectiveness test using Wilcoxon Signed Rank Test showed a significant difference between pretest and posttest scores ($p < 0.05$).

The module has been proven to be able to increase student involvement, understanding, and independence in carrying out self-development skills. This shows that the use of Flip PDF-based modules significantly helps achieve the learning objectives of special self-development programs for students with intellectual disabilities. It is recommended to develop interactive teaching modules with a wider range of material, not only limited to the skill of wearing buttoned shirts, but also other self-development skills such as eating independently, maintaining personal hygiene, or wearing shoes.

Recommendation

Future research should extend the use of Flip PDF based interactive modules to a broader range of self-care skills and different levels of intellectual disability, with larger and more diverse samples to strengthen generalizability. Long-term impacts on students' independence and daily living abilities also warrant investigation. This study faced several limitations, including limited access to digital devices and variations in parental support, which may have affected learning consistency. Teachers are encouraged to integrate the module into regular classroom routines, provide ongoing guidance, and collaborate with parents to reinforce skills at home. The gradual adoption of similar digital tools for other self development areas is also recommended to foster students' independence more holistically.

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