

The development of flip book maker-based e-module in computer applications course for elementary education student teachers



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ABSTRACT

The inconsistent implementation of e-modules within the Faculty of Teacher Training and Education (FKIP) at Syiah Kuala University (USK), particularly in the Elementary School Teacher Education (PGSD) program, highlights a crucial gap in adapting to technological advancements. In response to this, the authors identified the need for digital teaching materials aligned with information technology (IT) for effective instruction. This study focuses on the development and evaluation of flip book-based e-modules for the Computer Application course (APLIKOM) within the PGSD program. Utilizing a research and development (R&D) approach, the study employed the ADDIE development model. Initial testing involved a small-scale group of 10 students, while a larger cohort of 30 students participated in subsequent evaluations. Validation from material and media experts produced an impressive average score of 86.5%. Student responses, assessed through both small and large-scale tests, exhibited a commendable average of 89.5%. Evaluation tests demonstrated the effectiveness of the flip book-based e-module, yielding an overall average score of 88. Notably, 100% of students in both test groups met the minimum criteria for mastery learning. The findings suggest that the developed flip book-based e-module for the APLIKOM course is valid, practical, and effective in delivering teaching materials to students. This research contributes valuable insights into the integration of digital tools in teacher education programs, addressing the pressing need for IT-based instructional materials in contemporary educational settings.



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1. Introduction

Education involves a purposeful and systematic endeavor to establish a conducive and joyful learning environment for students. The current technological advancements in the global era have introduced innovative and engaging learning methods, particularly through the creation of learning media designed to enhance direct learning activities [1]. Furthermore, the rapid progress of science and technology poses a challenge for teachers in presenting teaching materials during the learning process. Teachers are expected to adeptly integrate technology into the learning process, aligning with the era of industrial revolution 4.0, which prioritizes IT-based information. Rapanta *et al*, emphasized that learning resources should be made interesting and applicable to technology to captivate students' interest in reading and facilitate their understanding of the learned concepts [2]. According to Hunaidah *et al*, the transformation of teaching materials from printed to digital or electronic modules (E-modules) is essential [3]. E-modules, designed for individual learning in a practical electronic format, enhance accessibility and ease of use for students, contributing to the successful attainment of

subject competencies. The creation of compelling teaching materials necessitates the integration of media to stimulate students' imagination and foster increased attention during learning [4]. While books and modules are common tools for teachers, traditional printed teaching materials have drawbacks such as a monotonous appearance and the inconvenience of being heavy, potentially discouraging students from carrying them. Educators can address these issues by developing creative and innovative teaching materials using various information technologies. These materials should not only be visually appealing but also easily accessible and portable for students to read anytime and anywhere. Educators should seize this opportunity for innovation to enhance the overall quality of learning. Preliminary observations and discussions with Computer Application course (Aplikom) instructors at Syiah Kuala University revealed that none of the lecturers had incorporated application-based or digital e-modules into their teaching. Despite using teaching materials in books and modules, these materials were not application-based. Therefore, there is a clear need for improvement and innovation to create digital-based teaching materials that students can access through their smartphones. The developed teaching materials must utilize software compatible with the smartphone platform to facilitate easy access. The resultant teaching material is a Flip Book-based e-module, an electronic book application enriched with images, sound, and video. These features are expected to enhance student motivation and facilitate reading anywhere and anytime, ultimately fostering enthusiasm for learning and achieving satisfactory learning outcomes.

Building upon the research conducted by Latifah *et al*, the development of Flip Book-based e-modules has demonstrated potential in enhancing the quality of the learning process, as evidenced by improved learning outcomes [5]. This finding aligns with previous research, Handayani *et al*, suggesting that the development of e-modules, particularly those based on flip books, can positively impact student learning outcomes [6]. In instances where prior learning outcomes (68) did not meet the Minimum Criteria of Mastery Learning, the use of flipbooks resulted in increased learning outcomes, meeting the required standard. Several other studies consistently emphasize the positive influence of Flip book-based modules on learning outcomes and academic achievement. For instance, research by Suyasa *et al* [7] and Perdana *et al*, [8] indicated that flipbooks contribute to improved achievement and understanding in the learning process. This observed difference underscores the effectiveness of Flip book-assisted learning in enhancing student performance. Existing learning materials, whether printed or non-printed, fail to provide the convenience students seek when studying. The weight of traditional books makes them impractical, while students prefer application-based modules that are visually appealing and easily accessible through their Android devices. The advantages of using flip book maker-based modules extend to enabling students to independently create instructional materials, fostering interactive engagement through features like animation, audio, and navigation.

Modules function as meticulously organized, engaging, and systematic self-contained learning resources designed to cater to various age and knowledge levels, facilitating easy comprehension. The incorporation of electronic modules as learning resources is crucial for enhancing the effectiveness of learning, ensuring the smooth delivery of materials, and facilitating ease of understanding. Interactive electronic learning modules play a pivotal role in boosting students' motivation for learning, engaging sensory activities, providing immediate feedback, empowering students to determine their learning pace, and enabling self-evaluations [9]. Similar research conducted by Azis *et al*, [10] and Klingenberg *et al*, [11] indicated that developing electronic modules supported by smartphone-based audio and video elements can increase students' interest in learning. The visual appeal of these modules significantly contributes to learner engagement. Rahmatsyah *et al*, emphasized that electronic modules involve structurally interesting combinations of information [12]. Digital modules can present various materials using interactive learning media [13]. E-Modules serve as guides and independent learning resources for students [14]. Deemed effective and efficient for independent learning, electronic modules allow students to study at their convenience, fostering greater autonomy [15]. A Flip Book Maker is a software application designed to present electronic display modules. This software operates by simulating the experience of flipping through the pages of a physical book. With the capability to create and convert PDF files and images into a dynamic book or album, the flip book maker enables users to navigate through each page as if turning the pages of a book. The output generated by this flipbook maker can be saved in various formats, including application, SWF, HTML, and EXE [16].

The Flip Book Maker can convert PDF files and images into interactive books or albums, generating output in formats like SWF or HTML [16]. Its advantages include the ability to provide a

realistic "flip effect," allowing for the experience of reading a tangible book. The user-friendly application facilitates the easy creation of electronic books enriched with images, sound, and video elements. Despite these advantages, it is important to note that the Flip Book Maker has drawbacks. According to Zhang *et al*, the multimedia effects of the application may divert readers' attention from the information being conveyed [17]. To address this concern, it is crucial to recognize that readers seek information rather than being captivated solely by multimedia effects. The combination of text, animation, video, sound, and other features in Flip Book media provides audio and visual stimuli, enhancing student memory retention. As an interactive form of learning, electronic modules incorporating audio-visual displays, sound, and movies have been shown to be effective in conveying messages. This approach is 70% more effective in attracting students' interest and serves the dual purpose of providing information and entertainment. In conclusion, the interactive nature of electronic modules, especially those using the Flip Book Maker, is crucial in creating engaging student learning experiences. Audio-visual media possess significant potential for conveying messages, proving to be more effective in capturing students' interest and attention to impart information, entertainment, and education. This form of learning media can be readily employed and revisited, offering the ability to present detailed content, allowing for acceleration and deceleration as needed [18]. Interactive electronic modules incorporating audio-visual displays, sound, and videos are user-friendly, making them highly suitable for effective learning media [19].

2. Method

This research adopts the Research and Development (R&D) research model, as defined by Hollands *et al*, with a focus on producing and testing the effectiveness of a product [20]. This model facilitates the implementation of strategies and the utilization of materials in instructional settings. The ADDIE development model is employed in this research due to its recognized flexibility, allowing for seamless adaptation between teaching and learning [21]. Saeidnia *et al*, stated that the ADDIE model consists of five stages: Analysis, Design, Development, Implementation, and Evaluation [22]. The following provides an explanation of each stage within the ADDIE model. The Analyze stage involves an examination of the curriculum and student characteristics. Subsequently, the Design stage encompasses the development of a design plan aligned with the prior analysis. In the Development stage, a flipbook maker-based e-module design is created, adhering to the established plan. This stage also includes the validation of the product by material and media experts. Material validation assesses the suitability of the content within the flipbook maker-based e-module under development. Following validation, the Implementation stage involves small-scale and large-scale trials to assess the practicality of the product. Lastly, the Evaluation stage is dedicated to analyzing the effectiveness of the product. Data collection in this research involved an online questionnaire. PGSD FKIP USK students enrolled in the computer application course served as subjects, with 10 students participating in a small-scale test and 30 students in a wide-scale test. These students provided feedback through the questionnaire after using the flipbook maker-based e-module. Qualitative data analysis is conducted in line with Triwahyuningtyas *et al*, framework, which assesses the quality of the product based on validity, practicality, and effectiveness [23].

2.1. Validity of Flipbook Maker-Based E-Module

This study assessed the validity, practicality, and effectiveness of flipbook maker-based e-modules through a comprehensive analysis of content, format, and language. The evaluation involved scoring each criterion using a Likert scale, and the overall value was calculated based on the methodology proposed by Phakiti [24].

$$Score = \frac{\text{The Score Obtained}}{\text{Maximum score}} \times 100\% \quad (1)$$

2.2. Practicality Assessment of Flipbook Maker-Based E-Module

Practicality is assessed through student responses, utilizing the percentage formula recommended by Phakiti [24] for calculating the practicality score.

$$Score = \frac{\text{The Score Obtained}}{\text{Total score}} \times 100\% \quad (2)$$

2.3. Effectiveness Assessment of Flipbook Maker-Based E-Module

Effectiveness is ascertained through the analysis of student learning outcomes. A minimum score of 75 is considered the threshold for student mastery learning, aligning with the minimum criteria of mastery learning. For the flipbook maker-based e-modules in the Aplikom course to be deemed effective, at least 85% of students should attain the minimum criteria of mastery learning.

3. Results and Discussion

This section outlines the development process of flipbook maker-based e-modules, aligning with the stages of the ADDIE Model: Analysis, Design, Development, Implementation, and Evaluation.

3.1. Analysis Stage

During the analysis stage, a comprehensive examination of student characteristics was conducted. The analysis revealed that students prefer engaging electronic teaching materials, specifically those that are digital-based and interactive. This insight into student preferences informed the development of e-modules based on the flipbook maker for the Aplikom course. The focus was on aligning the content with student competencies and ensuring the accuracy of the developed material, the flipbook maker-based e-module.

3.2. Design Stage

In the Design stage, the researchers customized the flipbook maker-based e-module to accommodate the identified characteristics of the students. The design process involved curating content from reliable sources and adhering to the recommendations of Nuryani and Abadi [25]. Their assertion emphasizes the importance of incorporating suitable images, symbols, and colors to motivate and enhance student memory.

3.3. Development Stage

The flipbook maker-based e-module, designed in the previous stage, is now developed according to the specified design. The final product is saved in PDF format and converted into an interactive flipbook using the Fliphtml5 web application. Following the guidelines of Kosasih [26], the development process ensures the creation of teaching materials that are systematically organized, aligned with the curriculum, and directed towards achieving the intended learning objectives. The development of a flipbook maker-based e-module is illustrated in Fig. 1.

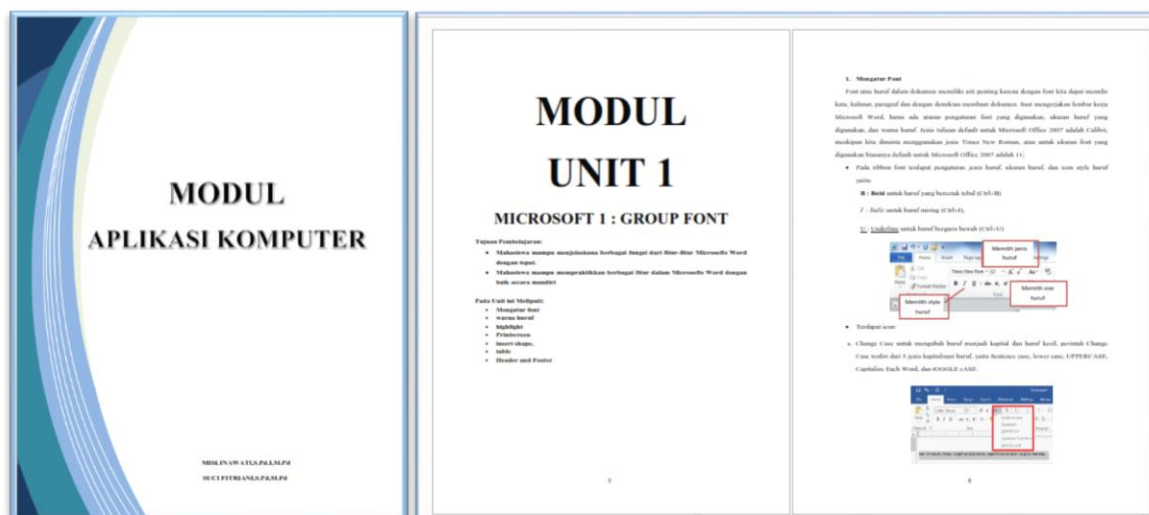


Fig. 1. Flipbook Maker Based E-module Display

The flipbook maker-based e-module underwent development and validation by material and media expert validators. This validation aimed to assess the feasibility of the developed flipbook maker-based e-module. The following are the validation results provided by material expert validators and media experts. According to Table 1, the material expert validation analysis yielded a score of 85%, while the media expert validation resulted in a score of 88%, both falling into the "very good" category. When these scores are averaged, the combined material and media validation result is 86.5%,

also classified as "very good." The outcomes of the validation analysis affirm that the flipbook maker-based e-module is deemed suitable for implementation as teaching material for students.

Table 1. Material Experts and Media Experts Validation Results

Validator	Score
Material Experts	85%
Material Experts	88%
Mean	86.5 %

3.4. Implementation Stage

The flipbook maker-based e-module, declared valid by expert validators, underwent both small-scale and broad-scale tests. Initially, a small-scale trial was conducted with 10 PGSD FKIP USK students. The results of the small-scale trial are presented in [Table 2](#).

Table 2. Small-Scale Trial Results

Small Scale Trial	Score
Student Response	87%
Mean	87%

Based on the analysis, student responses to the small-scale test of the flipbook maker-based e-module yielded a score of 87%, categorizing it as "very good." Following the successful outcome of the small-scale trial, the large-scale trial was subsequently conducted with 30 PGSD FKIP USK students. The results of the large-scale trial are presented in [Table 3](#).

Table 3. Large-Scale Trial Results

Large Scale Trial	Score
Student Response	92 %
Mean	92%

Based on the analysis, student responses in the large-scale trial of the flipbook maker-based e-module achieved a score of 92%, categorizing it as "very good." Upon averaging the response results of the small- and large-scale trials, a commendable value of 89.5% was obtained. Consequently, from the outcomes of both trials, it can be concluded that the flipbook maker-based e-module demonstrates practicality as a valuable teaching resource for students.

3.5. Evaluation Stage

The evaluation stage assesses students' proficiency after learning with e-modules. A test was administered to evaluate students' abilities. This stage aims to analyze the effectiveness of the e-module in the Aplikom course. The results of the student evaluation tests are presented in [Table 4](#).

Table 4. Evaluation Results of Small-and Large-Scale Trials

Test	Score	Percentage of mastery learning
Small-Scale Trial	86	100%
Large-Scale Trial	90	100%

Based on the analysis, the small-scale student evaluation yielded an average score of 86, while the large-scale achieved a 90 with 100% learning mastery. When averaged, the overall score reached 88. Considering both the small- and large-scale evaluation tests, the flipbook maker-based e-module is affirmed as effective for use as teaching material for students. The findings of this study suggest that using a flipbook maker-based e-module for learning in the Aplikom course serves as valuable support for students. Awwaliyah *et al.* [27] similarly asserted in their research that the flipbook maker-based e-module proves beneficial for lecturers and students, serving as effective teaching materials that facilitate the learning process.

4. Conclusion

The developed teaching material is the flipbook maker-based e-module designed for the Computer Applications (Aplikom) course, encompassing content and illustrative images to elucidate Aplikom concepts. The quality of this teaching material is assessed based on validity, practicality, and effectiveness. The research results indicate that the validation scores from material and media experts

averaged 86.5%, falling within the "very good" category. Consequently, the flipbook maker-based e-module is considered valid. Furthermore, the response scores from both small- and large-scale trials averaged 89.5%, demonstrating the practical utility of the flipbook maker-based e-module as effective teaching materials for students in practical application courses. Moreover, the results from student evaluation tests, both in small- and large-scale trials, achieved an average score of 88 with 100% mastery learning. This confirms that the flipbook maker-based e-module is a practical and effective teaching resource for students in the Aplikom course. In conclusion, the flipbook maker-based e-module in the Computer Applications course fulfills the valid, practical, and effective criteria, making it a valuable teaching resource.

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