Development of Project-Based Learning Interactive E-Books in Children's Clothing Courses

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Abstract. Children's fashion is a productive course. Students are required to be able to make children's clothing based on fashion trends, choose children's clothing materials, and use sewing techniques that are suitable for children's clothing. However, media limitations make it difficult for students to access resources that effectively support children's fashion learning. Furthermore, students often rely on the internet to find learning resources. This study aimed to explore the development of interactive e-book media based on project-based learning for children's fashion courses. We employed the ADDIE development model. The material expert validation results showed a score of 88.20%, categorized as very good, while media experts gave a score of 89%, also categorized as very good. Small group trials yielded a score of 92%, medium group trials scored 90.5%, and large group trials achieved 89.12%, all within the very good criteria. These findings demonstrate that the interactive project-based e-book is suitable for use in children's fashion courses. The e-book serves as an effective learning resource for students.

Keyword: E-books, Grading, Interactive, Project based learning

1 Introduction

Familiarizing students with information technology in the industrial world is highly essential. [1]. Vocational education serves as one example of how national education closely connects to the advancement of technology and societal needs. [2]. Vocational education focuses on producing graduates equipped with skills aligned with workforce demands, ensuring they are ready for employment. As a result, vocational education must prepare students with specialized competencies, enabling them to enter the industrial world confidently and independently, with technological expertise relevant to industry requirements.

In the field of education, particularly in the Fashion Design Education study program, graduates are expected to possess educational competence, professionalism in fashion, a well-developed personality, and the ability to adapt to advancements in science, technology, arts, and culture. These qualities, combined with a forward-looking perspective, aim to prepare professional educators in the fashion field who are ready to enter the fashion industry. To achieve this level of professionalism and industry readiness, students must successfully complete practical courses, including the

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Children's Fashion course. The children's fashion course is one of the productive courses that provides students with the skills to make children's clothing.

Based on the observation results, in the Children's Fashion course, many students have difficulty in breaking down children's clothing patterns according to the model, determining children's clothing models, and determining suitable materials for children's clothing. This happens because most students come from high school. Moreover, there is a lack of learning media that enables students to independently create children's clothing at home. Current learning is only centered on teachers; students only get material from teachers who explain how to make children's clothing so that students feel bored, and the speed of receiving different student learning makes students unable to repeat learning at home.

Learning communication using only oral language will not be able to help students understand abstract learning materials; equipment or media are needed that can help concretize abstract materials [3] and create an engaging learning atmosphere. Students cannot repeat lessons because there is no media that helps them learn independently. The available guidebooks are only a source of media for teachers to provide materials. In addition, based on observations, students now more often search for materials via the internet; this can be seen from the results of assignments collected by students, many of which come from the internet. This is a driving force behind the development of interactive e-book media, which is a component of project-based learning.

Digital books (e-books) are electronic versions of printed books that include text, images, videos, and audio, which can be accessed on computers, mobile phones, smartphones, gadgets, and other electronic devices, serving to present information in an engaging format. [4]. E-books offer enjoyable, convenient, and practical learning, allowing students to access study materials anytime and anywhere, including on smartphones and gadgets. [5]. The availability of e-books as teaching materials encourages students to be more engaged, critical, and independent while also boosting their literacy and interest in reading [6]. Developing e-books is expected to make it easier and more efficient for users to use learning materials [7]. To enhance comprehension of the material, the e-books under development will incorporate search functions, practice questions, and images [8] [9]. E-books are self-contained, allowing students to learn on their own due to their structured and comprehensive nature [10][11].

Many students rely on the internet. This situation is encountered during class discussions, when lecturers give cases or assignments, and students search the internet more than reading books to answer questions [12]. Therefore, the use of e-books is considered necessary in learning. Students should find the design of e-books engaging and motivating, as this ensures the successful achievement of learning objectives [13]. E-books must be designed according to an approach that suits the student's personality [14].

The project-based learning model includes a student-centered approach and emphasizes everyday problems [15]. Learning with project-based learning can improve the development of students' knowledge and skills [16]. The development of this interactive e-book takes into account the student's environment, incorporating theories, images, learning videos, and learning evaluations. The content within it aligns with

the student's developmental needs. The teaching materials cover topics that are highly relevant and familiar to the student's surroundings. Each learning theme will be equipped with a learning evaluation in the form of problems that students must solve, and then students must find solutions to produce products from children's fashion courses. Project-Based Learning (PBL) engages students in building knowledge by having them undertake significant projects and create products [17] [18].

According to the description above, media is very necessary for learning. We must adjust the media to align with the learning objectives and choose the appropriate approach. This study involved the development of interactive e-book media based on problem-based learning in the Fashion Design Education program at the Universitas Negeri Medan.

2 Research Methodology

The research on the development of interactive e-book media based on Project-Based Learning was carried out on students in the odd semester of 2023/2024 at the Fashion Design Education Study Program, Universitas Negeri Medan.

This study is research and development (R&D). The ADDIE model serves as the development model in this study. Curricula that aim to teach knowledge, skills, or attitudes can effectively apply the straightforward ADDIE model [19].

The process of developing learning media using the ADDIE model involves five stages: analysis, design, development, implementation, and evaluation [20]. The analysis stage involves carrying out initial observations, analyzing the needs of lecturers and students, and scrutinizing learning materials. The process involves identifying learning media that align with the needs of the target students. The process involves determining learning goals, selecting learning content/materials, assessing the learning environment, and choosing delivery strategies for instruction.

We create new media concepts and development tools during the design stage. We document the design for each learning unit. The documentation includes detailed instructions for implementing the design or creating media. The process involves creating an initial storyboard for an interactive e-book, which is based on project-based learning.

At the development stage, the product (materials, tools) that is in accordance with the model structure is started. Creating instruments to measure product performance and validation of interactive e-book media based on project-based learning carried out by material experts and media experts.

Students participate in product trials during the implementation stage to gauge the media's effectiveness. At the evaluation stage, the achievement of product objectives is measured. The process involves measuring the target's achievements. We are searching for information that can help students achieve good results.

We collect both qualitative and quantitative data in this development research. During the product validation phase, the qualitative data includes input, feedback, critiques, and expert suggestions for improving the learning media, while the quantitative data consists of scores from the material and media questionnaires.

The instruments used in this study were media needs questionnaires and media validation questionnaires. The study employed a Likert scale for measurement (see Table 1) [21].

Table 1. Likert scale

Category	score
Completely agree	5
Agree	4
Disagree	3
Don't agree	2
Completely Disagree	1

We present the media's feasibility as quantitative data, then further analyze it using descriptive information. The techniques for analyzing data include first having media and subject matter experts check the validity of the questionnaire, then putting the collected data into a table, using the feasibility scores from the student questionnaires to draw conclusions, and finally using the results to meet the criteria that were set up front.

3 Results And Discussion

The Children's Fashion course is a practical component of the Fashion Education program, offering students the skills to design and create children's clothing. In accordance with the development of the times, children's clothing models are increasingly diverse, following fashion trends, so this course is very important for students to learn so that they can make children's clothing that is in accordance with the development of fashion trends.

The limitations of children's fashion learning media make it difficult for students to learn children's fashion, especially in children's fashion; students must understand trends, materials, sewing techniques, and designs that are suitable for children's fashion. To assist students in studying children's fashion, the development of interactive e-books based on project-based learning is underway.

The creation of interactive e-books based on project-based learning employs the ADDIE development model. The ADDIE model utilizes a systematic approach, breaking down the learning planning process into several steps: analysis, design, development, implementation, and evaluation.

During the analysis stage, observations and interviews were carried out to examine the curriculum of children's fashion courses and assess the needs of both lecturers and students. Based on the Fashion Design Education Study Program Curriculum, the competencies that must be achieved in the children's fashion course are being able to make children's clothing according to the design.

Based on the observation results, it is evident that there are still many students who are unable to determine the appropriate materials, designs, and sewing techniques for children's clothing. Students also tend to be passive and only learn through

sources from lecturers. Additionally, students often struggle with conducting practicums independently. The results of interviews with lecturers confirmed that, currently, the media for children's clothing courses is still limited. This necessitates the need for learning media that can inspire students to think creatively, such as an interactive e-book that incorporates project-based learning.

The lecturer needs analysis was conducted with 3 lecturers teaching children's fashion courses, while the student needs analysis involved 32 students enrolled in these courses. Based on the questionnaires that were given to students and teachers, the needs analysis shows that 84.27% of students and 89.75% of teachers agree that there is a big need for interactive e-book media based on project-based learning. These percentages suggest that media is crucial for enhancing learning efficiency and effectiveness while also fostering critical, creative, and independent thinking among students.

There are two steps to the design stage: (1) Selecting the material that aligns with the required competencies. The process involves identifying the material required for the development of interactive e-books, which includes designing the initial product and structure of children's fashion materials, collecting these materials, and conducting evaluations. The second step involves selecting the software for the interactive e-book development process. We developed e-books in this study using Canva and Flipbook (see Fig.1).

Fig.1. Children's Fashion e-book cover

The next stage is development, which involves testing the product. During this phase, the interactive e-book media based on project-based learning is validated by material and media experts, followed by testing with small, medium, and large groups. The expert validation results are presented as assessment scores for the components of the interactive e-book media based on project-based learning. Validation by material experts is carried out by 2 lecturers who teach children's fashion courses.

Table 2. Overall results of material validation

No	Aspect	score
1	Suitability of material content	92%
2	Linguistics	84%
3	Language	88,58%

Average (%)	88,20%
Category	Very good

The evaluation of material validation can be seen in Table 2. The validation using expert judgment method showed that the content feasibility aspect received a score of 92%, classified as very good, the linguistic aspect scored 84%, also in the very good category, and the material presentation aspect achieved 88.58%, also in the very good category. The average assessment result from the material experts' validation was 88.20%, falling into the very good category.

Media expert validation was carried out by two fashion lecturers with expertise in their field (see Table 3). The assessment by media experts aimed to evaluate the suitability of the interactive e-book media based on project-based learning for children's fashion courses.

Table 3. Media validation material

No	Aspect	score
1	Graphics	88%
2	Visual Presentation	90%
Overall (%)		89%
Category		Very good

According to the media expert validation results, the visual presentation aspect received a score of 90%, categorized as very good. The graphic aspect scored 88%, also in the very good category. Combining these two aspects, the overall media validation result was 89%, classified as very good.

From the results of the validation of material and media experts, each assessment was obtained, namely 88.20% and 89% with a very good category. These data indicate that the interactive e-book media based on project-based learning is appropriate for use in children's fashion education within the Fashion Design program at the State University of Medan.

The implementation stage involves small, medium, and large group trials. These trials are conducted to identify any shortcomings in the product, allowing for further revisions. The small group trial involved 8 students, the medium group trial was conducted with 16 students, and the large group trial included 32 students.

The small group trial resulted in a score of 92%, categorized as very good. The medium group trial scored 90.5%, also rated as very good, and the large group trial received a score of 89.12%, with very good criteria. Based on these results, it can be concluded that the interactive e-book media based on project-based learning is highly suitable for use in children's fashion education.

The findings of this study align with the view that learning through e-books is more effective and easier for students to comprehend [22][23]. This suggests that project-based learning e-books can be effectively integrated into the learning process. Lecturers can utilize project-based e-books to boost students' motivation and engagement in learning [24]. The use of project-based e-books can enhance students' critical thinking skills [25][26]. Therefore, interactive e-books based on project-based learning are appropriate for use in the learning process.

4 Conclusion

The outcome of this study is the creation of interactive e-book media based on projects for children's fashion courses, utilizing the ADDIE development model. The validity test results from material experts showed 88.20%, classified as very good. Media experts gave a validity score of 89%, also categorized as very good. The small group trial achieved 92%, meeting very good criteria, while the medium group trial scored 90.5%, also in the very good category. The large group trial resulted in 89.12%, with very good criteria. These findings suggest that the interactive e-book media based on project-based learning is suitable for use in children's fashion courses within the Fashion Design Study Program at the State University of Medan. This study has implications for enhancing student engagement in the learning process through features that encourage exploration, collaboration, and creativity. This supports more active and meaningful learning. We advise future researchers to incorporate features like simulation, gamification, and real-time feedback to enhance the interest and effectiveness of e-books.

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