Development of Digital-Based Teaching Materials (Flipbooks) as an Effort to Help Students Learn Service and Smash Skills in Sepak Takraw

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Abstract

This research is based on observations conducted through Google Forms and interviews showing that 97.6% of respondents stated the need for effective and flexible learning innovations. In addition, 100% of respondents stated that flipbook-based digital learning materials have never been used in basic sepak takraw learning techniques. Based on the results of the needs analysis, this study aims to develop flipbook digital teaching materials related to basic service techniques and sepak takraw smash materials. This study applies the ADDIE development model which includes the stages of Analysis, Design, Development, Implementation, and Evaluation. The data analysis techniques used are descriptive quantitative and qualitative. The subjects of this study were fifth-semester students of the physical education, health, and recreation study program with a purposive sample. The final results show that the content/material expert test is in the very feasible category (100%), the design expert test is in the feasible category (88.3%), the media expert test is in the very feasible category (96.7%), and the field practitioner test is in the very feasible category (96.9%). Furthermore, the product trial obtained individual test results of 94.2%, small group test of 95.5%, and large group test of 92.7%, all of which are in the very appropriate category. Thus, this flipbook learning material is considered relevant and appropriate for for use in sepak takraw learning, and is expected to contribute to the Physical Education, Health, and Recreation Study Program, Faculty of Sports and Health, Ganesha University of Education, and sports practitioners in Indonesia.

How to Cite

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INTRODUCTION

Education is a shared responsibility between the community and the government so that its implementation takes place in a planned and systematic manner. Article 31 paragraph (3) of the 1945 Constitution affirms the government's obligation to implement a national education system that increases faith, piety, and noble morals. In line with this, Law Number 20 of 2003 Article 3 states that national education functions to develop the potential of students and form a dignified character and civilization of the nation (Amin & Suraida, 2024). Education can take place formally through schools, and colleges, informally through training, and informally through family and the environment (Raudatus Syaadah et al., 2022).

Physical, Sports, and Health Education (PE) plays an important role in developing students' physical fitness, motor skills, knowledge, and mental, emotional, and spiritual attitudes, as well as fostering a healthy lifestyle (Huang, 2024). Through PE, students are not only fostered in their physical aspects, but also in values such as discipline, creativity, cooperation, and responsibility that support cognitive, affective, moral, and personality development (Rumini et al. 2022). Therefore, PE is a strategic subject at all levels of education that contributes to the achievement of national education goals and needs to be implemented in a planned and responsible manner.

During higher education, students are required to master competencies according to their field of study through a set curriculum. In the Physical Education study program, these competencies generally focus on pedagogic courses that support teaching skills (Teguh Pambudi et al., 2022). Students study various courses as a means of increasing knowledge and experience, and are required to master knowledge and skills, including service and smash techniques in sepak takraw learning.

Sepak takraw is a popular sport in Indonesia and is in great demand by the public. Sepak takraw is a traditional sport that is loved by students and is played by utilizing all limbs, except the hands and arms (Pangestu et al., 2025). In the game of sepak takraw, players are required to master basic 'techniques, especially serving and smash. Serves serve as an initial attack to start the game, while smash is used as the main attack to put pressure on the opponent. Without service mastery, the game cannot go well.

In the rapidly growing digital era, information and communication technology (ICT) plays an important role in education, so the use of technology is an inseparable need (Satyawan et al., 2024). Technological advances are driving a paradigm shift in learning through the use of innovative and interactive media to increase learning effectiveness. The use of technology in the learning process is also applied to PE subjects, where educators can use various digital platforms such as Zoom, Google Classroom, Google Meet, e-learning, and flipbooks to deliver material to students.

Flipbooks are a form of digital media that is structured to support the learning process to make it more interesting and easy to use (Tuhuteru et al., 2023). In addition, according to (Prasasti & Anas, 2023) The advantage of Flipbook lies in its ability as an interactive multimedia that integrates materials, images, videos, evaluations and navigation into a single platform. This media is easy to use, flexible with zoom in and zoom out features, economical, and presents interesting learning variations to prevent students from boredom in the learning process.

Results of the research conducted (Hamidah & Asrohah, 2025) stated that the development of digital flipbook-based teaching materials was declared very feasible to be used based on the acquisition of an average percentage of 91.90%. Furthermore, the research carried out (Diana Rossa Martatiyana, Lina Novita, 2022) stated that the assessment results showed that the validation by learning content experts obtained a score of 97%, design experts 96.1%, and media experts 93.75%. In addition, the results of the product trial included an individual test of 98.6%, a small group test of 97.8%, and a large group test of 97.3%. Based on the results of previous research, it can be concluded that flipbooks are digital teaching materials that are very feasible and effective to use in the learning process.

Based on the results of interviews and observations through Google Form on students of the Penjaskesrek Study Program who have taken sepak takraw courses, it is known that learning includes theory and practice. Commonly used media are still in the form of PowerPoint, e-learning, and video tutorials. Along with the development of technology, respondents stated that flipbook-based digital teaching materials are not yet available to support this learning.
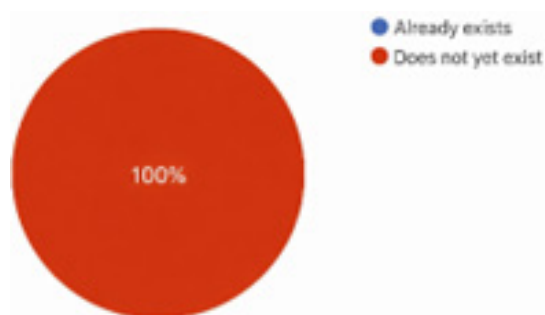
Figure 1. The survey results show that there is no digital-based teaching material for Flipbook.

In addition, as many as 97.6% of respondents stated that flipbook-based digital teaching materials are very important to increase the effectiveness of learning, both theoretical and practical, especially in sepak takraw courses.
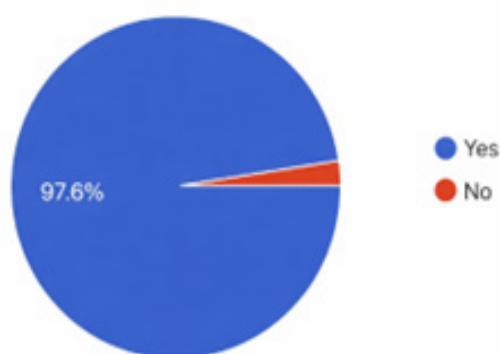
Figure 2. Results of the survey of teaching material needs

Flipbook-based digital learning media is considered an innovative solution to overcome these problems. In addition to presenting material in the form of text, flipbooks are also equipped with interactive visual and audio elements so that learning becomes more interesting.

To overcome various obstacles in learning sepak takraw theory and practice, the researcher developed a digital teaching material entitled Development of Digital-Based Teaching Materials (Flipbook) as an Effort to Help Students Learn Service and Smash Skills in Sepak Takraw. This research aims to produce digital learning media that supports the lecture process, especially in the basic service technique material and smash sepak takraw. The products developed are expected to be a reference for educators in presenting material in a more interactive, interesting, and effective manner.

METHOD

The type of research used is R&D (Research and Development). The R&D method aims to produce a specific product while testing its effectiveness. This research process includes analyzing the needs for product development and evaluating effectiveness so that the product can be widely used by the public (Wardana et al., 2025).

This study uses the ADDIE development model to develop a learning design, which includes five stages: Analysis, Design, Development, Implementation, and Evaluation. The research subjects include students of the Semester V Semester Penjaskesrek Study Program, material experts, design experts, media experts and field practitioner experts.
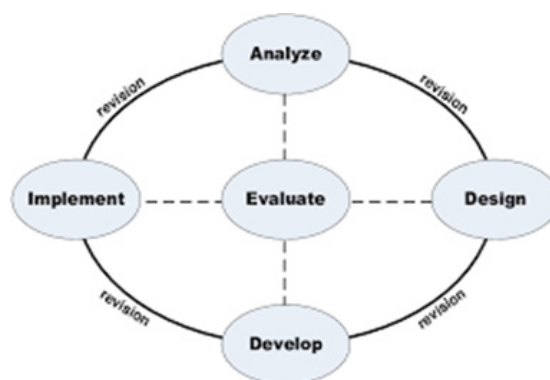
Figure 3. ADDIE Method

In research, there are various types of data analysis techniques, such as qualitative and quantitative descriptive data analysis, and combined data analysis techniques. The selection of data analysis techniques in research can vary, depending on the point of view to be studied. This development research generally has two data analysis techniques, namely:

The research uses qualitative descriptive analysis techniques used to process data from material experts, design, media, practitioners and field tests. Data in the form of input, criticism, and suggestions from the questionnaire were analyzed to be the basis for product revision. Furthermore, quantitative descriptive data analysis techniques are used to process data obtained through questionnaires in the form of descriptive percentages.

$$\text{Presentase} = X\ 100\%\ \Sigma x/(\text{SMI})$$
$$\text{Description} = \Sigma x = \text{Number of Seconds}$$
$$\text{SMI} = \text{Ideal Maximum Score}$$

Furthermore, to calculate the overall percentage of the subject, the following formula is used:

$$\text{Present} = F : N$$

Description :
F = Total percentage of the total subject
N = Number of subjects

This study aims to assess the feasibility of products through questionnaires or questionnaires. Respondents' ratings are collected in the form of Percentages, then converted to a scale of five to determine product eligibility categories, as described in the following **Table 1.**

Table 1. Conversion of achievement level with a scale of 5

Achievement Rate (%)	Qualification	Description
90-100	Highly Worth It	No revision required
80-89	Worthy	Slightly revised
65-79	Quite Decent	Revised to the extent
55-64	Less Worthy	Many things have been revised
1-54	Very Less worthy	Repeated product making

RESULTS AND DISCUSSION

The This development research aims to produce digital teaching materials in the form of flipbooks on basic service and smash techniques in sepak takraw learning. The product development process is carried out by applying the AD-DIE model which includes five stages, namely needs analysis, design, development, application of products in learning, and evaluation to assess the quality, feasibility, and suitability of the teaching materials developed to support the effectiveness of Sepak Takraw learning in higher education.

The first stage of analysis, at the analysis stage, needs were identified through Google Form observation and sepak takraw learning interviews with students of the Physical Education, Health, and Recreation Study Program, Faculty of Sports and Health, Ganesha Education University who have taken TP courses. Sepak Takraw Learning. Findings from observations and interviews revealed that as many as 97.6% of respondents considered digital-based teaching materials as an important need in learning sepak takraw theory and practice, in addition, respondents also stated that during the sepak takraw learning process, the most widely used media included PowerPoint presentations, Learning learning media, and video tutorials. Furthermore, respondents revealed that until now there are no flipbook-based digital teaching materials, both for theory and practice. Therefore, the development of flipbooks is seen as an innovative alternative to overcome these problems, because it is able to combine text with interactive visual and audio elements.

The second stage is the design stage. At this stage, the basic service and smash technical materials that will be applied in the teaching materials are determined, then the hardware and software used in the development process of digital-based teaching materials (flipbooks) are determined. The hardware devices used in the planning stage of this research include smartphones and laptops, while the software devices used include Microsoft Word, Canva, Google Drive, Google Form, CapCut, YouTube, and Flipbuilder. The next stage is designed in the form of storyboards and flowcharts so that the layout, flow, and appearance of teaching materials are systematically formed. Furthermore, the preparation of research instruments was carried out in the form of questionnaires. In the last stage, evaluation questions were prepared for all learning materials using Google Form.

The third stage is the development stage. At this stage, the preparation and preparation of teaching materials is carried out which includes the development of images and videos, the creation of learning videos, the preparation of evaluation questions, and the determination of product design. Furthermore, comprehensive product development was carried out which included the preparation of cover pages, instructions for use, prefaces, table of contents, Chapter I, Chapter II, Chapter III, technical lists, and prop and developer profile pages. The results of this stage are in the form of digital-based teaching materials in the form of flipbooks on basic service techniques and sepak takraw smash materials. The products that have been developed are then validated by experts and experts using questionnaires and questionnaires that have been prepared. The validators involved are lecturers from Ganesha Education University in accordance with their fields of expertise, namely Dr. I Ketut Semarayasa, S.Pd., M.Or., AIFO-P as expert 1 and Dr. I Made Satyawan, S.Pd., M.Pd. as expert 2. After being declared eligible, an expert test was then carried out to assess the feasibility of the flipbook teaching materials, which was carried out by experts, as experts in learning content/material Mr. Dr. I Ketut Semarayasa, S.Pd., M.Or., AIFO-P, . as learning design experts Mr. Prof. Dr. I Made Tegeh, S.Pd., M.Pd. as learning media experts, Mr. Dr. Kadek Yogi Parta Lesmana, S.Pd., M.Pd., AIFO-P, as a field practitioner expert, Mr. Dr. I Made Satyawan, S.Pd., M.Pd. from the results of the validity test by experts got the following percentage **Table 2.**

Table 2. Results of Expert Test Results

Research Subject	Product Eligibility (%)	Remarks
Expert in Learning/ Material Content	100 %	Highly Relevant
Learning Design Expert	88,3 %	Relevant
Learning Media Member	96, 7 %	Highly Relevant
Expert Field Practitioner	95, 9 %	Highly Relevant

The fourth stage of the Implementation stage, The implementation stage is the process of implementing flipbook-based digital teaching materials that have been developed. At this stage, teaching materials are used in accordance with the functions and purposes that have been designed. Implementation is carried out through three trial stages, namely individual trials, small groups, and large groups. The subjects in the trial were students in the fifth semester of the Physical Education Study Program, Health and Recreation, Faculty of Sports and Health, Ganesha Education University. From the results of the trial, the percentages were obtained as follows T**able 3**.

Table 3. Trial percentage results

Research Subject	Product Eligibility (%)	Remarks
Individual Trials	94, 2	Highly Relevant
Small Group Trials	95, 5	Highly Relevant
Large Group Trials	92, 7	Highly Relevant

At the evaluation stage, based on the results of the feasibility test of flipbook-based digital teaching materials, it is assessed through a final evaluation of the product developed based on the assessment of content experts, media, design, and field practitioners, as well as trials for students in the fifth semester of the Penjaskesrek Study Program. Expert and student input is the basis for determining teaching materials in the TP Sepak Takraw Learning course, especially basic service and smash technique materials. The results of validity and feasibility show that flipbook-based teaching materials are included in the very feasible category. With these results, it can be concluded that digital-based teaching materials (flipbooks) on basic techniques in sepak takraw learning can be used to support the learning process. and Revisions based on the input of design experts and the results of tests on students are still carried out to obtain optimal results in the development of flipbook-based digital teaching materials.

Figure 4. Flipbook Development Results

This digital flipbook can be accessed via the following link: Basic Service Techniques *https://go.undiksha.ac.id/e5j8r* and Basic Smash *https://go.undiksha.ac.id/R9voj* The use of this digital flipbook teaching material involves several steps, namely: 1). Read and understand the learning outcomes and objectives of each material, 2). Read and understand the material in each chapter, 3) Read and understand the material summary containing key points that relate to the learning objectives, 4) Click the link and watch the tutorial video available for each learning material, 5). Complete the formative assessment exercises in the form of a link form in each chapter.

This flipbook contains the following elements: 1). Cover, 2). Instructions for Use, 3). Preface, 4). Table of Contents, 5). Chapter 1, which contains the definition, history, aspects of sepak takraw, summary, and evaluation of Chapter I, 6). Chapter II Discussion of basic techniques containing Definitions, implementation techniques, photos, tutorial videos, summaries, and Chapter II Evaluation, 7). Chapter III containing Conclusions, 8). Bibliography, 9). Development Profile and Demonstrator Profile.

Research conducted by (Andi Rustandi & Rismayanti, 2021) stated that e-modules are able to increase students' motivation and interest in learning through the presentation of structured, interesting, and interactive materials. According to research (Delita et al., 2022) also stated that the use of technology in learning media makes a significant contribution to improving the quality of learning and is an important element in optimizing learning potential in the digitalization era. This is in line with (Belva Saskia Permana dkk ., 2024) which emphasizes that electronic teaching materials represent a form of teacher innovation

in answering the demands of learning in the 21st century and the era of the Industrial Revolution 4.0. Teachers who have creativity are able to develop modern digital learning tools, such as flipbooks. In terms of substance, digital teaching materials still contain the same components as printed teaching materials, including KD, GPA, materials, and exercises, but have advantages in the form of ease of access and more interactive nature.

According to (Ramadhina 2022) Flipbooks are one of the innovations from conventional textbooks that are interactive. Flipbooks have different characteristics compared to conventional textbooks. Textbooks tend to have limitations in terms of appearance, compilation process, and use in learning. In addition, printed books are relatively perishable and less able to attract students' interest in learning. On the other hand, flipbooks are presented in an interactive digital form that combines text, images, and videos, so that they can increase students' interest in the learning process (Pertiwi et al. 2018). In addition, (Agustina & Fitrihidajati, 2020) also stated that the additional advantages of this teaching material lie in the presentation of the material in the form of sentences and visuals, ease of mobility, and its ability to increase student involvement in the learning process.

According to (Roemintoyo & Budiarto, 2021) The ADDIE model consists of five main stages, namely Analysis (analysis), Design (design), Development (Development), Implementation (Implementation), and Evaluation (evaluation). This model emphasizes a structured and sequential learning approach, where each stage has an interrelated role, ranging from analyzing student needs, planning strategies and teaching materials, developing learning products, to evaluating and improving learning outcomes.

Based on the results of validity tests by experts, and trials on students to develop flipbook-based digital teaching materials were declared suitable for use. These findings are in line with previous research that showed that flipbook media is engaging, validated, and highly suitable for learning. This is in line with research (Afwan et al., 2020) The development of flipbook digital learning media by integrating local history material 'Kalianda 5 Hour Battle' in one of the high schools in Kalianda City, Flipbook digital learning media has proven to be effective and efficient to use in the learning process. Furthermore, in line with the research (Ramadhina, 2022) Development of Flipbook Application-Based E-Modules in Elementary Schools The results of the

small-scale product implementation test obtained 90.75% and 86.90% results in large-scale tests. It can be concluded that digital flipbook-based electronic modules (e-modules) are in the very feasible category.

CONCLUSION

Based on the above explanation, it can be concluded that the research conducted is R&D research that produces a product in the form of Flibook digital-based teaching materials. After validation by subject matter experts, learning design experts, learning media experts, and field practitioners, as well as individual trials, small group trials, and large group trials, the results were rated as excellent, making the digital flipbook-based learning media very suitable for use in the sepak takraw learning process. The availability of this digital teaching material based on flipbook can provide a new atmosphere in the physical education learning process, especially in the material on serves and smashes in sepak takraw.

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