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The Development of an E-Module for Physical Education and Health on the Topic of Physical Activity in the Context of the Merdeka Curriculum Adaptation

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Abstract

This research is intended to create an E-Module for Physical Education (PE) on physical activity games in alignment with the Merdeka Curriculum, which offers a flexible, student-centered educational approach. In the context of PE, badminton not only enhances physical fitness but also helps to shape students' character and moral values. The development of this E-Module It adopts the ADDIE model, encompassing analysis, design, development, implementation, and evaluation phases. A total of 84 seventh-grade students were selected as samples, divided into a limited trial group and a field trial group. Data collection was carried out using questionnaires. The findings of the study show that the PE badminton E-Module is highly effective when the development was carried out using the Research and Development (R&D) model following the ADDIE framework approach. This E-Module is specifically designed for seventh-grade students and integrates multimedia elements such as text, images, videos, audio, and interactivity, making it easy to use both in the classroom and at home. The validity of the E-Module is high, with scores of 90% for content, 85% for language, and 90% for media. The practicality of the E-Module is also rated very well with a score of 90%, demonstrating its ease of use for both teachers and students. Its effectiveness in improving students' understanding and motivation was proven, with a score of 92%. This E-Module is highly effective and serves as a valuable learning tool in PE, offering an engaging and interactive learning experience.

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INTRODUCTION

Education is one of the crucial aspects in the development of a nation (Bangun, 2016), play a central role in shaping a young generation that is understanding, skilled, and ethical, so that they can be productive and responsible parts of society (Pitnawati et al., 2023). In Indonesia, the National Education Law has become a fundamental foundation in the structure of education (Arisandi, 2014), establishes a framework for curriculum, evaluation, funding, and education management, while defining the role of the state, government, community, and family in supporting the national education system. The subject of Physical Education (PE) in addition to maintaining physical fitness, also focuses on shaping the character and moral values of students (Habibie, 2017). However, the effective implementation of Physical education faces significant challenges (Meo, 2019), especially in the implementation of the Independent Curriculum which requires a paradigm change from the traditional education system to a more flexible and innovative approach (Oktadinata et al., 2024; Umar et al., 2023).

These challenges include the lack of educational infrastructure, uneven distribution of facilities, and the lack of human resources and interactive learning resources such as E-Modules. This research is important to answer these challenges by developing an E-Module that can integrate sports theory and practice in an attractive and interactive digital format. E-Module is expected to enrich students' learning experience, improve their understanding of the concept of PE, and overcome the limitations of facilities and resources in schools, especially in remote areas. Several previous studies have highlighted the importance of technology integration in education (Machfud et al., 2023). According to data from the Indonesian Ministry of Education and Culture, there is an inequality in the distribution of sports facilities between schools in urban and rural areas.

A survey by the Indonesian Internet Service Providers Association (APJII) shows that internet penetration in Indonesia reaches around 64,8% (Tri Suminar, 2016), However, the use of information technology for education is still limited. In addition, a study in the Journal of Adolescent Health found that increased use of digital devices was associated with decreased physical activity among adolescents (Makitan et al., 2024), demonstrates the need to balance the use of technology with physical activity. Although technology has great potential in education, its unbalanced use can reduce physical activity and social interaction of students (Lin et al., 2017). Therefore, there is a need for an approach that integrates technology with physical activities, ensuring the benefits of technological advances without sacrificing the physical health and social development of students. This gap shows that much still needs to be done to ensure that technology is used effectively and in a balanced manner in education.

This research aims to develop an E-Module that focuses on badminton as part of PE subjects. This E-Module is expected to increase the effectiveness of the teaching and learning process, provide an interesting learning experience, and produce optimal learning outcomes. With the implementation of a comprehensive and interactive E-Module, it is hoped that PE education can be more effective in forming a young generation who are physically healthy, tough in character, and have high integrity.

METHODS

This research is designed as a development research that aims to produce valid and effective products to improve the character of students. The product developed in this study is a teaching

material in the form of a mathematical comic containing Pancasila values for grade IV elementary school students on the surface area and rectangular and triangular area material. The research utilized the ADDIE model as the research and development framework, consisting of five stages (Arsanti, 2018). The study employed the ADDIE model (Branch, 2010) as the research and development approach, which includes five stages. The research participants were 29 fourth-grade students from SDN Sampangan 02 Semarang, Indonesia. Among them, six students took part in a limited trial, while 23 students participated in a larger-scale trial.

The research method with ADDIE as the model of this research (Benuf & Azhar, 2020). The steps involved in the research are as follows: Analyze, which focuses on analyzing various components related to the development of the module; Design, where the module is created, including elements such as the front page, glossary, concept map, introduction, learning activities, badminton game lessons, practice questions, and evaluation; Development, the stage where the learning materials are realized, including the creation of a PDF version of the module that integrates audio and video content, accessible online through a scannable barcode or by typing the provided video link; Implementation, which involves field testing with both small and large groups; and finally, Evaluation, which is used to assess the success and alignment of the product with the expectations and the implementation process

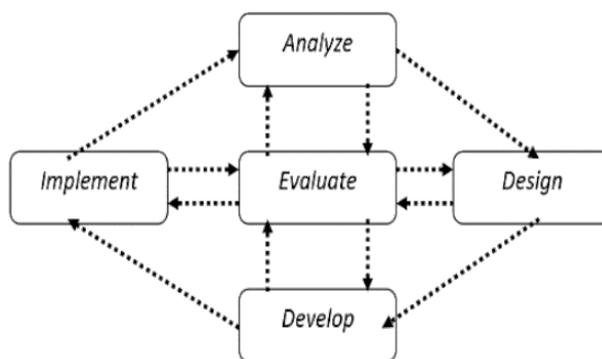


Figure 1. ADDIE model

The development of the E-Module of PE subjects on badminton game activity materials adapted to the Independent Curriculum using the ADDIE. In the Analysis stage, data is collected through interviews and observations to understand learning needs (Chen et al., 2023). The results of the analysis show the need for more visual and interactive learning tools to explain the basic techniques of badminton.

The Design stage involves designing product specifications, including learning objectives, content, assessment tools, as well as the structure of the e-module with attractive media (Jian et al., 2023). In the Development stage, teaching materials are developed through pre-production, production, and post-production, and are tested internally by material, language, and media experts, and then revised based on feedback. Implementation involves field trials with students to gather input and make further revisions before official implementation in the classroom.

Finally, the Evaluation stage includes formative and summative evaluations to assess the effectiveness of the e-modules, using evaluation instruments that identify strengths and weaknesses, and compiling a full report of the evaluation results with recommendations for further development

(Sanad & Musleh Al-Sartawi, 2023). This e-module is specifically designed for grade VII students and integrates multimedia elements such as text, images, video, audio, and interactivity, making it easy to use in the classroom and at home, with high validity and practicality, as well as effectiveness in increasing students' understanding and motivation.

The data in this study consisted of validation results from material, language, and media experts regarding the feasibility of the developed product, as well as a questionnaire on the use of comics as teaching materials distributed to students and teachers. The data collection instrument employed was a questionnaire utilizing the Likert scale. The data collected were quantitative, used to assess the quality of the E-module, including its feasibility and effectiveness. Data analysis was conducted to evaluate the validity of the developed product. This study includes both qualitative and quantitative data. Qualitative data comprises feedback and suggestions from material and media experts, which were used to enhance the product. Additionally, quantitative data analysis involved using the assessment scores from the questionnaire responses provided by material experts, media experts, and students, based on the Likert scale. The process included converting the questionnaire scores into numerical values for further analysis.

RESULT AND DISCUSSION

The identification of the gap between the current learning conditions and the ideal needs indicates the need for more comprehensive and interactive e-modules to improve learning effectiveness. The review of the existing teaching modules highlights the need for improvement in the clarity of learning objectives, material adjustments, the use of interactive media, details of facilities and infrastructure, as well as simpler assessment methods and language. In the design stage of PE learning e-module for badminton material, specific, measurable, and relevant learning objectives are set, including basic badminton techniques, game strategies, and fair play values, so that the material presented is comprehensive and effective. The structure of the e-module is designed with easy-to-understand page layout, navigation, and order of materials, using formats and media such as text, images, videos, and interactive elements to make the e-module more engaging and effective. Assessment tools are designed to measure students' understanding and skills as well as observation sheets to assess students' engagement and interaction during the use of e-modules, ensuring learning effectiveness. Detailed learning content, including explanations, examples, and illustrations, as well as interactive exercises and quizzes are designed to test learners' understanding, ensuring mastery of the material. A final evaluation that assesses learners' achievement after completing the e-module provides useful feedback for further improvement.

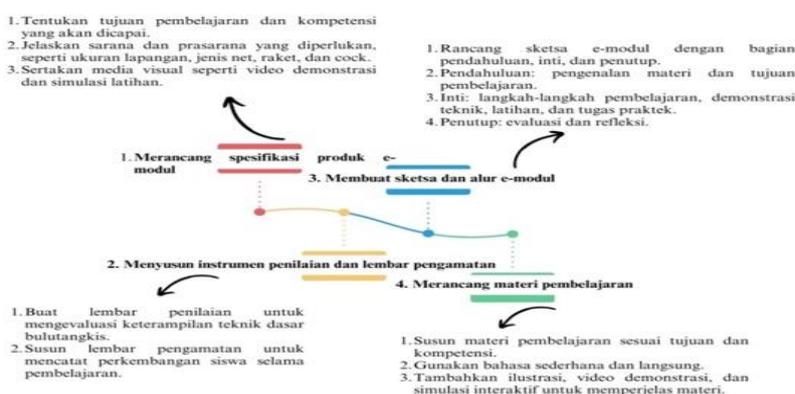


Figure 2. Stages of product design

In the development stage of PE learning e-modules, the development of teaching materials is carried out through three main stages: pre-production, production, and post-production (Sanad & Musleh Al-Sartawi, 2023). In the pre-production stage, the learning objectives and competencies to be achieved are determined, including basic badminton techniques, game strategies, and fair play values. In the production stage, e-modules are designed using Canva to produce attractive and professional designs, which are then downloaded in PDF format. Furthermore, the e-modules are submitted to Hyzine PDF to Flipbook to integrate video and audio, creating a more interactive learning experience. This process ends with the creation of a product barcode for easy access.

In the development of PE learning e-module content, the first step is to create informative and easy-to-understand texts to ensure that students understand the material clearly, including basic badminton techniques, game strategies, and sportsmanship values. Images, videos, and audio that support learning are produced to enrich the content and make it more engaging. In the PE learning e-module development stage, an internal trial was carried out by involving material, language, and media experts to assess the quality and suitability of the e-module content. Eval Edmizal, S.Pd, M.Pd acted as a material validator, Dr. Yenni Hayati, SS, M. Hum as a language validator, and Ramadhani Fajri, S. St., M. Ds as a media validator. The feedback gathered from these experts is used to correct shortcomings and improve the quality of e-modules, ensuring that the products meet academic and pedagogical standards. This validation process ensures that the e-module is ready to be used effectively in learning. Furthermore, the e-module is revised based on suggestions and inputs from experts and early users to ensure optimal function and fulfillment of learning needs, so that it becomes more effective and beneficial for learners and educators.

The following for the validation results of several experts can be seen in the table below:

Table 1. Validation results in each aspect

Aspects	Validation Results
Material Validity	90%
Language Validity	85%
Media Validity	90%
Practicality	90%
Effectiveness	92%

In the implementation stage of the PE learning e-module, a field trial was carried out by involving 19 grade VII students of SMPN 30 Padang to observe the use of the e-module in a real environment, collect feedback, and identify areas of improvement before wider implementation. Discussions and questionnaires are used to get feedback from students and educators regarding the effectiveness and experience of using e-modules, which are then used to improve the product. The official implementation of the e-module was carried out in grade VII of the UNP Padang City Laboratory Development Junior High School involving 84 students, as well as conducting a practicality test to assess the application and interaction of students and educators with the module.



Figure 3. QR Products

In the evaluation stage of the PE learning e-module, a formative evaluation is carried out by examining the implementation process, conformity with the plan, and progress towards the research objectives to ensure that each stage runs well. The summative evaluation aims to assess the success and effectiveness of e-modules in improving learning and achieving the expected results. The use of evaluation instruments to measure the practicality of e-modules helps determine how easy and effective the modules are to be used in daily learning, as well as analyze the results of the evaluation to find aspects that need to be improved. A full report of the evaluation results covering strengths, weaknesses, and recommendations for further development is documented to provide guidance for future improvements, ensuring that e-modules are continuously improved and adapted to the needs of learners and educators.

CONCLUSIONS

This study developed an e-module for PE on badminton, aligned with the Merdeka Curriculum. Using the ADDIE model (Analysis, Design, Development, Implementation, Evaluation), the e-module integrates multimedia elements (text, images, video, audio) to enhance student engagement. Results show the e-module is valid (90% for content, 85% for language, 90% for media), practical (90%), and effective (92%) in improving student understanding, motivation, and learning outcomes. It offers an interactive and flexible learning tool for both students and teachers.

CONFLICTS OF INTEREST STATEMENT

The authors declare that there are no conflicts of interest. All co-authors have reviewed and approved the content of the manuscript, and there are no financial interests to disclose. We affirm that the submission is original and not currently being reviewed by any other publication.

AUTHOR CONTRIBUTIONS

Rattu Vemilla Aino was responsible for conceptualization, methodology, data analysis, and drafting the original manuscript, as well as preparing the final manuscript. Yanuar Kiram contributed to supervision, methodology, and reviewing and editing the manuscript. Donie played a significant role in data collection, project administration, and supporting the development of the e-module. Nuridin Widya Pranoto was involved in validating the results, critically reviewing the manuscript, and assisting with data interpretation. All authors have read and approved the final manuscript.

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