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## Development of physical education e-modules for students of the Islamic early childhood education program: utilisation of the FlipHTML5 application

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### ABSTRACT

**Background:** This study addresses the gap in independent learning materials for Early Childhood Islamic Education (PIAUD) students, particularly the absence of physical education modules that integrate teachings from the Quran and Hadith. **Research Objectives:** The research aims to develop an interactive e-module designed to facilitate independent learning while aligning with Islamic values. **Methods:** Using the ADDIE model, which includes analysis, design, development, implementation, and evaluation stages, the study involved a sample of 50 PIAUD students. Data was collected through observations, interviews, student response questionnaires, and expert validation forms for Islamic and physical education. Both qualitative and quantitative methods were used to assess student engagement, content relevance, ease of use, and the module's overall effectiveness. **Findings/Results:** The results demonstrated that the e-module significantly improved student engagement and learning outcomes, particularly by integrating Islamic teachings into physical education. Feedback from students and experts confirmed that the module was relevant, user-friendly, and effective in promoting independent learning. **Conclusion:** The study concludes that the interactive e-modules incorporating Islamic values can enhance independent learning for PIAUD students, and it recommends the development of similar modules for other subjects while advocating for the broader integration of Islamic principles in modern educational tools.

**Keywords:** Independent learning; e-module; qu'ran; hadith; physical education

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## INTRODUCTION

In the context of Perguruan Tinggi Keagamaan Islam Negeri (PTKIN), physical education courses are a relatively new addition and lack adequate learning resources to support students. This gap poses a significant challenge, as PTKIN students do not have access to physical education modules that align with Islamic teachings. In response, there is a pressing need to develop physical education modules tailored to this environment, aiming to strengthen students' independent learning (Li & Liu, 2024; Shimon, 2019). As the world transitions into Industry 4.0, where technology plays a pivotal role, it is essential to create modern educational materials that leverage technological advancements (Almeida & Simoes, 2019). These modules should be designed to be

accessible via mobile platforms, such as the FlipHTML5 application, enabling flexible and independent learning for students (Aprilisa, 2020; Aulinda, 2020; Setiawardani et al., 2021).

To further support the development of physical education modules aligned with Islamic teachings, it is important to consider the philosophical and spiritual underpinnings of physical activity in Islam. Physical education, from an Islamic perspective, is not just about enhancing physical fitness but also about maintaining overall well-being in accordance with the principles of Islam. Islamic teachings encourage the holistic development of an individual—physical, mental, and spiritual (Hadi, 2020; Saputra et al., 2022). The concept of physical and spiritual health is central in Islamic thought, emphasising the importance of caring for one's body as an act of worship, as it is a gift from Allah (Isgandarova, 2012). Therefore, physical education in PTKIN should not only focus on sports skills but also integrate ethical and moral dimensions that align with Islamic values, such as discipline, fairness, and teamwork, which are integral to many physical activities.

Moreover, in the context of Islamic teachings, physical education can be framed within the concept of worship, where maintaining physical fitness is seen as a form of stewardship over one's body. This is reflected in the Hadith of Prophet Muhammad, which encourages physical activity such as swimming, archery, and horseback riding as recommended activities for Muslims (Insaf & Ashath, 2024; Tomar, 2018). By incorporating these values, physical education modules tailored to PTKIN students can cultivate not only physical competence but also reinforce Islamic virtues. The integration of Islamic principles into physical education also aligns with the broader goals of Islamic education, which seeks to develop well-rounded individuals who are capable of contributing positively to society while upholding Islamic ethical standards (Moslimany et al., 2024).

In addition, the rise of Industry 4.0, characterised by rapid technological advancements, offers a unique opportunity to modernise the way physical education is taught. The use of e-modules accessible through platforms like FlipHTML5 represents a shift towards more interactive, self-directed learning environments (Masykur et al., 2024; Wulansari et al., 2023). This approach is particularly beneficial in promoting independent learning among PTKIN students, who may face unique challenges related to balancing academic pursuits with religious commitments. E-modules designed with Islamic values in mind not only provide culturally relevant content but also foster flexibility in learning, allowing students to engage with the material at their own pace and in a manner that respects their religious practices (Huriyah et al., 2022). This blend of technological innovation and religious relevance can significantly enhance the educational experience for PTKIN students, offering them a more personalised and meaningful approach to physical education.

Several studies have highlighted the positive impact of module development on students' academic progress, particularly in fostering critical thinking and independent learning (Azizah & Handayani, 2020; Fauziah & Wulandari, 2022; Gola et al., 2022). However, a key gap in the literature is the lack of physical education modules that integrate Islamic teachings. The researcher measured improvements in students' critical thinking and self-learning skills, finding positive correlations between the module usage and students' outcomes. However, these studies did not incorporate religious or cultural values, which is particularly relevant for PTKIN students. A search of Scopus data, Google Scholar, PoP tool revealed no studies combining physical education with Islamic values, highlighting a need for research in this area. The absence of such modules in repuTable

academic literature indicates a significant research opportunity, particularly for PTKIN students, who require materials that are culturally and religiously relevant (Hamad et al., 2019).

The objective of this study is to develop an e-module for physical education that is aligned with Islamic teachings, designed to enhance the quality of learning for PTKIN students. This module is intended to simplify teaching and learning activities by organizing content in a way that aligns with expected learning outcomes (Kuswanto & Pratiwi, 2020). By incorporating Islamic values into physical education, this research aims to address the current gap in educational resources while supporting the development of independent learning (Engeness, 2021; Gola et al., 2022). Additionally, the use of FlipHTML5 technology offers mobile-friendly access, ensuring students can engage with the material anytime and anywhere (Amin et al., 2022; Nurhayati et al., 2022).

The novelty of this research lies in its integration of Islamic values within a physical education module, something that has not been explored in previous studies. Furthermore, the use of modern technology, such as FlipHTML5, to facilitate independent learning in a mobile-accessible format is a significant innovation. By addressing the lack of culturally relevant physical education resources, this study not only contributes to the academic field but also provides practical solutions for improving student engagement and learning outcomes within the PTKIN environment (Ghavifekr & Rosdy, 2015; Manca & Ranieri, 2016). The potential impact of this research is far-reaching, offering a unique contribution to both physical and Islamic education by enhancing learning efficiency and inclusivity.

## METHOD

This research employed the Research and Development (R&D) method, utilising the ADDIE model as the framework for developing the e-module (Rayanto, 2020). The R&D approach ensures a structured process, and the ADDIE model consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. In the Analysis phase, the researchers identified the need for physical education modules that integrate Islamic teachings, as current materials do not address this gap. The Design phase focused on creating content that incorporates physical education with teachings from the Quran and Hadith, while ensuring user-friendly features for PIAUD students. In the Development stage, the e-module was created using FlipHTML5 to enhance interactivity and accessibility for Android devices. The implementation stage involved testing the e-module with selected students to evaluate its usability and effectiveness. Finally, the Evaluation phase gathered feedback from students and experts in both Islamic education and physical education, allowing for improvements and validation of the module.

The population in this study comprises Early Childhood Islamic Education (PIAUD) students who need independent learning materials, particularly those related to physical education integrated with Quranic and Hadith teachings. The research sample consisted of 50 students, selected through purposive sampling, targeting students who lacked access to relevant learning resources. The trial of the e-module was conducted with these 50 PIAUD students in both classroom and home learning environments to test the module's usability across different settings. The feedback obtained from these trials played a critical role in refining the module before its final implementation.

Data analysis in this study used qualitative and quantitative methods. We obtained qualitative data through observations and interviews, and quantitative data through expert validation analysis and product trial analysis. We analysed the expert validation data from the questionnaire to evaluate the content feasibility, material systematics, module design suitability, and language accuracy. Table 1 presents the assessment score

for each answer choice in the expert validation assessment score. Table 2 delineates the eligibility requirements for the average analysis.

Table 1. Expert Validation Assessment Score (Modified)

Score	Eligibility Answer Choices
4	Very Good
3	Good
2	Pretty Good
1	Not Good

Table 2. Expert Validation Criteria

Quality Score	Eligibility Criteria
$3.26 < \bar{x} \leq 4.00$	Very Worth Using
$2.51 < \bar{x} \leq 3.26$	Proper to Use
$1.76 < \bar{x} \leq 2.51$	Not Suitable for Use
$1.00 < \bar{x} \leq 1.76$	Not Suitable for Use

The student response questionnaire has answers according to the content of the questions. Each attractiveness answer option has a different score regarding the suitability of the product for the user. The assessment scores can be seen in Table 3.

Table 3. Trial Assessment Score

Score	Attractiveness Answer Choices
4	Very Interesting
3	Interesting
2	Less Attractive
1	Not Attractive

The results of the assessment scores from each student was averaged and then converted into a statement to determine the attractiveness of the product being made. Converting scores into assessment statements is as follows in Table 4.

Table 4. Criteria for Attractiveness Test (Modified)

Quality Score	Questions Quality Aspects of Attractiveness
$3.26 < \bar{x} \leq 4.00$	Very Interesting
$2.51 < \bar{x} \leq 3.26$	Interesting
$1.76 < \bar{x} \leq 2.51$	Less Attractive
$1.00 < \bar{x} \leq 1.76$	Not Attractive

## RESULTS AND DISCUSSION

### Need Analysis

The results of this study are presented descriptively and require analysis and interpretation before further discussion. E-modules play a crucial role in every lesson, particularly in supporting the smooth running of the teaching and learning process. The development of e-modules is carried out using a more systematic and structured learning model. Since the physical education e-module is specifically designed for PIAUD students, the material presented in this e-module helps students to develop motor skills in early childhood education. Previous studies have shown that learning modules, especially e-modules, have a positive impact on students' academic progress and can enhance critical thinking skills as they are designed for independent learning (Farida et al., 2020; Fauziah & Wulandari, 2022; Gola et al., 2022). However, to date, no research has specifically examined the development of physical education e-modules that are designed with an Islamic approach. This indicates a significant need to develop physical education learning modules that align with Islamic values, especially for PTKIN students.

The importance of an Islamic approach in this module is emphasised because it provides cultural and religious relevance for PTKIN students. This approach helps increase student engagement and motivation by making the learning experience more aligned with their personal beliefs (Hamad et al., 2019). This is consistent with research showing that culturally relevant learning materials can significantly improve the effectiveness of e-learning programmes (Al-Samarraie et al., 2018). The use of FLIPHTML5 technology, which allows access via smartphones, ensures that this module meets the needs of the Industry 4.0 era, where digital technology plays a significant role in education (Ghavifekr & Rosdy, 2015). By facilitating independent and flexible learning, this module supports students in accessing material anytime and anywhere, which is crucial for improving learning efficiency and effectiveness (Aguilera-Hermida, 2020). This study aims to address a gap in the literature by developing a physical education e-module based on an Islamic approach. The module is designed to assist PTKIN and international Islamic university students in learning physical education in a way that is relevant to their beliefs, while also leveraging modern technology to facilitate flexible, interactive, and independent learning.

### Design

After obtaining the analysis results, the next stage is the design stage. The design stage of the physical education E-module development product for PIAUD students, namely: Making the E-module in the content section using *Microsoft Office Word 2013*, the paper size used is A4, 1.5 spacing, the typeface used is *Arial*. Preparing the E-module design begins with compiling a framework consisting of an initial section, content section and closing section.

The research instrument for this product development is a questionnaire prepared to evaluate the E-module that has been created. Preparation of instruments based on aspects adapted to the objectives of each questionnaire. The instrument prepared was a validation questionnaire for material and media experts. The questionnaire that has been prepared is given to experts when reviewing the E-module before testing in the field. After the E-module has been validated by experts, it is then tested on students with a response questionnaire to the E-module. The E-module quality assessment instrument that has been developed is in the form of a check list questionnaire for material experts and media experts. At the beginning of designing the assessment instrument, a questionnaire grid was prepared. Next, questionnaires were given to experts to determine the quality of the E-module and questionnaires were given to students to determine student responses to the E-module that had been developed.

### Development

#### Editing

At the development stage, the E-module begins to be created based on the design at the design stage <https://online.flipbuilder.com/ywoi/mwhq/> Activities carried out at the development stage are: Making an E-module Draft . At the E-module drafting stage, the outline of the contents of the E-module is packaged into a physical education E-module for students. Where physical education includes materials that are tailored to the outcomes of PIAUD study programme graduates. The front cover consists of the E-module title, image and author's name. After completing the writing and preparation stages of the E-module, a prototype or initial draft of the E-module is obtained. The initial E-module draft then underwent a validation stage to obtain suggestions for improvements regarding the E-module that has been created. Next, the initial E-module draft is revised according to the validator's suggestions until the E-module is ready to enter the field.

**Validation**

After the E-module draft has been completed, the next stage is validation. The stage carried out was a feasibility test of the E-module with validation by several experts. The purpose of this validation is to ask for suggestions and input from experts regarding the E-module being created. Validation was carried out by 6 experts, namely 3 material experts and 3 media experts. The material experts are Professors in Sports, Professors in Early Childhood Education, and Doctors in Sports and Health. Meanwhile, media experts are Doctors of Educational Technology who are experts in the field of educational design. The validation results of material experts and media experts are as follows:

**Table 5 . Material Expert Validation Results**

Aspect	Analysis	Validator		
		1	2	3
Content, Presentation, and Language	$\sum$ Score	35	46	41
	$x_i$	2.9	3.8	3.4
	$\bar{x}$	3.38		
	Criteria	Very Worth Using		

**Table 6. Media Expert Validation Results**

Aspect	Analysis	Validator		
		1	2	3
E-module Design	$\sum$ Score	62	61	65
	$x_i$	3.2	3.2	3.4
	$\bar{x}$	3.29		
	Criteria	Very Worth Using		

**Implementation**

**Product testing**

After the product was validated and declared feasible by the validator, the physical education E-module for PIAUD students was tested on UIN Raden Intan Lampung students. The trial carried out was a small group test consisting of 30 PIAUD students. Large group trials will be carried out on 60 PIAUD students. With result:

**Table 7. Product Testing Results**

Trials	N	Value	Grades
Small Scale	30	3.35	Very Interesting
Big Scale	60	3.39	Very Interesting

**Evaluation**

The next stage of the ADDIE model is evaluation. The evaluation was conducted by analysing data from the needs analysis, product design, expert validation on materials and media, and the results of student response questionnaires. Evaluation occurred throughout all stages and concluded when student responses to the e-module indicated highly positive feedback, confirming that the e-module was ready for classroom use. The results of this study emphasise the importance of providing flexible access to learning materials for PIAUD students, allowing them to study independently at their own pace. Through the FlipHTML5 platform, students engage with interactive content such as images, videos, and animations, enhancing their involvement in the learning process and improving material comprehension. This flexibility accommodates various learning styles, supporting visual, auditory, and other learner preferences. These findings suggest

that the use of e-modules not only increases student engagement but also enhances learning outcomes, particularly for PIAUD students.

This research supports previous studies that highlight the advantages of e-modules and technology-based learning tools in offering flexibility and engaging content (Priyono et al., 2022). Consistent with Aprilutfi's research, the study shows that platforms like FlipHTML5 accommodate diverse learning styles and provide current, relevant content (Aprilutfi, 2022). Additionally, this study builds on Conole et al. by emphasizing the importance of interactive learning tools that offer quality educational material (Conole et al., 2004). A novel aspect of this research is the integration of Islamic values, which few studies have explored in e-learning tools for PIAUD students, however, there are limitations. First, this study did not directly measure the academic performance of students after using the e-module. While engagement and satisfaction were assessed, the actual impact on learning outcomes remains unquantified. Additionally, the study's focus on PIAUD students may limit the generalisability of its findings to other educational contexts. Access to technology could also be a limitation, as students with limited internet connectivity may face difficulties in fully utilising the e-module. An alternative interpretation of the results suggests that increased student engagement may stem from the novelty of the digital platform itself, rather than the content of the e-module. The integration of Islamic values may also have contributed to student motivation, enhancing the learning experience through cultural and religious relevance. These factors may have played a role in the positive outcomes, independent of the e-module's technical features.

Future research should focus on quantifying the e-module's impact on students' learning outcomes in physical education for PIAUD. Further exploration could also address the integration of Islamic values in other academic subjects using technology-based learning tools. Research could investigate solutions to overcome technological access limitations, especially for students in underserved areas. Expanding the study to different educational settings would enhance the generalisability of the findings. Longitudinal studies could assess the long-term impact of e-modules on academic performance, skill development, and self-regulated learning.

In conclusion, this research demonstrates the potential of e-modules, when combined with platforms like FlipHTML5, to improve the learning experience for PIAUD students. By offering interactive content and accommodating different learning preferences, e-modules can support independent learning. However, addressing technological limitations and measuring academic outcomes in future studies will provide a more comprehensive understanding of their effectiveness. The results also indicate that the development of physical education e-modules, based on FlipHTML5 technology and designed with an Islamic approach, holds great potential for enriching the learning experiences of PTKIN students. The integration of mobile technology into learning environments, particularly those aligned with religious values, offers students flexible access to high-quality materials, as highlighted by TEL research (Heflin et al., 2017). The presence of e-modules encourages self-paced learning, critical in today's industrial era (Logan et al., 2021), and aligns with broader research on the benefits of digital learning in higher education. One limitation of this study is the sample size and geographic scope, which may not fully represent the broader PTKIN student population. Variations in students' acceptance of technology and access to reliable internet may also have influenced the study's outcomes. Al-Emran et al. suggest that technology acceptance in educational settings is influenced by prior experience and perceived ease of use (Al-Emran et al., 2016). Additionally, some students may prefer traditional learning methods or face challenges navigating new technologies, as highlighted by Alqurashi (Alqurashi, 2019). This underscores the need for diverse learning options and proper support to ensure successful adoption of e-learning technologies (Zou & Xie, 2019).

Future research could develop e-modules for other subjects, using similar approaches to integrate Islamic values across disciplines. Studies should also evaluate the long-term impact of e-modules on student academic achievements and the development of social and cognitive skills (Hwang et al., 2015). Other technologies, such as adaptive learning platforms, could further enhance personalised learning experiences (Xie et al., 2019). Additionally, incorporating culturally relevant content, as suggested by Aung & Khaing, and exploring the use of gamification in e-modules (Aung & Khaing, 2016), as recommended by Subhash & Cudney, could increase students' engagement and motivation (Subhash & Cudney, 2018). By continuously adapting and improving e-learning tools, educators can better meet the diverse needs of students, ultimately enhancing their educational experience.

## CONCLUSION

The FlipHTML5 platform modernizes physical education learning for PIAUD students by integrating texts, images, videos, animations, and hyperlinks into interactive e-modules. This approach makes learning more engaging, accessible, and flexible, allowing students to study anytime and anywhere while aligning with the latest curriculum developments. Additionally, the platform fosters independent learning and enhances digital literacy, a crucial skill in today's educational landscape. Despite its advantages, this study is limited by its focus on engagement and satisfaction rather than academic achievement, and the findings may not generalise to other contexts. Challenges such as limited internet access also need addressing. Future research should explore the e-module's impact on academic outcomes, its adaptability to other subjects, and strategies to improve accessibility in underserved areas. By demonstrating the potential to integrate Islamic values with digital learning, this study highlights the role of e-modules like FlipHTML5 in advancing education in Islamic institutions. It sets a foundation for future innovations, including the use of technologies like VR and gamification, to enhance engagement and learning outcomes in physical education while maintaining cultural and religious relevance.

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## CONFLICT OF INTEREST

The writers do not have any conflicts of interest to disclose.

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