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Implementation of interactive HOTS e-modules based on gamification in improving learning outcomes in Islamic religious education subjects for students of SMPN 1 Taluditi

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Abstract

The purpose of this study is to develop HOTS content in the e-module of Islamic Religious Education subjects at SMPN 1 Taluditi, increase creativity in developing teaching strategies and methods, improve critical thinking in understanding learning content and develop teacher creativity in designing materials, media and teaching modules that are appropriate to the conditions and abilities of students at the junior high school level. The method used is R&D with the DDDE (Decide, Design, Develop, and Evaluate) model which was chosen because it is in accordance with the objectives of developing HOTS and gamification-based interactive e-modules. A small-scale trial of the HOTS e-module was conducted by teacher experts and lecturers, and a large-scale trial was conducted by 22 students. The trial subjects were determined using a purposive sampling technique. Research data collection was carried out by administering a questionnaire test that had been collected descriptively. The results of the study showed that the gamification-based interactive HOTS e-module developed using the DDD-E model met the validity criteria with an average score of 3.89, was considered practical with an average score of 3.67, and demonstrated effectiveness, with 87.8% of students achieving a minimum test score of 70.

KEYWORDS

Interactive Media; Hots e-module; Learning Outcomes; Gamification; Islamic Religious Education

Research Background

Islamic Religious Education (PAI) plays a crucial role in teaching teachers in junior high schools. In addition to providing basic knowledge of religious concepts, it also equips educators with critical thinking, problem-solving, and analytical skills, essential for imparting knowledge.

knowledge to young students in an engaging and accessible way. Because teachers are often responsible for fostering curiosity and a love of learning in children, it is crucial for them to be well-prepared (Guerrero-Alcedo et al., 2022; Purnama et al., 2023). This approach not only fosters cognitive development but also lays the foundation for future academic success in more complex subject areas. The primary objective of this research is to develop a Higher-Order Thinking Skills (HOTS) e-module (Maxnun et al., 2024) that combines gamification and interactive media, specifically designed for teachers at SMPN 1 Taluditi in Pohuwato Regency. This e-module focuses on improving

student learning outcomes, particularly in Islamic Religious Education.

Current teaching methods often fail to fully engage students, relying on outdated tools (Lestari et al., 2024) that do not develop the dynamic skills needed for modern learning. This study seeks to address this gap by creating innovative resources that better prepare teachers for the challenges of teaching in the digital age (Paris et al., 2023). One of the main challenges faced is the reliance on traditional, static learning tools such as PowerPoint presentations and printed materials. A preliminary survey of students revealed that 93% struggled to use digital media effectively in their learning, often relying on outdated tools that encourage active learning and foster curiosity in their students. To address this limitation, this study integrates modern digital tools such as Canva and Flipbook with gamification platforms such as Kahoot, Quizizz, and Wardwall (Lulu Maulidah et al., 2023; Rojabi et al., 2022; Wang & Wang, 2024). These tools have been individually recognized for their ability to increase engagement and improve learning outcomes, but little research has been conducted on their combined use in teacher training given that their motivation to learn needs to be enhanced. By integrating these platforms into a single e-module, this study aims to create a comprehensive learning resource that empowers future teachers to design interactive, engaging, and thought-provoking learning. This research was guided by the DDD-E (Decide, Design, Develop, Evaluate) model (Belmonte et al., 2019), a structured approach to curriculum development that ensures e-modules are not only effective but also adaptable (Zulkarnain et al., 2022). This model facilitates continuous improvement of e-modules based on feedback and performance data, ensuring their long-term relevance. The use of the DDD-E model also supports the hypothesis that the integration of multiple digital platforms will result in significant improvements in students' critical thinking (Nowlan et al., 2023; Nuryadi & Widiatmaka, 2023) and creativity, essential skills for effective Islamic education. There is a need for innovation in teaching for teachers in junior high schools, where access to high-quality interactive learning resources is limited (Belmonte et al., 2019; Bunari et al., 2024; Mar'atussolichah et al., 2024). Many students in this region rely on traditional teaching methods that do not fully engage students. By introducing interactive e-modules, this study aims to transform teaching methods, making them more accessible and engaging for both teachers and students. Furthermore,This study addresses the broader issue of how technology can be used to improve education in areas where resources are often limited (López-Belmonte et al., 2021). This research aligns with Indonesia's national education goals, particularly the emphasis on 21st-century skills such as critical thinking, communication, and collaboration (Kumar, 2021). The integration of digital devices also supports the country's efforts to integrate technology into all levels of education, ensuring that teachers are well-equipped to meet the needs of today's digitally literate learners.

Gamification has been widely recognized for its ability to increase student engagement and motivation (Guerrero-Alcedo et al., 2022; Mee Mee et al., 2021; Shortt et al., 2023). In these studies, platforms such as Quizizz and Kahoot were used to make science learning more interactive and enjoyable for pre-service teachers (Pham, 2022a, 2022b). By incorporating game-based elements, e-modules not only make learning more enjoyable but also help strengthen critical thinking and problem-solving skills. Lim and Yunus (Lim & Yunus, 2021; Talib et al., 2023) emphasized that the use of digital learning has a positive impact on teachers, stating that the technology is beneficial (Budiarto et al., 2024; Fajaruddin et al., 2024; Ritonga et al.,

2024), and its ease of use and feasibility are acceptable to teachers. This is particularly important for elementary science education (Bogusevschi et al., 2019), where maintaining student interest is often a challenge (Kanoksilapatham & Suranakkharin, 2021; Usman & Anwar, 2021). Creativity is a crucial skill for teachers, particularly in Islamic religious education (Nuryadi & Widiatmaka, 2023). The ability to present scientific concepts in innovative and engaging ways can make the difference between students who struggle to grasp difficult concepts and those who succeed in the classroom (Purnama et al., 2023). The e-module developed in this study encourages prospective teachers seeking to fill this gap to think creatively about how they can integrate digital tools into their learning, thereby fostering innovative approaches to science education that will benefit their students in the future (Nurhidayat et al., 2024).

The primary objective of this research is to develop an e-module for Higher-Order Thinking Skills (HET) content in Islamic Religious Education (PAI) learning. By equipping educators with the skills to use digital tools creatively and effectively, this e-module aims to improve the overall quality of Islamic Religious Education (ISE) in the region. One of the key benefits of this e-module is its ability to bridge the gap between theoretical knowledge and practical application. The implications of this research go beyond the immediate development of a HOTS e-module (Jing & Eng, 2023; Subari, 2022) for junior high school teachers. This research seeks to address a critical need in teacher education by developing a gamification-based e-module that enhances critical thinking and creativity. Through the integration of modern digital tools (Erdoğan, 2019; Irzawati, 2023; Sukadari et al., 2023) and interactive learning strategies, this research aims to equip junior high school teachers with the skills they need to create engaging, innovative, and effective ISE learning. By doing so, it will not only improve the quality of teacher education in Pohuwato Regency but also contribute to broader efforts to modernize Indonesia's education system and prepare future generations for success in the 21st century.

RESEARCH METHODOLOGY

Research design

This study uses a Research and Development (R&D) approach, specifically following the Decide, Design, Develop, and Evaluate (DDD-E) model (Zulkarnain et al., 2022), to create an interactive e-module based on Higher-Order Thinking Skills (HOTS) integrated with gamification (Safirah et al., 2024). The DDD-E model was chosen because it aligns with the goal of systematic e-module development (Erna et al., 2021; Jing & Eng, 2023; Maxnun et al., 2024) which enhances teachers' critical thinking and creativity. This approach allows for a structured process for setting learning objectives, designing e-modules, developing content, and evaluating their effectiveness.

Research procedures

This study used two key instruments: a Likert-scale questionnaire and an expert validation process. The questionnaire, administered to 22 students, measured perceptions of the e-module's usefulness, content relevance, engagement, and impact on critical thinking and creativity, using a five-point scale. Expert validation involved three experts, including a lecturer and IT specialist, as well as a teacher from a junior high school, who assessed the e-module's content accuracy, technological

usability, pedagogical effectiveness, and the e-module's effectiveness.

Practicality. This combined instrument provides comprehensive insights into the effectiveness of e-modules and their alignment with educational objectives.

This research procedure follows the DDD-E model, the procedure is structured into four main stages:

1. **Decide**This stage focuses on identifying learning objectives, mapping themes relevant to Islamic Religious Education subjects, defining problems, and conceptualizing solutions. Learning resources and prerequisite skills are also identified here.
2. **Design**The design stage includes creating an e-module framework using flow diagrams, display models and storyboards. This step provides a clear framework for combining interactive and gamification elements.
3. **Develop**At this stage, e-modules are created by combining interactive features such as animation, audio, video, quizzes, and images using digital platforms like Canva, MS PowerPoint, Flipbook, Polotno Studio, Wardwall, and Book Creator. The content is designed to enhance teachers' critical thinking skills and creativity.
4. **Evaluate**The final stage includes expert validation, followed by a product trial with students. This evaluation assesses the e-module based on criteria of validity, practicality, and effectiveness. Feedback from experts leads to revisions before the final product implementation.

Research Subjects

This study involved a sample of 22 students from SMPN 1 Taluditi in Pohuwato Regency. These participants were eighth-grade students selected using purposive sampling to ensure they represented the target audience of the developed e-module.

Data Collection and Analysis Techniques

Quantitative data from the questionnaires were analyzed using descriptive statistics to measure the e-module's feasibility and impact. Likert scale scores were analyzed to evaluate students' perceptions of the module's ability to enhance critical thinking and creativity. Thematic analysis was applied to qualitative feedback provided by experts to identify areas for improvement and confirm the validity of the module's design and content.

RESULTS AND DISCUSSION

This research develops HOTS e-module Islamic Religious Education (PAI) learning media content with gamification and the results of the development products include:

1. Decide

In the "Decide" stage, this study aims to improve students' learning outcomes in critical thinking skills and creativity of junior high school teachers by developing an interactive application-based e-module that combines HOTS and gamification at SMPN 1 Taluditi. The learning theme focuses on HOTS, with content designed based on gamification quizzes related to the subject matter. Participants are students, who have prior knowledge of media learning. A prerequisite for this trial is that students have an Android smartphone to access the HOTS e-module design.

The material developed consists of PAI content with HOTS questions, which is then combined with gamification through tools such as Mentimeter, Quizizz, Wardwall, and Kahoot,

Designed in an interesting way to increase motivation, critical thinking, and creativity so that teachers can develop their creativity in junior high school teachers to be applied to educational programs. The material design developed is in the form of PAI content with HOTS questions combined with gamification through tools such as Mentimeter, Quizizz, Wardwall, and Kahoot, which are designed in an interesting way to increase motivation, critical thinking, and creativity so that students can develop their creativity.

The HOTS PAI electronic mo dule was developed using Canva and Heziein flipbook with the following design:



Figure 1. Cover Image 2 Meeting 1-5

Table 1. Validator assessment results

Rated aspect	Validator 1	2	3	Average	Qualification
Media content	4	3.67	4	3.89	Legitimate
Language and appearance	4	3.8	4	3.93	Legitimate
Illustrations and layout	3.75	3.67	3.75	3.72	Legitimate
Benefit	4	4	4	4	Very valid
Overall average score				3.89	Legitimate

The validator test results indicate that the developed HOTS e-module content media product based on gamification (Maxnun et al., 2024; Widiyastuti et al., 2021) meets the validity criteria with a score of 3.89. The expert validator made several revisions to further optimize the development of gamification-based HOTS PAI content before being declared valid, with several improvements as follows:

Table 2.HOST e-module before and after revision

Before revision	After revision
Difficulty accessing gamification links	The link has been prepared for access
The color is too basic	The color has been changed to an attractive pastel color.
The quiz is wrong on the subject written	The writing has been corrected

Gamified content has no instructions in it gamificationtest	Instruction has been linked to specific

After the media was declared valid, a trial was conducted on students of SMPN 1 Taluditi in Pohuwato Regency to assess whether the product developed had met the standards of practicality and effectiveness.



Figure 3. Socialization and trials for students

Table 3. Student responses to media

NO	Statement	Average	Qualification
1	The initial interface of this media program is visually appealing.	3.84	Very good
2	This app features an attractive color scheme.	3.52	Very good
3	The text presented in the media is easy to read.	3.60	Very good
4	The material is aligned with the PAI HOTS content.	3.63	Very good
5	The background music in this app is fun and catchy.	3.19	Good
6	Gamification elements are well integrated with HOTS PAI content.	3.76	Very good
7	The material is presented in an easy to understand manner. understand.	3.78	Very good
8	Examples and practice questions are relevant to the PAI HOTS curriculum.	3.78	Very good
9	This media is effective in improving students' critical thinking skills and	3.80	Very good

	creativity.		
10	This medium is intuitive and easy to use	3.65	Very good
Overall Average Score		**3.66**	**VeryGood**

The average overall score of student responses was 3.66, which qualifies as "very good." At this stage, it can be concluded that the developed media meets the criteria of practicality. Afterward, a learning outcome test was administered to students at the end of the lesson to assess the effectiveness of the developed learning media.

Table 4. Percentage of student exam scores

Test score (Nt)	Studentpercentage
Nt ≥ 70	86.8%
Total < 70	13.2%

Based on the results of the learning trial, 86.8% of students obtained an Nt score ≥ 70, which indicates that the developed media meets the effectiveness criteria. The interactive HOTS electronic module based on gamification developed using the DDD-E model meets the validity criteria with an average score of 3.89, is stated to be practical with an average score of 3.66, and shows effectiveness, with 86.8% of students achieving a minimum test score of 70.

The development of interactive e-modules designed to enhance Higher Order Thinking Skills (HOTS), using the DDD-E model, has proven to be a valuable asset for pre-service teachers. These e-modules have demonstrated high validity, practicality, and effectiveness, as demonstrated by high average scores and the majority of students achieving the targeted outcomes. This discussion will explore the benefits of using these e-modules in preparing pre-service teachers, as well as their broader implications for student engagement and critical thinking development (Maxnun et al., 2024). One of the key strengths of interactive HOTS e-modules lies in their proven validity and practicality. Their content has been tested and refined to ensure its alignment with educational standards while being user-friendly for both teachers and students. Furthermore, the effectiveness of the e-modules is reflected in the positive learning outcomes achieved by students. This highlights the module's potential to be a powerful tool in the classroom, fostering a more interactive and engaging learning experience.

The primary goal of HOTS e-modules is to foster students' critical thinking skills. By incorporating gamification elements, these e-modules challenge students to think more deeply and creatively as they interact with the material (Rostikawati et al., 2023). For teachers, these modules provide a practical example of how technology can be leveraged to foster higher-order learning, helping to create a more stimulating and thought-provoking classroom environment. In addition to promoting critical thinking, the interactive nature of e-modules significantly

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increases student engagement. Gamified learning experiences capture students' attention and motivate them to actively participate in the learning process (Pratiwi et al., 2023; Shortt et al., 2023). This is important for teachers to understand, as student engagement is a key component of effective teaching. E-modules serve as valuable examples of how digital tools can be used to make learning more dynamic, thereby improving overall student achievement. The atmosphere of activity among students when taught using e-modules becomes more interactive and encourages participation in asking questions, providing ideas, exploring critical thinking, and incorporating their answers into gamified learning (Ricu Sidiq & Najuah, 2020). The participation process is also seen in several results of Samad, Paris and Rostikawati (Paris et al., 2023; Rostikawati et al., 2023; Samad & Munir, 2022).

The development of this HOTS e-module is not only beneficial for teachers but also paves the way for further research and innovation in educational practice. As more educators and researchers explore the effectiveness of the DDD-E model and gamification in learning, there is the potential for the emergence of more sophisticated and impactful teaching tools. Teachers who implement these innovative strategies into their classrooms will be better prepared to meet students' evolving needs, thus promoting long-term academic success and engagement.

CONCLUSION

A gamification-based interactive HOTS e-module, developed through the DDD-E model, has been shown to improve student learning outcomes. Its high validity, practicality, and effectiveness, as evidenced by high average scores and the majority of students achieving targeted test results, indicate that this e-module can enhance critical thinking and student engagement. For teachers, incorporating this innovative digital learning tool into their teaching strategies will equip them with an effective method for developing higher-order thinking skills and creating an engaging learning environment.

This study highlights the successful development of a practical and effective HOTS-based interactive e-module for teachers at SMPN 1 Taluditi in Pohuwato Regency. The integration of the DDD-E model and gamification not only enhances the learning experience but also enhances educators' ability to teach with creativity and critical thinking. This is important because it fills a gap in traditional teaching methods by offering innovative and adaptive tools that better suit the needs of modern education. The findings indicate that the implementation of this e-module results in more engaged and critical-thinking students, ultimately improving their learning outcomes. By equipping teachers with these advanced strategies, this study contributes to the ongoing evolution of education, ensuring that they are ready to face the challenges of a more complex and dynamic learning environment. This study underscores the relevance of implementing technology-enhanced HOTS-based learning modules in teacher training, sets a precedent for broader educational reform, and emphasizes the need for the continuous development of teaching methods to foster better learning and engagement.

This interactive HOTS e-module developed using the DDD-E model is valid, practical, and effective. It provides teachers, readers, and other researchers with information related to the DDD-E HOTS design module with innovative tools to enhance critical thinking and student engagement, and promote better learning outcomes through gamified educational experiences.

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