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DEVELOPMENT AND EFFECTIVENESS OF A WEB-BASED INTERACTIVE LEARNING PLATFORM TO ENHANCE STUDENTS' UNDERSTANDING OF RAMADAN FASTING IN ISLAMIC SECONDARY EDUCATION

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Article

Abstract

Abstract The conventional teaching methods in Islamic Education, particularly on the topic of Ramadan fasting, often fail to engage students effectively. To address this issue, this study aimed to develop and evaluate the effectiveness of a web-based interactive learning platform for teaching Ramadan fasting to secondary school students at Madrasah Tsanawiyah. Ma'arif 01 Tulakan. Using the ADDIE model, the research followed a systematic process: analysis, design, development, implementation, and evaluation. The platform incorporated features such as quizzes, educational videos, and discussion forums to create an engaging and accessible learning experience. A pre-test and post-test experimental design involving 20 students revealed a significant improvement in comprehension, with mean scores increasing from 61.00 to 82.50 ($t = -9.731, p < 0.000$). Additionally, feedback from students highlighted high satisfaction levels regarding ease of access (88%), usability (85%), and content quality (86%). The findings demonstrate the platform's potential to enhance students' understanding and engagement in Islamic education through digital innovation. This study provides a replicable model for integrating technology into Islamic educational practices, offering a pathway for further advancements in digital learning environments. Despite the growing use of digital learning, studies focusing on interactive web-based platforms in Islamic education, particularly for Ramadan fasting, remain limited. This study fills this gap by developing and empirically evaluating a structured and interactive learning platform, offering both theoretical and practical contributions to technology-enhanced Islamic education.

Islamic Education;
Ramadan Fasting;
Interactive
Learning; Web-
Based Platform;
Digital Innovation.

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Introduction

Islamic education plays an essential role in shaping students' knowledge and character, particularly in understanding religious practices such as Ramadan fasting. However, conventional teaching methods, which are often lecture-based, tend to limit student engagement and result in superficial understanding (Basri et al., 2023; Rahman, 2024). As one of the core topics in Islamic Education, Ramadan fasting embodies both spiritual and practical dimensions that shape students' character and religious identity (Prayitno & Wathoni, 2022; Shalihin et al., 2020). However, the conventional teaching approaches, predominantly lecture-based methods, often fail to effectively convey these multifaceted aspects to students, resulting in disengagement and superficial understanding (Harto, 2021).

In the digital era, students require more interactive and flexible learning environments that align with their learning preferences. The integration of technology, especially web-based learning platforms, offers opportunities to enhance engagement and facilitate independent learning through multimedia and interactive features (Munawir et al., 2024). This is especially concerning given that students now expect dynamic and technology-integrated learning environments (Patimah & Herlambang, 2021; Ibda et al., 2023). This gap highlights the urgent need for innovative strategies that align with students' learning preferences while maintaining the essence of Islamic teachings (Al Arood et al., 2020).

Although previous studies have explored the use of digital learning tools in education, most of them focus on general subjects or do not specifically address Islamic education content.⁵ Moreover, there is still a lack of studies that develop and evaluate interactive web-based platforms specifically for teaching Ramadan fasting at the Islamic secondary school level (Qazi et al., 2021). Web-based platforms, in particular, provide flexible, interactive, and engaging learning experiences through multimedia content, quizzes, and forums (Yahaya et al., 2022; Sahidan et al., 2019; Kurniawan et al., 2021). The integration of project-based and interactive digital learning tools, such as those combining platforms like Google Classroom and YouTube, has proven to significantly enhance engagement, critical thinking, collaboration, etc., in Islamic education, providing a foundation for adopting similar innovations in the teaching of Ramadan fasting (Sari et al., 2023). Such platforms allow students to explore religious concepts at their own pace, fostering deeper comprehension and critical thinking (Febrian & Nasution, 2024; Asad et al., 2020). However, the adoption of technology in Islamic education remains inconsistent, with many institutions relying solely on traditional methods.

At MTs Ma'arif 01 Tulakan, students encounter difficulties in understanding the concepts of Ramadan fasting, including its principles, practices, and broader significance (Zakaria & Nawi, 2020). Observations revealed a lack of accessible and interactive learning resources, further compounded by students' limited motivation to engage with conventional teaching methods. Addressing these challenges requires a shift toward technology-based solutions that cater to diverse learning needs and preferences.

In addition to fostering academic understanding, the platform serves as a model for integrating technology into Islamic education (Effendi et al., 2024; Ridwan et al., 2024). The findings align with the broader call to modernize religious education while preserving its core values, demonstrating that digital tools can enhance both engagement and comprehension without compromising the integrity of Islamic teachings.

This study positions itself within the field of technology-enhanced Islamic education by focusing on a specific religious topic and target group, namely secondary school students. Unlike previous studies that tend to be general, this research integrates structured instructional design (ADDIE) with interactive digital features in a focused learning context. Thus, it offers both theoretical and practical contributions by providing a scalable model for implementing interactive web-based learning in Islamic education.

Method

This study based learning media for the topic of Ramadan fasting at MTs Ma'arif 01 Tulakan. This method is chosen to align with the research objective of creating and evaluating the effectiveness of learning media. The development model used in this research is the ADDIE model, consisting of five stages: Analyze, Design, Develop, Implement, and Evaluate (Hidayat & Nizar, 2021). Employs the Research and Development (R&D) method, aimed at developing a web.

The first stage, Analyze, focuses on identifying problems and learning needs for the topic of Ramadan fasting at MTs Ma'arif 01 Tulakan. This stage involves classroom observations in Islamic Education (PAI), interviews with PAI teachers, and student surveys to explore existing challenges in teaching Ramadan fasting. Data gathered from this stage serve as a foundation for designing a website tailored to the students' needs and preferences.

In the Design stage, the focus is on planning the elements to be developed for the website, including content selection, interactive features, and visually appealing designs for students. The content includes the definition, principles, conditions, and virtues of Ramadan fasting, along with its practical applications in daily life. The website is designed to be user-friendly and accessible for independent learning. Interactive features such as videos, quizzes, and discussion forums are integrated to support a more engaging and effective learning process.

The Development stage involves creating the website based on the design plan. The website is built on a platform that facilitates dynamic and interactive content presentation, accessible via computers or smartphones. After development, an initial trial is conducted with a sample of students to identify technical challenges and ensure the website functions as intended.

In the Implementation stage, the developed website is applied in the learning process for eighth-grade students at MTs Ma'arif 01 Tulakan. Students are granted access to the website as part of the learning materials for Ramadan fasting. Teachers integrate the website into lesson plans and provide guidance during the learning process. This stage is expected to offer students a more engaging and interactive learning experience.

The final stage, Evaluation, assesses the website's effectiveness in enhancing students' understanding of Ramadan fasting. Both qualitative and quantitative methods are used for evaluation. Quantitative data are collected through pre-tests and post-tests, measuring students' understanding before and after using the website. Additionally, qualitative evaluation involves gathering student feedback through questionnaires, assessing aspects such as convenience, ease of use, and content quality. The evaluation results are used to refine the website and provide recommendations for the development of other technology-based learning media in the future.

Research Results And Discussion

Analysis

The analysis phase revealed several key challenges in teaching Ramadan fasting material at MTs Ma'arif 01 Tulakan. These include variations in students' levels of understanding, limited engagement due to conventional lecture-based teaching methods, and restricted opportunities for independent learning outside the classroom. These findings indicate that traditional instructional approaches are insufficient to accommodate diverse learning needs.

From a pedagogical perspective, these challenges reflect the need for more student-centered learning environments. According to recent studies, effective Islamic education should not only transmit knowledge but also engage students actively in the learning process through meaningful interactions and contextual understanding. Therefore, the identification of these needs provides a strong foundation for developing an interactive and flexible learning platform that aligns with contemporary educational demands.

Table 1. Results of the Analysis Stage

Aspects	Findings of Analysis	Learning Needs
Learning problems	<ol style="list-style-type: none"> 1. Variations in students' understanding of Ramadan fasting material. 2. Conventional learning methods are less effective in attracting students' attention, especially for visual/kinesthetic students. 3. Limited time to study the material in depth outside of class hours. 	<ol style="list-style-type: none"> 1. Learning that can include different levels of student understanding. 2. The use of interactive and varied learning media. 3. Flexible access to materials, which allows students to learn anytime and anywhere.
Available resources	<ol style="list-style-type: none"> 1. Fairly stable internet access at MTs Ma'arif 01 Tulakan. 2. Most students have a device such as a smartphone or laptop. 3. Teachers have basic skills in the use of technology, but need further training for the management of web-based learning media. 	<ol style="list-style-type: none"> 1. Development of a website that can be accessed properly using the existing internet. 2. <i>Website</i> accessible using the student's device. 3. Training for PAI teachers to improve skills in managing and utilizing <i>websites</i> as a learning medium.
Learning Objectives	<ol style="list-style-type: none"> 1. Students need to improve their understanding of Ramadan fasting materials. 2. Students need the opportunity to learn independently outside 	<ol style="list-style-type: none"> 1. A <i>website</i> that provides clear material and can improve students' understanding of Ramadan fasting. 2. A <i>website</i> that provides

of class hours.	flexible access to self-study anytime and anywhere.
3. Need a tool for evaluation that can provide direct feedback to students.	3. Online quiz or test feature that allows for immediate evaluation and feedback on student understanding.

Table 1 above highlights that the learning process for Ramadan fasting material at MTs Ma'arif 01 Tulakan faces several challenges, such as variations in students' understanding, less engaging teaching methods, and limited time for independent study. To address these issues, flexible and interactive learning media, as well as evaluation tools that provide immediate feedback, are required. Existing resources, such as internet access and students' devices, support the development of a website as a solution. The learning objectives are to enhance students' understanding, provide opportunities for independent access, and deliver effective evaluations.

Design

Based on the identified needs, the design phase focused on creating a structured and interactive learning environment. The website was designed with key features such as multimedia-based content, interactive quizzes, and user-friendly navigation. These elements were intentionally integrated to support different learning styles, including visual, auditory, and kinesthetic learners.

The incorporation of multimedia and interactive features is supported by educational technology theories, which emphasize that learning becomes more effective when students are exposed to varied and engaging content formats. Furthermore, the inclusion of immediate feedback mechanisms through quizzes reflects the principles of formative assessment, which plays a crucial role in enhancing students' understanding during the learning process.

Below is the table summarizing the design phase for the development of the Ramadan fasting website at MTs Ma'arif 01 Tulakan:

Tabel 2. Results of the Design Stage

Aspects	Applied Design	Purpose
Struktur Website	Main page with systematic distribution of material: fasting intentions, legal conditions for fasting, things that cancel fasting, and the virtues of the month of Ramadan.	Make it easier for students to access and follow the material in a structured manner.
Learning Media	Use of educational videos, infographics, and interactive texts to explain Ramadan fasting material.	Provide a variety of media that suits the student's learning style (visual, auditory, kinesthetic).
Evaluation	Interactive quizzes after each topic,	Measure students'

Features	with different types of questions and live feedback.	understanding and provide feedback to improve their learning outcomes.
Flexible Access	Responsive website, accessible via smartphones, tablets, and laptops.	Provides easy access to materials anytime and anywhere, enabling independent learning.
UI/UX Design	Simple design, with eye-pleasing colors and intuitive navigation.	Ensuring user comfort and making it easier for students to access materials without confusion.
Interactivity	Interactive educational video feature, with animations and graphics that support material explanations.	Increase student engagement in learning through engaging and informative visual experiences.

This table shows the design results for a website designed to meet the learning needs of Ramadan fasting materials, with a focus on accessibility, interactivity, and user comfort. By integrating these elements, this website is expected to increase the effectiveness of learning Ramadan fasting material at MTs Ma'arif 01 Tulakan. This website is also expected to provide a more interesting, interactive, and flexible learning experience for students.

Development

In the development phase, the website was successfully created using Google Sites as the main platform. The platform includes essential components such as learning materials, instructional videos, and interactive quizzes. The design prioritizes accessibility and responsiveness, ensuring that students can access the content through various devices, including smartphones and laptops.

The successful development of this platform demonstrates that relatively simple and accessible technologies can be effectively utilized to support digital learning in Islamic education. This finding is important, especially for schools with limited technological infrastructure, as it shows that innovation does not always require complex systems but rather thoughtful design and implementation.

Below is the table summarizing the development phase for the creation of the Ramadan fasting website at MTs Ma'arif 01 Tulakan:

Tabel 3. Results of the Development Stage

Aspects	Development Results
Website Name	Ramadan Fasting Material Website
Website Purpose	Providing interactive learning materials about Ramadan fasting that can be easily accessed by students to deepen and test their understanding of Ramadan fasting.

Development Platform	Google Sites
Key Features	Interactive quizzes, educational videos, learning materials, and live feedback from quizzes.
Target Users	Students of MTs Ma'arif 01 Tulakan, especially students who study Ramadan fasting material in Islamic Religious Education (PAI) subjects.
Interface Design (UI)	Simple and easy-to-use interface, with clear navigation and clean layout to make it easy for users to access materials and other features.
Materials	Learning materials that include fasting laws, intentions, legal conditions for fasting, as well as educational videos and quizzes to evaluate students' understanding.
Website Address	
Website Manager	The management team of the Ramadan Fasting Material website.
Responsive Features	The website is designed to be responsive, ensuring a good and functional display on various devices, such as desktops, tablets, and smartphones.

The website display that has been developed includes the start page display, materials, educational videos, interactive quizzes, and supporting illustrations can be seen in the following screenshots of images.



Figure 1. Home view (home page of the website)

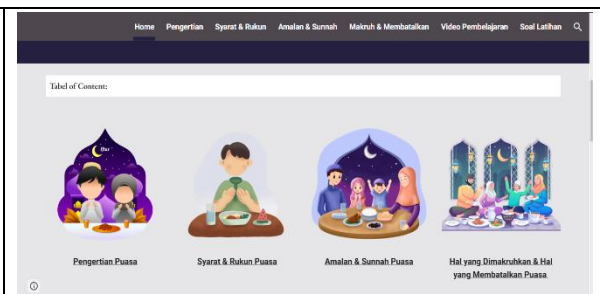


Figure 2. Interactive learning material display



Figure 3. Display of quiz questions

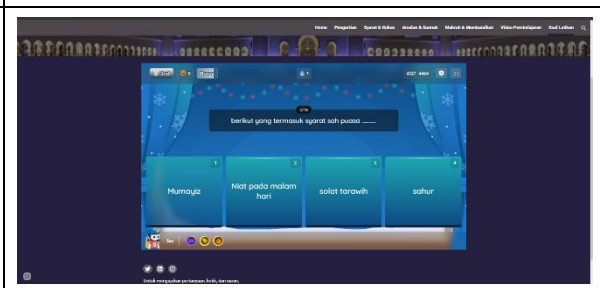


Figure 4. Educational video display



Figure 5. Supporting illustration display



Figure 6. Supporting illustration display

The development phase successfully produced the website based on the previously created design plan. During this process, a prototype of the website was developed, integrating interactive features such as quizzes and educational videos, along with uploading learning content about Ramadan fasting. The content covers essential topics such as rules, conditions, intentions, and virtues of fasting. The design and features were tailored to provide a comfortable and effective learning experience for students at MTs Ma'arif 01 Tulakan. The website was optimized for smooth access across various devices, from smartphones to desktop computers. This development phase resulted in a website prototype ready for testing and use by students, aiming to enhance their understanding of Ramadan fasting in an interactive and engaging manner.

Implementation

During the implementation phase, the Ramadan Fasting Learning Website was fully implemented for eighth-grade students at MTs Ma'arif 01 Tulakan. The implementation process involved introducing and training students on how to access and use the website as a learning resource. Students were provided with guidance on how to access the learning materials, participate in interactive quizzes, and watch educational videos available on the website.

During this phase, the website administrators supervised the operation to ensure the website ran smoothly without technical issues. Initial feedback from students indicated that they could easily access the website using their devices, and most students found that the website helped them understand Ramadan fasting material in a more enjoyable and interactive way. The implementation process also included data collection through pre-tests and post-tests to measure students' understanding after using the website.

During the implementation phase, students at MTs Ma'arif 01 Tulakan received brief training on how to access and utilize the Ramadan Fasting Learning Website. The website administrators provided guidance on the available features, such as accessing learning materials, participating in interactive quizzes, and watching educational videos.

Once introduced, the website access and usage: The website was accessed by students both during class for learning activities and outside class using personal devices such as smartphones, tablets, or laptops. During the usage process, students could study under the teacher's supervision or independently by reviewing available materials, watching educational videos, and participating in interactive quizzes to test their understanding of the topics learned.

Throughout the implementation process, the website administrators monitored the website to ensure it operated smoothly without technical disruptions. Each feature, including learn-

ing materials, quizzes, and videos, was checked to ensure everything functioned properly and could be accessed easily by students.

At the end of the implementation after using the website, students were asked to provide feedback about their experience. This feedback was crucial for evaluating the website's effectiveness as a learning tool.

To evaluate the effectiveness of the website in improving students' understanding, pre-tests and post-tests were conducted. The test results were used to compare students' understanding levels before and after using the website. By comparing pre-test and post-test scores, it became evident whether there was an improvement in students' understanding of Ramadan fasting material taught through the website.

Preparation for evaluation and improvement all feedback and test results collected were evaluated during the evaluation phase. These evaluation results were used to make further improvements and developments to the website, ensuring its continued effectiveness as a learning tool.

Discussion

The During the evaluation phase, an assessment was conducted on the entire process and outcomes of the development of the Ramadan Fasting Learning Website. This evaluation aimed to assess the effectiveness of the website in improving students' understanding and to identify aspects that need improvement to enhance the quality of learning. The evaluation focused on two main aspects: learning outcomes (post-test and pre-test results) and user feedback. The first step involved evaluating the results of the post-test and pre-test. These results were further analyzed using the Paired Samples T-test statistical method to determine whether there was a significant difference between the pre-test and post-test scores. This statistical analysis was essential to evaluate the effectiveness of the website in enhancing students' understanding. The results of the Paired Samples T-test are as follows:

Table 4. Paired Samples T-test Results

		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pre Test - Post Test	-21.500	9.881	2.209	-26.124	-16.876	-9.731	19	.000	

Based on the results of the Paired Samples T-test statistical analysis, there is a significant difference between the pre-test and post-test scores of the students. The average score difference between the pre-test and post-test is -21.500, indicating an improvement in students' understanding after using the Ramadan fasting learning website. The standard deviation value of 9.881 shows a considerable variation in score changes among students, while the standard error mean of 2.209 reflects the precision of the estimated score difference. The estimated dif-

ference range lies within the 95% confidence interval, between -26.124 and -16.876. The obtained t-value is -9.731, indicating a significant difference between the pre-test and post-test scores. With a p-value of 0.000, which is less than 0.05, it can be concluded that the difference between the pre-test and post-test scores is highly significant. This indicates that the Ramadan fasting learning website is effective in improving students' understanding of the Ramadan fasting material.

Table 5. Statistical Descriptive Results

	Mean	N	Std. Deviation	Std. Error Mean
Pre Test	61.00	20	12.937	2.893
Post Test	82.50	20	10.195	2.280

The evaluation phase not only aims to determine the effectiveness of the developed web-based learning platform but also to interpret how and why the platform contributes to improving students' understanding of Ramadan fasting. Unlike the previous section, which primarily presented statistical results, this discussion provides a deeper analysis by connecting the findings with relevant theories and prior studies.

The significant improvement in students' post-test scores ($M = 82.50$) compared to pre-test scores ($M = 61.00$), supported by the paired samples t-test results ($t = -9.731$, $p < 0.05$), indicates that the web-based interactive learning platform had a substantial positive impact on students' comprehension. This finding aligns with constructivist learning theory, which emphasizes that learners actively construct knowledge through interactive and meaningful experiences rather than passive reception of information. (Hanafi, 2020)

The integration of multimedia elements such as videos, quizzes, and interactive content appears to play a crucial role in enhancing students' engagement. Previous studies have demonstrated that multimedia-based learning environments significantly improve students' motivation and retention of knowledge, particularly in religious and conceptual subjects.² The immediate feedback provided through interactive quizzes also supports formative assessment practices, enabling students to identify their mistakes and improve their understanding in real time. (Yahaya, 2022)

Furthermore, the high levels of student satisfaction in terms of accessibility (88%), usability (85%), and content quality (86%) suggest that the platform successfully meets the characteristics of effective digital learning environments, namely flexibility, user-centered design, and content relevance. These findings are consistent with research indicating that user-friendly digital platforms can enhance learning autonomy and promote self-directed learning behaviors among students.

However, despite these positive outcomes, several important considerations need to be addressed. First, the relatively small sample size ($N = 20$) limits the generalizability of the findings. Future research should involve larger and more diverse populations to validate the effectiveness of the platform across different educational contexts. Second, the study primarily focuses on cognitive outcomes (understanding of Ramadan fasting) without deeply examining affective or behavioral dimensions, such as students' spiritual development or practice

consistency. This represents an important area for further investigation, particularly in the context of Islamic education.

In addition, while the platform enhances engagement, its long-term effectiveness depends on consistent integration into teaching practices and teachers' digital competencies. Studies have shown that the success of technology-based learning is strongly influenced by teachers' ability to effectively integrate digital tools into pedagogy.⁶ Therefore, continuous teacher training and institutional support are essential to maximize the benefits of such innovations.

Overall, this study contributes to the growing body of research on technology-enhanced Islamic education by providing empirical evidence that interactive web-based platforms can significantly improve students' understanding. More importantly, it demonstrates that digital innovation, when properly designed and implemented, can complement traditional religious education without compromising its core values.

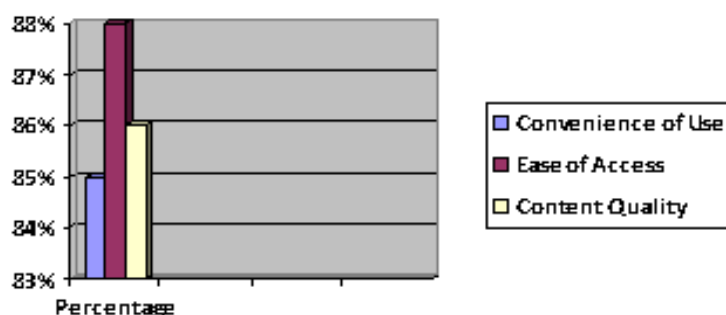


Figure 1. User feedback evaluation graph

Student feedback on their experience with the website highlights a high level of satisfaction across several key aspects. The Ease of use aspect received an 85% rating, indicating that most students found the interface and overall user experience to be comfortable and satisfactory. Accessibility was rated at 88%, reflecting that the website was easy to access and use without significant difficulties. Additionally, the content quality scored 86%, showing that students found the materials provided to be relevant, informative, and valuable for learning about Ramadan fasting.

The combined evaluation of pre-test and post-test results, along with student feedback, demonstrates that the use of the website for teaching Ramadan fasting has had a positive impact on students' understanding. Overall, these findings confirm that the website is effective in enhancing students' comprehension and has been well-received by its users. However, there are still areas for improvement to further enhance the user experience.

Conclusion and Suggestions

Based on the research and evaluation conducted, it can be concluded that the development of the Ramadan Fasting Learning Website at MTs Ma'arif 01 Tulakan has proven effective in enhancing students' understanding. The results of the pre-test and post-test showed a significant improvement, with an average pre-test score of 61.00 and an average post-test score of 82.50, indicating a significant difference with a t-value of -9.731 and a p-value of 0.000.

This demonstrates that the website successfully helped students better understand the Ramadan fasting material. Additionally, feedback from students was very positive, with high satisfaction levels regarding ease of use (85%), accessibility (88%), and content quality (86%). However, there are several suggestions for improvement that need to be considered to enhance the user experience, such as improving visual design and adding a search feature. Overall, the website has successfully served as an effective learning medium and was well-received by students, making it a potential model for the development of technology-based learning in the future.

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