MIMBAR AGAMA DAN BUDAYA
Vol. 42 No.1 – June 2025 (54-75)
E-ISNN : 0854-5138 || (Print)| e-ISSN 2715-7059 (Online)
DOI: https://doi.org/ 10.15408/mimbar.v42i1.47172

Development of Islamic Mobile Learning for Indonesian High Schools: Bridging Traditional and Digital Education through an Android-Based Platform

Fahmi Fazar[1*], Udin Supriadi[2], and Saepul Anwar[3]

[1,2,3]Department of Islamic Religious Education, Indonesian University of Education, Indonesia

Article Info
Article history:
Received: December 12, 2024
Revised: January 19, 2025
Accepted: June 30, 2025

Keywords:
Digital learning, educational technology, Indonesian high school, islamic mobile learning, religious education

ABSTRACT

This study explores the development and evaluation of the Islamic Mobile Learning (IML) application, which is designed as a supplement for students in studying Islamic Religious Education (PAI) in high schools in Indonesia. The Research and Development (R&D) approach is used combined with the ADDIE model, this study focuses on creating learning media in the form of user-friendly Android-based applications by integrating interactive multimedia features, such as quizzes, videos, and animations. This application has been validated by material experts and media experts as well as pretest-post-test assessments, very high reliability was achieved (Cronbach's Alpha = 0.989) accompanied by validity (Pearson Correlation> 0.7). The research findings show a significant increase in student learning outcomes after using the IML application and positive feedback from them as users. Although there are challenges regarding accessibility and scalability, the results indicate that the IML application offers a promising learning media as a supplement to Islamic Religious Education learning, making it more attractive, user-friendly, easily accessible, and adaptable to diverse learning environments.

Correspondence Address:
fahmifazar@upi.edu

Please cite this article in APA Style as:
Fazar, F., Supriadi, U., & Anwar, S. (2025). Development of Islamic mobile learning for Indonesian high schools: Bridging traditional and digital education through an Android-based platform. *Mimbar Agama dan Budaya*, 42(1), (54-75). https://doi.org/ 10.15408/mimbar.v42i1.47172

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1. INTRODUCTION

The rapid development of digital technology has significantly changed the education sector in Indonesia, with the integration of mobile learning platforms, especially Android-based learning applications, offering a solution to overcome the limitations of traditional learning methods that are currently still used (Luckyardi et al., 2024; Padmo et al., 2019; Ribahan & Muslimin, 2025; Sari et al., 2020). In the context of Islamic Religious Education, with its emphasis on moral and spiritual teachings, there is a very high need to adopt modern technology practiced alongside conventional education (Achruh et al., 2024; Assalihee et al., 2024; Inda et al., 2024; Isaac, 2025). The development of mobile learning media specifically designed for Islamic Religious Education learning in Indonesian secondary schools is a bridge between the gap between traditional religious teaching and the demands of the digital era (Arim et al., 2024; Hulliyah et al., 2021; Nurdin et al., 2024; Wulandari & Handayani, 2021). The presence of this Android platform provides a learning environment that is very easy in terms of access and flexibility, especially for students in remote areas, so that they can improve their overall learning experience and make Islamic Religious Education learning more interesting and interactive (Khoo, 2019; Sarlan et al., 2021; Zaragoza et al., 2019).

In today's digital age, educational technology offers unprecedented flexibility and accessibility. Mobile learning in particular allows learners to access learning content anywhere and anytime, in line with their tech-savvy preferences and needs (Alanazi et al., 2024; Lazaro & Duart, 2023; Pan & Mow, 2023; Sulisworo & Toifur, 2016). However, amidst the increasing absorption of technology in various lines of education in this country, the integration of digital devices in Islamic Religious Education at the secondary school level is very limited (Abubakari & Kalinaki, 2024; Jasiah et al., 2024; Miskiah et al., 2019). There are still many schools that in their teaching practices still emphasize face-to-face learning based on text, while the application of interactive and multimedia resources is very limited. This condition creates an urgent need for innovative solutions that combine the core values of Islamic Religious Education with advances in educational technology (Binsaleh & Binsaleh, 2020; Salim et al., 2024; Suhid et al., 2021). Developing mobile learning media for Islamic Religious Education based on Android is able to optimally address this disparity by providing a more interesting, interactive, and highly flexible learning experience that meets the various needs of participants throughout the country, including those in the 3T (frontier, outermost and disadvantaged) areas (Alrasheedi et al., 2015; Koderi et al., 2019).

Previous studies have shown that the positive impact of mobile learning on student engagement and academic achievement is very significant. The flexibility of mobile learning, one of the main challenges is to ensure that the content is in harmony with the values and principles of Islamic principles (Ahmed & Chowdhury, 2025; Khalid, 2017; Mohammed et al., 2021; Muhamad et al., 2024). Research also reveals that mobile apps can significantly improve learners' understanding of religious topics by incorporating interactive elements such as videos, quizzes, and discussions (Anuyahong & Pucharoen, 2023; Mustaffa & Mansor, 2017; Shumkova, 2022; Vincent-Layton, 2019). However, mobile learning has been proven to be very beneficial in 3T areas; however, there is still a gap regarding how digital devices can further optimize student participation in Islamic Religious Education (Ahmad et al., 2025; Alotaibi et al., 2019; Bunyamin et al., 2020).

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Although mobile learning shows promise, research on the development of mobile learning media that integrates traditional Islamic Religious Education learning with digital technology, especially for secondary school students in Indonesia, is very limited (Memon et al., 2021; Pratama & Scarlatos, 2020). In addition, although there are several mobile learning media for Islamic Religious Education, only a few are designed to integrate Islamic teachings with interactive digital devices in a comprehensive manner. The lack of research on the long-term effects of mobile learning on student engagement and academic achievement, especially in Islamic Religious Education, remains a significant gap (Anselmo et al., 2024; Beteta et al., 2024; X.-Z. Li et al., 2023; Looi et al., 2015). Furthermore, the long-term effects of mobile learning on learners' engagement and academic achievement, particularly in Islamic Religious Education, have not been thoroughly explored (Anselmo et al., 2024; Isa et al., 2020; Kristiawan et al., 2022; Zakaria & Nawi, 2020).

This research addresses the discrepancy by developing Android-based mobile learning media designed to bridge the gap between traditional Islamic Religious Education learning and digital technology in Indonesian secondary schools (Prasetio et al., 2020; Sukmayadi & Yahya, 2020). The main innovation of this media lies in the integration of Islamic Religious Education materials with interactive digital features, such as multimedia learning, quizzes, videos and offline functionality. This is crucial to overcome geographical challenges, especially in the 3T areas (Hanif et al., 2023; Muflihah et al., 2025; Pariyar et al., 2019; Samala et al., 2024; Sitompul et al., 2023; Tordet et al., 2025; Yasin et al., 2021). This learning medium ensures that students not only get access to high-quality religious material but also engage with it in a way that is aligned with Islamic principles. Furthermore, the app is designed to promote learner-centered learning, encourage active participation and increase their motivation through its gamification elements and interactive content (Gamarra et al., 2022; Hernanz et al., 2025; Jacob & Centofanti, 2024; Purbo, 2020). By combining traditional learning with digital tools, this research aims to provide a comprehensive solution to improve Islamic Religious Education in Indonesian secondary schools and contribute to the growing body of research on mobile learning in a religious context (Hamami & Nuryana, 2022; Ibda et al., 2023; Pabbajah et al., 2021; Shaleh et al., 2024; Suyatno et al., 2022).

2. METHODS

This research uses a Research and Development (R&D) approach to design, develop, and evaluate an Android-based learning media called Islamic Mobile Learning (IML), which is specifically developed for high school students in Bandung, Indonesia. The main objective is to create a mobile application that integrates Islamic Religious Education materials with interactive digital features, which provides a flexible, engaging, and user-centered learning experience for students. The development of the IML application is guided by the ADDIE learning design model, a stable framework in educational technology that has been used worldwide to develop effective learning innovations (Jia et al., 2025; Li & Sun, 2024; Trust & Pektas, 2018; Widyastuti & Susiana, 2019).

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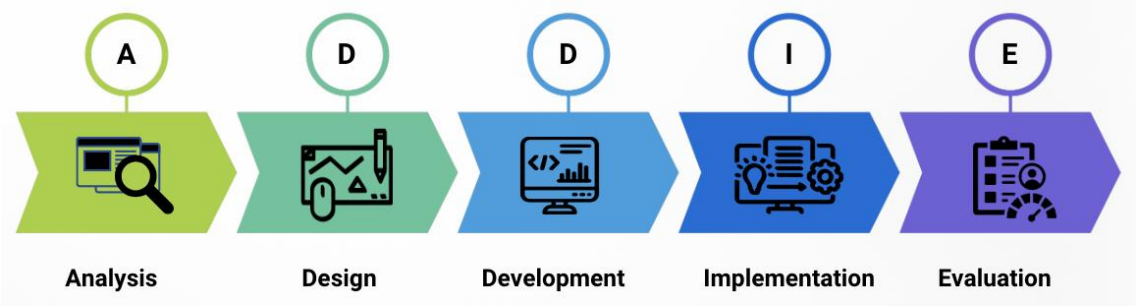

Figure 1. *R&D Research Process with ADDIE*

The figure 1 illustrates the R&D research process guided by the ADDIE model, which consists of five key stages: Analysis, Design, Development, Implementation, and Evaluation. In the Analysis stage, learner needs were identified by reviewing curriculum documents and conducting interviews with teachers to evaluate the limitations of existing learning media. This helped ensure that the IML application would address identified educational gaps. The Design stage included content layout based on the 2013 national curriculum and designing a visually appealing and user-friendly interface using CorelDRAW 2018 software. In the Development stage, the mobile application was formulated using Smart Apps Creator 3 software, which incorporated interactive elements such as quizzes, videos, and animations to enhance learner engagement. The application was then tested in small and large group trials during the Implementation stage. In the Evaluation stage, formative evaluation was conducted through expert feedback, while summative evaluation utilized pre- and post-test scores to measure the effectiveness of the learning media in terms of learning outcomes and user satisfaction.

Table 1. *Summary of Participants by School, Grade and Gender*

School	Grade	Male Students	Female Students	Total Students
Public School A	XI	29	31	60
Public School B	XI	33	27	60
Total Student		**62**	**58**	**120**

Table 1 summarizes the number of participants in this study, consisting of 120 eleventh-grade students from two public high schools in Bandung, Indonesia. The study was conducted in two stages: a small group trial (60 students from school A) and a large group trial (120 students from schools A and B). Students were selected based on three criteria: actively involved in Islamic Religious Education (PAI), owning an Android-based mobile phone, and participating voluntarily. In addition, two certified Islamic Religious Education teachers, one instructional media expert, and one learning material expert contributed to the application validation process. A mixed-methods approach combining qualitative (interviews and observations) and quantitative (questionnaires and test scores) data was used to analyze the feasibility, effectiveness, and implications of the IML application (Cleland, 2017; Gläser-Zikuda et al., 2020; Hidayatul et al., 2020).

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3. RESULTS AND DISCUSSION

In two public high schools in Bandung, traditional learning methods in Islamic Religious Education (IRE) subjects make learning only one-way, with low student engagement. Although digital infrastructure is available, it has not been optimally utilized in the classroom. Interviews with teachers revealed a strong need for more immersive and android-based learning strategies. This gap presents an opportunity to explore the potential of IML applications to increase student engagement and interaction with learning materials.

3.1. Analysis Stage

Field observations and interviews in two senior high schools in Bandung identified several critical issues in the teaching of Islamic Religious Education (IRE). Learners lacked motivation and passive engagement due to the influence of traditional methods such as lectures and reading boring textbooks, which were widely considered monotonous and uninspiring. In addition, learners reported difficulties in understanding abstract religious materials, especially in areas such as Fiqh and Aqidah, where visual aids and interactive elements were lacking. Teachers also found that learners often memorized religious texts without understanding their full meaning, and many struggled to relate these teachings to their daily lives. Table 2 below summarizes the main findings from interviews with educators and learners.

Tabel 2. *Interview result from Teachers and students*

Category	Statement from Teacher and Student	Description
Difficulty in Understanding Content	Teacher: "Students often have difficulty understanding Islamic materials because the lessons focus more on memorization than on the core of understanding." Student: "Some materials, such as Fiqh or Aqidah, are too abstract and quite difficult to understand without visual aids or appropriate examples."	Students have difficulty understanding the material because the explanations are still abstract and there is a lack of concrete examples in the real world.
Unengaging Materials	Teacher: "IRE learning materials tend to be boring, relying too much on a single textbook and lectures." Student: "The lessons are boring, relying on reading, memorization and note-taking. Interactive media such as quizzes, videos or educational apps would increase engagement."	The material provided is very monotonous and lacks variety, resulting in low levels of motivation and participation from students.
Limited Use of Technology	Teacher: "Although digital technology is available, its use is still very limited. Not all students have access to mobile devices, and sometimes teachers do not have enough time or skills to fully integrate technology into IRE lessons." Student: "Educational technology is not optimally used. I would like to learn to use mobile learning applications or media to learn interactively in and out of the classroom."	The educational technology available in schools has not been optimally utilized for Islamic Religious Education learning, so that student involvement is still passive.
Need for Interactive Media	Teacher: "Students have difficulty in connecting religious materials to their daily lives." Student: "Using more mobile applications or Android platforms for learning, especially for memorizing, reading, and understanding will help students engage more actively."	Students showed a deep interest in visual, interactive, and mobile-based learning media to improve their religious understanding.
Student Response to Digital Media	Teacher: "In general, students respond positively to the use of digital media in the classroom, because they are very familiar with the latest technology." Student: "We respond well, but some students who do not have access to devices feel left out."	Digital learning media is generally very well received, although some learners experience barriers regarding accesibility.

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The interview findings in Table 2 reveal some significant challenges in the implementation of Islamic Religious Education (IRE). Both teachers and students expressed concerns about the traditional teaching approach, which emphasizes memorization over deep understanding. This results in students having difficulty understanding abstract materials such as Aqidah and Fiqh, without visual learning media or real-life examples. In addition, the materials presented in class especially textbooks with lecture methods are considered monotonous and less interesting to students. To make the learning experience more dynamic and contemporary, both teachers and students suggest supplements in the form of interactive media such as videos, quizzes, and animations in mobile learning media that can be used both inside and outside the classroom. Although digital technology is available, its potential is still underutilized due to constraints such as limited access to mobile devices and lack of media skills for some Islamic Religious Education teachers. However, some students responded positively to the use of digital media in lessons, although some students expressed complaints about not having access to the necessary devices. The presence of solutions in the form of mobile learning media, such as the Islamic Mobile Learning (IML) application, appears as promising good news. The flexibility of this application allows students to access learning materials anytime, anywhere, according to their respective digital behaviors and preferences. Both teachers and students agree that the IML application, although simple in design, is practical and user-friendly. Its smooth access to learning materials can bridge the gap between classroom and real-world learning experiences, making learning more personal, engaging, and accessible.

Based on the findings from the Analysis, the development phase of the study will focus on creating an Islamic Mobile Learning (IML) application designed to meet the needs of learners. The application will incorporate multimedia features, including animations, quizzes, and videos, to increase learner engagement and retention. By integrating these interactive features, the IML application aims to make Islamic Religious Education learning more meaningful, improve understanding, and revitalize learning methods in secondary school classrooms to be more lively. The application development will also address the challenges identified in the needs analysis, providing flexible and engaging learning media that align with learners' preferences for Android-based interactive media.

3.2. Design Stage

During the design phase of the Islamic Mobile Learning (IML) application development, the researcher focused on creating a visually appealing and pedagogically effective interface. This was done by developing high-quality visual components, such as icons, layouts, and educational illustrations, to ensure that the application was both engaging and functional. CorelDRAW 2018, a professional graphic design software, was used to create clean and intuitive visuals that would support the application's instructional goals. This design process helped align the user interface with the application's educational goals, ensuring that IML was easily accessible as a learning supplement. The IML application design is designed to support key features based on the 2013 curriculum standards and learning needs formulated for students. Core Islamic Religious Education Materials, including topics such as faith, moral values, and daily worship are integrated into the application. The features of these materials are presented through a modern and interactive interface that emphasizes visual learning. In addition, researchers ensure that every

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element in the application will enhance user interaction, allowing students to actively engage with the material in a more meaningful way.

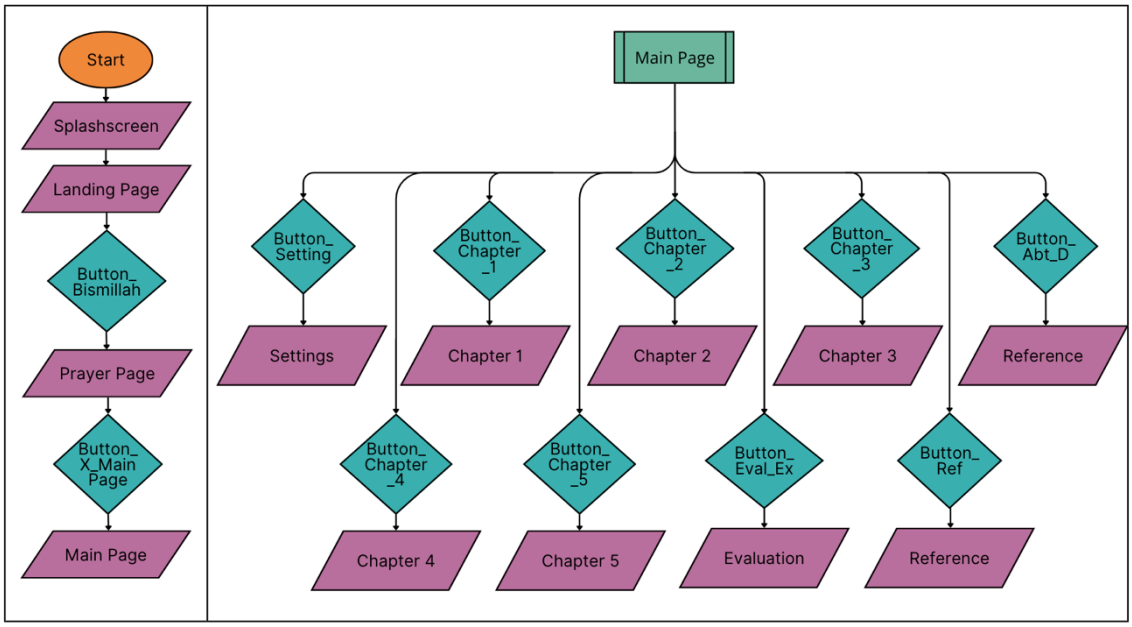

Figure 2. *flowchart of the Islamic Mobile Learning (IML) application*

To guide the development process, Figure 2 presents a flowchart of the main menu and navigation structure of the IML application. When running the application, the user is first introduced to the splashscreen, which displays the name of the application. After the splashscreen, the user is directed to the landing page, then there is a *"bismillah"* button, when pressed it displays a prayer for learning, When the x button is clicked, it will be directed to the main menu, which contains nine important navigation options. These options include: Settings, About Developer, Chapter 1 Material, Chapter 2 Material, Chapter 3 Material, Chapter 4 Material, Chapter 5 Material, Evaluation Questions, and References. Each menu item is carefully designed to ensure a smooth user experience, providing quick and easy access to learning content and supporting materials.

3.3. Development Stage

In the Development phase of the Islamic Mobile Learning (IML) project, the design concept has been prepared begins to be translated into an interactive Android application using Smart Apps Creator 3 (SAC 3) software. This software allows the integration of interactive and multimedia features, such as videos, animations, and quizzes, without the need for special skills in programming. The inclusion of these features aims to make Islamic Religious Education materials more interesting, while ensuring accessibility for students in 3T areas with limited internet access through offline functionality. The development process also focuses on creating a user-friendly interface to ensure that students can easily navigate the application and access content quickly.

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Figure 3. *Interface Design of the Islamic Mobile Learning (IML)*

Figure 3 shows the interface design of the IML application. An application developed using Smart Apps Creator 3 software presents Islamic Religious Education and Character Education materials for eleventh grade high school/vocational high school students. This design displays illustrations of the Kaaba and the al-Haram mosque in the background, which links the application theme to Islamic values. The title and class information are displayed in the middle right of the screen, and the "Bismillah" button at the bottom serves as a navigation tool to proceed to the main menu. This design layout emphasizes simplicity and clarity, ensuring that students without advanced technological skills can easily interact with the IML application.

Figure 4. *mainpage design of the Islamic Mobile Learning (IML)*

Figure 4 shows the main menu design of the IML application. The layout of the page is visually appealing, with the theme of Islamic Religious Education and Character Education prominently displayed at the top. The interface includes several interactive icons such as books that represent the various chapters of the IRE material. These icons, arranged in a bookshelf-style layout, enhance the user experience by making navigation engaging and intuitive. The colorful bookshelf background further enriches the learning environment, offering learners easy access to the learning materials for every chapter.

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Figure 5. *quizzes design of the Islamic Mobile Learning (IML)*

This image shows the design of the quiz section in the IML application. The interactive quiz format is designed to make learning fun and engaging. The statement, "Masha Allah," after the multiple-choice button is pressed is displayed as a green check mark, indicating whether the selected answer is correct or a red X indicating that the answer is incorrect. The immediate feedback (check mark or X) strengthens the appeal to learners and motivates them to continue to improve their understanding of the material. This gamification approach encourages active participation and enhances the learning experience of learners.

After the IML application has been developed using Smart Apps Creator 3, validation testing will be carried out using Android-based mobile devices. Before being fully implemented in the classroom, the application undergoes a rigorous expert validation process. This process involves feedback from four main validators: two certified Islamic Education teachers, IRE material expert lecturers for material validation, and educational technology expert lecturers for media validation. The Material Validation process focuses on ensuring that the material is accurate, comprehensive, and aligned with the 2013 curriculum. Media Validation assesses the application's interface design, usability, and functionality of multimedia elements such as animations, videos, and quizzes. This validation process ensures that the material and user experience meet the standards required for effective IRE learning.

Table 3. *Summary of Validation Results for the IML Application*

Validator	Percentage
Material Expert	89.5%
Media Expert	88.5%
PAI Teacher	90%
Average	**89.33%**

The results of the validation test show that the IML application is both pedagogically and technically feasible to be used in Android-based Islamic Religious Education learning. With high scores in material and media validation, the IML application is very capable of engaging students, supporting retention, and encouraging interactive learning. This proves that the application is in line with the educational goals of Islamic Religious Education in the digital era and is able to provide high-quality and easily accessible materials for high school students (Hernanz et al., 2025; Muzakkir et al., 2024; Nordin & Ariffin, 2016; Sevkli et al., 2017; Shamsuddin et al., 2016).

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3.4. Implementation Stage

To validate the effectiveness of the IML application on smartphone, a trial was conducted using students devices from booth schools (School A and School B) with devices running at least Android version 10. This trial was crucial to assess the feasibility, functionality, and compatibility of the application with students' mobile devices. Feedback collected from this trial confirmed that the application was accessible and usable, ensuring its reliability as a mobile learning apps for students.

Figure 6. *the implementation stage of Islamic Mobile Learning (IML)*

In the implementation phase, students used their smartphones in class to test the application. Figure 6 shows the main page of the IML application as displayed on students' smartphones during the implementation phase. The interface includes interactive book icons for different chapters, such as "Chapter 1: Beriman Kepada Kitab-Kitab Allah" (Faith in the Holy Book) to "Chapter 5: Masa Kejayaan Islam" (The Golden Age of Islam) along with quizzes for all chapters. This structure makes it easy for students to navigate to each learning material. The trial showed that the IML application is intuitive, engaging, and successful in increasing students' interaction with the learning material, offering them a more flexible and interactive way to learn both inside and outside the classroom.

Figure 7. *display of chapter 5 of IML on student's smartphone*

Figure 7 shows the menu of Chapter 5 of the IML application titled *"Masa Kejayaan Islam"* (The Golden Age of Islam). This chapter covers materials such as *"Periodisasi Sejarah Islam"* (Periodization of Islamic History), *"Kemajuan Islam pada Masa Klasik "* (Progress of Islam in the Classical Period), and "*Tokoh-tokoh Kejayaan Islam"* (Figures of the Golden Age of Islam). This chapter also includes multimedia elements such as videos, further enhancing the interactive learning experience. This display allows learners to explore key moments in Islamic history while engaging with rich multimedia content to deepen their cognitive.

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Figure 8. *display of chapter 5 quizzes of IML on student's smartphone*

Figure 8 illustrates the quiz interface of Chapter 5. The screen displays multiple-choice questions, and when the correct answer is selected, the application displays positive feedback within a thumbs-up emoji and the phrase *"Subhanallah"* in bold green text, congratulating the learner on the correct answer. This gamification feature helps increase learner interest and motivation in answering the questions by providing instant feedback on their performance, making the learning process more enjoyable and rewarding.

3.4.1. Product Appeal

After receiving positive validation from expert lecturers in the material and media, a product trial was conducted to assess the appeal of the IML application. This stage was conducted in two phases: a small group trial with 60 students (school A) and a large group trial with 120 students (schools A and B). This trial aimed to measure various aspects of the application, such as its visual appeal, simplicity of the user interface, and interactivity. The results of the small group trial showed a high level of interest, with 85% of students categorizing the application as "very interesting". Similarly, in the large group trial, 90% of students gave the application the same rating, reinforcing the appeal of this application. The above findings indicate that the IML application is not only effective for IRE learning purposes but also captivates students, increases their motivation and enhances their learning experience.

3.4.2. Product Effectiveness

In evaluating the Islamic Mobile Learning (IML) application that has been developed with the aim of supporting Islamic Religious Education (PAI) learning, the researcher conducted an assessment in the form of a pretest and post-test. The results of the assessment were analyzed using a t-test to determine the impact of the product on student learning outcomes. Before conducting the t-test, the researcher ensured the reliability and validity of the pretest and post-test items by utilizing SPSS 26 software. The results of the pretest and post-test item reliability tests are shown in Figure 9 below.

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Reliability

[DataSet1]

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	120	99.2
	Excluded[a]	1	.8
	Total	120	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.767	25

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
F10	178.633333	416.806	.912	.757
F5	178.633333	416.806	.912	.757
F13	178.666667	415.989	.924	.757
F4	178.666667	415.989	.924	.757
F14	178.683333	415.714	.925	.757
F20	178.825000	417.692	.763	.758
F25	178.825000	416.683	.813	.757
F2	178.683333	415.714	.925	.757
F12	178.825000	417.692	.763	.758
F11	178.666667	415.585	.946	.756
F22	178.825000	417.692	.763	.758
F21	178.683333	415.714	.925	.757
F7	178.666667	415.585	.946	.756
F9	178.683333	416.050	.907	.757
F16	178.825000	417.692	.763	.758
F6	178.666667	415.585	.946	.756
F15	178.825000	417.692	.763	.758
F1	178.825000	416.683	.813	.757
F3	178.683333	415.848	.917	.757
F23	178.683333	415.714	.925	.757
F17	178.666667	416.796	.880	.757
F19	178.666667	415.585	.946	.756
F18	178.683333	415.714	.925	.757
F8	178.666667	416.997	.869	.757
F24	178.825000	416.683	.813	.757
Total_Score	91.1833333	108.386	1.000	.988

Figure 9. *display of pretest item of Reliability test*

The figure 9 shows the results of the pretest item reliability test before the use of the Islamic Mobile Learning (IML) application. The main focus of this test is to assess the internal consistency of the pretest items, ensuring that the items measure the intended educational concepts reliably. The Cronbach's Alpha score of 0.767 indicates an acceptable level of reliability, as values above 0.7 are generally considered appropriate for learning assessments. The Total Item Statistics table provides detailed information for each item, including the mean, variance, corrected item-total correlation, and Cronbach's Alpha if the item is deleted. These values help evaluate how well each of these items correlates with the overall test score. Items with higher correlations are considered more consistent with the total measure, while items with lower correlations may require further review. This reliability score of 0.767 confirms that the pretest items are reliable, ensuring a strong basis for further evaluation into validity testing.

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Table 4. *Pretest Item Validity Test*

Item	Pearson Correlation	Sig. (2-tailed)	Validity
F10	.916**	.000	Valid
F5	.916**	.000	Valid
F13	.927**	.000	Valid
F4	.927**	.000	Valid
F14	.928**	.000	Valid
F20	.773**	.000	Valid
F25	.821**	.000	Valid
F2	.928**	.000	Valid
F12	.773**	.000	Valid
F11	.948**	.000	Valid
F22	.773**	.000	Valid
F21	.928**	.000	Valid
F7	.948**	.000	Valid
F9	.911**	.000	Valid
F16	.773**	.000	Valid
F6	.948**	.000	Valid
F15	.773**	.000	Valid
F1	.821**	.000	Valid
F3	.921**	.000	Valid
F23	.928**	.000	Valid
F17	.885**	.000	Valid
F19	.948**	.000	Valid
F18	.928**	.000	Valid
F8	.875**	.000	Valid
F24	.821**	.000	Valid

Table 4 presents the results of the pretest item validity test for the Islamic Mobile Learning (IML) application. The results of this test evaluate whether the pretest items are valid measures of the constructs they are intended to assess. The Pearson Correlation values listed for each item range from 0.773 to 0.948, all of which are considered valid because they exceed the threshold value of 0.7. This indicates that the items correlate well with the overall scale, indicating that the items function as intended and accurately measure the knowledge they are intended to assess. The Sig. (2-tailed) column shows that all items have a value of 0.000, confirming statistical significance and indicating that each item is relevant and contributes to the overall validity of the pretest items. In particular, items F19, F11, and F7 have the highest correlation (0.948), indicating their strong alignment with the total scale, while others, such as F22, F20, and F16, have slightly lower correlations (0.773), but still meet the validity criteria. This validity test confirms that the pretest items function well and provide a reliable measure of the intended Islamic Religious

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Education material, strengthening the effectiveness of the IML application in evaluating students' cognitive abilities.

Reliability

[DataSet2]

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	120	100.0
	Excluded[a]	0	.0
	Total	120	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.989	25

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
F10	78.0716801	110.131	.820	.988
F5	78.0716801	110.131	.820	.988
F13	78.0716801	110.131	.820	.988
F4	77.9384930	108.010	.916	.988
F14	77.9550799	108.188	.910	.988
F20	78.0716801	110.131	.820	.988
F25	78.0714718	109.955	.841	.988
F2	77.9550799	108.188	.910	.988
F12	78.0716801	110.131	.820	.988
F11	77.9382831	107.801	.938	.988
F22	78.0716801	110.131	.820	.988
F21	77.9550799	108.188	.910	.988
F7	77.9382831	107.801	.938	.988
F9	77.9552012	108.307	.897	.988
F16	78.0716801	110.131	.820	.988
F6	77.9382831	107.801	.938	.988
F15	78.0716801	110.131	.820	.988
F1	78.0714718	109.955	.841	.988
F3	77.9551102	108.218	.907	.988
F23	77.9550799	108.188	.910	.988
F17	77.9388228	108.338	.881	.988
F19	77.9382831	107.801	.938	.988
F18	77.9550799	108.188	.910	.988
F8	77.9389127	108.428	.872	.988
F24	78.0714718	109.955	.841	.988

Figure 10. *Display of Post-test Item Reliability Test*

Figure 10 shows the results of the post-test item reliability test of the Islamic Mobile Learning (IML) application. The purpose of this test is to assess the internal consistency of the post-test items, ensuring that they reliably measure the knowledge and learning outcomes expected by the application. The Cronbach's Alpha score for the post-test items was 0.989, which is an excellent result, indicating excellent internal consistency and indicating that the items used in the post-test have high-quality reliability. A Cronbach's Alpha value of 0.989 is considered excellent, because a value above 0.9 indicates that the items are highly consistent and effectively measure the expected content. The Total Item Statistics section shown in the table provides detailed information on the contribution of each item to the overall reliability score.

After completing the reliability test with Cronbach's Alpha of 0.989, the researcher continued by conducting a validity test for the post-test items to ensure that the items very accurately assess the expected learning outcomes. The results of the validity test for the post-test items are presented in Table 5, which provides further validation of the effectiveness of the measurement instrument.

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Table 5. *Post-test Item Validity Test*

Item	Pearson Correlation	Sig. (2-tailed)	Validity
F10	.781**	.000	Valid
F5	.781**	.000	Valid
F13	.781**	.000	Valid
F4	.908**	.000	Valid
F14	.900**	.000	Valid
F20	.781**	.000	Valid
F25	.808**	.000	Valid
F2	.900**	.000	Valid
F12	.781**	.000	Valid
F11	.934**	.000	Valid
F22	.781**	.000	Valid
F21	.900**	.000	Valid
F7	.934**	.000	Valid
F9	.884**	.000	Valid
F16	.781**	.000	Valid
F6	.934**	.000	Valid
F15	.781**	.000	Valid
F1	.808**	.000	Valid
F3	.896**	.000	Valid
F23	.900**	.000	Valid
F17	.866**	.000	Valid
F19	.934**	.000	Valid
F18	.900**	.000	Valid
F8	.855**	.000	Valid
F24	.808**	.000	Valid

The table above presents the results of the post-test item validity test for the assessment tool, evaluating the effectiveness of each item in measuring the intended construct. The Pearson Correlation values for each item ranged from 0.781 to 0.934, all exceeding the threshold value of 0.7, indicating that the items correlate well with the overall scale and function as intended. These high correlation values indicate that the items accurately measure the cognitive or constructs they are designed to assess. In addition, all items have a sig. (2-tailed) value of 0.000, confirming statistical significance and strengthening the validity of each item. This means that the results are not due to random sampling, and the items are relevant and contribute meaningfully to the overall scale. Items such as F11, F7, F6, and F19 have the highest correlation of 0.934, indicating strong alignment with the total scale, while other items such as F16, F13, F10, and F5 although slightly lower at 0.781, still meet the validity criteria. Overall, the results indicate that the post-test items functioned very well and provided a reliable measure of the intended content, confirming that this assessment tool was effective in evaluating learners' cognition and assessing the targeted constructs.

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3.5. Evaluation Stage

The evaluation phase of this study was embedded in each phase of the ADDIE model, to ensure the quality and effectiveness of the implementation of the Islamic Mobile Learning (IML) application in two public secondary schools in Bandung, Indonesia. The initial evaluation involved conducting a needs analysis that highlighted key challenges such as low engagement and difficulty in understanding abstract Islamic concepts. Despite the availability of digital infrastructure, the lack of technology utilization in the classroom indicated a gap between the potential of digital tools and their actual use in teaching. This analysis guided the development of the IML application to address these challenges, by incorporating interactive features and multimedia content to engage learners more effectively. To assess the effectiveness and appeal of the IML application, this study used pretest-post-test evaluation and expert validation. The application was tested in two different schools, with 120 learners participating in the trial, 60 from each school. The pretest and post-test reliability tests showed high internal consistency, with Cronbach's Alpha scores of 0.767 for the pretest and 0.989 for the post-test, confirming the results of the reliability of the assessment items. The application was also validated by expert lecturers in content and media, achieving an average validation score of 89.3%.

Despite performing well in the product appeal and effectiveness tests, several challenges were identified during the implementation phase. Despite the positive reception of the app in both schools, some learners faced issues with access to devices and internet connectivity, which impacted their ability to fully engage with the app. These challenges highlight the need for more extensive field testing and teacher training to ensure that the IML app can be used effectively in a variety of learning environments, even in 3T areas. Overall, the evaluation confirmed that the IML app is a valuable learning medium to enhance Islamic Religious Education learning, offering a highly engaging and flexible learning experience for learners in both urban and rural schools.

Based on the findings from the Analysis, the development phase of the study will focus on creating an Islamic Mobile Learning (IML) application designed to meet the needs of learners. The application will incorporate multimedia features, including animations, quizzes, and videos to increase learner engagement and retention. By integrating these interactive features, the IML application aims to make Islamic Religious Education learning more meaningful, improve understanding, and revitalize learning methods in secondary school classrooms to be more lively. The application development will also address the challenges identified in the needs analysis, providing flexible and engaging learning media that align with learners' preferences for Android-based interactive media.

CONCLUSION

The development of Islamic Mobile Learning (IML) learning media has shown promising results in improving Islamic Religious Education in high schools in Indonesia. By integrating interactive features, such as animation, video, and quizzes, this application effectively bridges the gap between traditional IRE education practices and digital learning tools. The needs analysis identified key challenges, such as passive student engagement and difficulty in understanding abstract religious concepts, which the IML application addresses by providing a more engaging

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and interactive learning experience. This approach helps deliver learning materials that are more accessible and engaging for students, especially in 3T areas.

The evaluation phase confirmed the effectiveness of the IML application in increasing active student participation, with pretest and post-test assessment results showing significant improvements in learning outcomes. The application also received positive feedback from students and experts in the field, with very high marks for its visual appeal and usability. The design of the IML application, which focuses on student-centered principles and good material delivery, ensures that the material is relevant and highly engaging, effectively motivating students to fully participate in IRE learning.

However, challenges remain in terms of scalability and accessibility. Issues such as limited access to digital devices and internet connectivity in some areas need to be further addressed to ensure wider scale adoption. Further research is needed to explore the long-term impact of IML applications on learner engagement and improved learning outcomes, and to assess their potential for integration into broader educational settings across Indonesia. Future research should also focus on teacher training to ensure sustainable adoption of the application and maximize its effectiveness across different school settings.

ACKNOWLEDGMENT

The researcher is very grateful to the Bidikmisi program run by the government of the Republic of Indonesia through the Directorate General of Higher Education, Ministry of Education and Culture and the Education Fund Guarantee Institution (LPDP) which is under the auspices of the Ministry of Finance which has fully supported this research.

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Vol. 42 No.1 – June 2025 (54-75)
E-ISNN : 0854-5138 || (Print)| e-ISSN 2715-7059 (Online)
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