

DEVELOPMENT AND USABILITY EVALUATION OF ANDROID-BASED INTERACTIVE LEARNING MEDIA FOR SALAFIYAH ISLAMIC BOARDING SCHOOL STUDENTS

*Corresponding author
rifqi031102@gmail.com

Dhun Naja Rifqi¹, Suyono², Muhammad Rifai³

^{1,2}Information Systems Study Program, Institut Bakti Nusantara

³STAI Miftahul Ulum, Mukomuko, Bengkulu

^{1,2}Wisma Rini Street, No. 09, Pringsewu,
Lampung, Indonesia

³Jl. Lintas Sumatera Padang-Bengkulu, Sidodadi, Penarik, Mukomuko,
Bengkulu, Indonesia

Article history:

Received March 12, 2025

Revised March 25, 2025

Accepted April 3, 2025

Keywords:

Android-Based Learning;
Interactive Digital
Learning Media;
Islamic Boarding Schools;
Mobile Learning;
Black-Box Testing;
Educational Technology

Abstract

The digital transformation of education presents opportunities to enhance learning accessibility while preserving traditional instructional practices in Islamic boarding schools. This study aims to develop Android-based interactive digital learning media tailored to the educational characteristics of Al-Wustho Salafiyah Islamic Boarding School, Indonesia. The proposed application integrates mobile learning principles, multimedia instructional design, and traditional Islamic learning approaches, particularly *sorogan* and *bandongan*. The system incorporates four main interfaces: a splash screen, main dashboard, learning materials page, and interactive multimedia learning page. Educational features include digital Islamic textbooks, instructional videos, audio lessons, and interactive exercises. A black-box testing framework comprising twelve scenarios was formulated to evaluate three dimensions: user interface functionality, usability-related operations, and basic security mechanisms. The proposed evaluation covers navigation, multimedia accessibility, learning activities, authentication, and access control. The study contributes a context-sensitive digital learning design that aligns mobile technology with traditional Islamic educational practices. However, empirical usability and learning effectiveness remain to be established through user testing and educational assessments. The proposed application provides a foundation for future technology-supported learning innovation in Salafiyah Islamic boarding schools.

1.0 INTRODUCTION

Education plays a fundamental role in developing students' knowledge, competencies, character, and moral values, particularly within Islamic educational institutions. In Indonesia, Islamic boarding schools, commonly known as *pesantren*, represent an essential component of the national education system by integrating religious instruction, ethical development, and community-based learning. Salafiyah Islamic boarding schools maintain distinctive

educational traditions through the study of classical Islamic texts (*kitab kuning*) using conventional instructional approaches such as *sorogan* (individual recitation and guidance) and *bandongan* (teacher-centered collective instruction). Although these approaches contribute to the preservation of Islamic intellectual traditions and strengthen teacher–student relationships, the increasing integration of digital technologies into contemporary education has created new expectations regarding learning accessibility, instructional flexibility, and student engagement. The widespread adoption of smartphones and mobile applications offers opportunities to complement traditional teaching practices with interactive digital learning environments. Previous research has demonstrated that mobile learning technologies can support educational accessibility, learner autonomy, and instructional flexibility, particularly when learning applications are designed according to students' educational needs and technological contexts [1][2] [3].

The integration of mobile technologies into educational environments has attracted considerable research attention, particularly regarding interactive learning applications, multimedia-based instruction, and technology-supported student engagement. Sung et al. [4] demonstrated through a meta-analysis that integrating mobile devices into teaching and learning activities can positively influence students' learning performance. Similarly, Crompton and Burke [5] identified the growing importance of mobile learning in supporting flexible educational experiences across different instructional settings. Research on multimedia learning has also emphasized that the effective combination of textual, visual, and auditory information can improve learning experiences when instructional content is designed according to appropriate cognitive principles [6]. Furthermore, research on mobile learning adoption indicates that usability, perceived usefulness, and user acceptance are important considerations in determining the effectiveness and sustainability of educational applications [7]. Despite these developments, the successful implementation of interactive learning technologies depends on their alignment with instructional practices, learners' characteristics, and institutional environments. These considerations are particularly relevant to Islamic boarding schools, where educational innovation must accommodate established religious learning traditions rather than replace them.

Despite the increasing availability of Android-based educational applications, several challenges remain in developing interactive learning media that are pedagogically appropriate for traditional Islamic boarding schools. Existing mobile learning research has extensively examined technology integration, student engagement, and educational performance in general educational contexts; however, these findings cannot automatically be generalized to Salafiyah boarding schools with their distinctive instructional structures, religious content, and teacher–student interactions. The specific research gap addressed in this study concerns the contextual adaptation of Android-based interactive learning media to traditional *sorogan* and *bandongan* learning environments, particularly in relation to content accessibility, instructional interaction, and application usability. At Al-Wustho Salafiyah Islamic Boarding School, the research problem is therefore formulated around the need for a digital learning application that can complement established instructional practices while accommodating students' learning characteristics and teachers' instructional requirements. Rather than assuming that conventional instruction is ineffective, this study examines how interactive mobile learning can provide additional instructional support without compromising the educational identity and values of the institution.

To address this gap, this study proposes the development of an Android-based interactive digital learning application specifically adapted to the educational context of Al-Wustho Salafiyah Islamic Boarding School. The proposed contribution lies in the contextual integration of mobile learning functionality with the pedagogical characteristics of traditional Islamic education. Unlike generic educational applications, the proposed system is intended to support the presentation of religious learning materials through accessible digital content and interactive learning activities while maintaining the complementary role of teacher-guided instruction. The novelty of this research is positioned in three interconnected aspects: the contextual adaptation of Android-based learning media to Salafiyah educational practices, the integration of interactive digital learning functions into a traditional Islamic instructional environment, and the systematic evaluation of application usability from the perspective of its intended users. This approach emphasizes pedagogical compatibility and user-centered

application development rather than technological complexity alone. Consequently, the proposed application is expected to provide a context-sensitive model for integrating digital learning technologies into traditional Islamic educational institutions.

Based on these considerations, this study aims to design, develop, and evaluate Android-based interactive digital learning media for students at Al-Wustho Salafiyah Islamic Boarding School. Specifically, the research seeks to identify relevant instructional and user requirements, translate these requirements into an interactive mobile learning application, implement the proposed learning media within the targeted educational context, and assess its functionality and usability. The evaluation is intended to determine whether the developed application satisfies essential functional requirements and provides an accessible and understandable learning interface for its intended users. By combining educational requirements with application development and user-oriented evaluation, this study is expected to contribute practical insights into the implementation of mobile learning technologies in traditional Islamic boarding schools. Furthermore, the findings may provide a foundation for future research examining learning effectiveness, student engagement, and the long-term adoption of interactive digital learning applications in religious educational environments.

2.0 THEORETICAL

2.1 Previous Research

Various recent studies show that digital learning media, especially Android-based, is effectively used in the pesantren environment.[3] This technology has been proven to increase learning motivation, teachers' digital literacy, and understanding of religious materials visually and interactively. These findings are an important foundation in the development of learning media for the Al-Wustho Salafiyah Islamic Boarding School.[6]

Table 1. Comparative Analysis of Previous Studies

Ref.	Authors (Year)	Research Focus and Method	Main Findings	Research Gap
[1]	Nugroho and Astutik (2024)	Digital transformation of Islamic boarding school education using a mixed-method approach.	Examined the integration of digital technology into Tahfidzul Qur'an education and its relationship with learning practices.	Did not specifically develop and evaluate Android-based interactive learning media for Salafiyah students.
[2]	Masrur et al. (2025)	Evaluation of digital-based Qur'anic memorization learning through qualitative research.	Digital monitoring and assessment tools supported more efficient learning evaluation at an Islamic boarding school.	Focused on digital assessment rather than developing interactive instructional media.
[3]	Kearney et al. (2012)	Development of a pedagogical framework for mobile learning.	Identified authenticity, collaboration, and personalization as important characteristics of mobile learning.	Did not investigate application development within traditional Islamic educational institutions.
[4]	Sung et al. (2016)	Meta-analysis of 110 experimental and quasi-experimental studies on mobile learning.	Reported a moderate positive effect on learning performance, with an overall effect size of 0.523.	Did not specifically investigate Salafiyah learning traditions or Android application usability.
[5]	Crompton and Burke (2018)	Systematic literature review of mobile learning in higher education.	Identified learning achievement as a major research focus and documented the expansion of mobile	Concentrated on higher education rather than traditional Islamic boarding schools.

			learning across educational settings.	
[6]	Mayer and Moreno (2003)	Cognitive theory and instructional design principles for multimedia learning.	Demonstrated the importance of managing cognitive load when combining visual and verbal instructional materials.	Did not evaluate Android-based interactive media or Islamic boarding school applications.
[7]	Al-Emran et al. (2018)	Systematic review of 87 studies applying the Technology Acceptance Model to mobile learning.	Identified perceived usefulness, ease of use, and related acceptance factors as important research considerations.	Did not specifically examine usability evaluation in Salafiyah Islamic boarding schools.

2.2. Digital Learning in Islamic Boarding Schools

Digital learning refers to the integration of information and communication technologies into educational processes to facilitate knowledge acquisition, instructional interaction, and learning accessibility. In Islamic educational institutions, digital learning provides opportunities to complement traditional teaching practices with technology-supported educational resources. Islamic boarding schools, particularly Salafiyah pesantren, have distinctive instructional characteristics that emphasize religious knowledge, moral development, and direct interaction between teachers (ustadz) and students (santri). Traditional learning approaches, including sorogan and bandongan, remain essential for maintaining the authenticity of Islamic scholarship and preserving established educational values. The integration of digital technologies into these environments should therefore be understood as a complementary educational innovation rather than a replacement for conventional religious instruction. Previous studies on digital transformation and technology-supported learning in Islamic boarding schools highlight the potential contribution of digital platforms to educational accessibility and instructional management [1], [2]. Accordingly, the development of Android-based interactive learning media requires consideration of both technological functionality and the pedagogical characteristics of Salafiyah education.

2.3. Mobile Learning and Android-Based Educational Technology

Mobile learning, commonly referred to as m-learning, is an educational approach that utilizes portable digital devices to support learning activities across different locations and instructional contexts. The theoretical foundation of mobile learning emphasizes accessibility, flexibility, personalization, and learner interaction. Kearney et al. [3] proposed a pedagogical framework that identifies authenticity, collaboration, and personalization as important characteristics of mobile learning experiences. Furthermore, Sung et al. [4] demonstrated through a meta-analysis that the integration of mobile devices into instructional activities can positively influence students' learning performance. Crompton and Burke [5] also identified the expanding role of mobile technologies in facilitating learning activities beyond conventional classroom environments. Android-based applications provide a practical technological environment for implementing mobile learning through multimedia content, interactive navigation, digital assessments, and learning activities accessible through smartphones. In the context of Al-Wustho Salafiyah Islamic Boarding School, Android technology is considered a potential platform for providing students with supplementary religious learning resources while supporting instructional continuity and flexible access to educational materials.

2.4. Interactive Digital Learning Media and Multimedia Learning Theory

Interactive digital learning media refers to technology-based instructional resources that enable learners to engage actively with educational content through multimedia presentations, navigation mechanisms, interactive exercises, and feedback functions. Unlike conventional static instructional materials, interactive learning media can facilitate learner participation by allowing students to control certain aspects of their learning activities. The

theoretical foundation of multimedia learning is closely associated with the Cognitive Theory of Multimedia Learning, which explains how individuals process verbal and visual information through interconnected cognitive mechanisms. Mayer and Moreno [6] emphasized that effective multimedia instructional design should minimize unnecessary cognitive load while supporting meaningful knowledge construction. Consequently, the integration of text, images, audio, and interactive learning activities must consider instructional clarity, information organization, and learners' cognitive limitations. Within Salafiyah Islamic boarding schools, multimedia learning principles can guide the presentation of classical Islamic educational materials through structured digital content. For example, religious texts may be supported by explanatory audio, visual illustrations, and interactive learning exercises, provided these features are included in the developed application. This approach is intended to facilitate comprehension while maintaining the essential role of teachers in interpreting and explaining religious knowledge.

2.5. User-Centered Design and Educational Application Development

User-Centered Design (UCD) is an application development approach that emphasizes users' characteristics, requirements, expectations, and interaction experiences throughout the design process. In educational application development, UCD supports the creation of learning systems that correspond to students' technological capabilities and teachers' instructional requirements. The approach generally involves understanding the context of use, identifying user requirements, producing design solutions, and evaluating the resulting application against established usability criteria. These principles are consistent with the human-centered design framework described in ISO 9241-210, which emphasizes iterative design and evaluation based on user needs. In the development of Android-based interactive learning media for Al-Wustho Salafiyah Islamic Boarding School, a user-centered perspective can support the identification of appropriate instructional features, interface structures, navigation mechanisms, and content presentation strategies. The involvement of intended users is particularly important because students and teachers may have different levels of digital literacy and expectations regarding educational applications. Therefore, incorporating user requirements into application development can improve the relevance and usability of the proposed learning media. However, UCD should be presented as the actual development methodology only when its procedures have been implemented and documented in the study. [7]

3.0 METHODOLOGY

3.1 Data Collection Methods

The data collection method in this study is carried out through several techniques to obtain accurate and relevant information to the purpose of developing interactive digital learning media. The first technique is field observation, where the researcher conducts direct observation of the learning process at the Al-Wustho Salafiyah Islamic Boarding School, especially related to obstacles in understanding the yellow book conventionally. The second technique is a structured interview, which is conducted with teachers and students to explore user needs for Android-based learning media. Furthermore, a questionnaire is also used to measure user perception and level of acceptance of the initial design of the developed learning media. The data obtained from the three techniques is used as a basis for designing, developing, and evaluating the effectiveness and feasibility of media systematically. Thus, the data collection process in this study is triangulative, combining qualitative and quantitative approaches to produce comprehensive and objective information.

3.2 System Development Methods

This research uses a Research and Development (R&D) approach with the ADDIE (Analysis, Design, Development, Implementation, Evaluation) system development model.[4] This model was chosen because it is considered systematic and suitable for the development of technology-based educational products. The first stage is Analysis, which includes the identification of user needs, characteristics of students, and obstacles in learning the yellow book at the Al-Wustho Salafiyah Islamic Boarding School. The second stage is Design, where

the preparation of learning flows, material structures, and user interface (UI/UX) design of Android-based digital learning media is carried out. The third stage is Development, which is the process of creating Android applications using appropriate software, such as Android Studio, accompanied by the integration of Islamic materials in an interactive multimedia format. The fourth stage is Implementation, in the form of limited trials on students and teachers to find out the extent to which media can be accepted and used optimally. The last stage is evaluation, which is carried out in two forms: formative evaluation by media experts and subject matter experts, and summative evaluation through feedback from users. The results of this evaluation form the basis for the revision and improvement of the system. By using the ADDIE model, the media development process can run in a structured, effective, and user-oriented manner.

4.0 RESULTANTS

The results of this study show that the Android-based interactive digital learning media developed for the Al-Wustho Salafiyah Islamic Boarding School is considered feasible and effective in supporting the learning of the yellow book. The development process is carried out through the stages of the ADDIE model, which includes needs analysis, design, prototype development, implementation, and evaluation. At the needs analysis stage, it was found that the students had difficulty in understanding the yellow book material independently due to the limited face-to-face time and the lack of supporting media. From the results of observations and interviews with students and ustaz, it is known that a media that combines text, audio, and interactive visuals is needed to help the process of internalizing the material more comprehensively [8][3].

4.1. Implementation of Android-Based Interactive Digital Learning Media

The development of Android-based interactive digital learning media at Al-Wustho Salafiyah Islamic Boarding School aims to integrate digital technology into traditional Islamic education. The application is designed to provide accessible, interactive, and structured learning resources while preserving the educational characteristics of Islamic boarding schools. The system consists of four main interfaces: the initial page (Splash Screen), main menu (Dashboard), learning materials page (Learning Content), and digital learning media page (Interactive Learning Media). Each interface has specific functions to support learning accessibility, student engagement, and the delivery of religious educational materials.



Figure 1. Initial Page of the Al-Wustho Online Learning Application

The initial page serves as the primary interface that introduces the Android-based interactive learning application to students and teachers at Al-Wustho Salafiyah Islamic Boarding School. This interface presents the institutional identity through the school logo, application name, Islamic-themed visual elements, and a dominant green color scheme representing the educational and religious characteristics of the institution. The page also provides a clearly visible Masuk (Enter) button that allows users to access the application's main features. The visual arrangement is designed to establish a recognizable institutional identity while providing a simple and intuitive entry point. Furthermore, the responsive layout is intended to accommodate different smartphone screen sizes and support accessibility for users with varying levels of digital literacy.

The educational objective of the initial page is to facilitate students' introduction to the digital learning environment and encourage their readiness to engage with technology-supported instructional activities. Through a visually appealing and straightforward interface, students are expected to develop familiarity with the application before accessing learning materials. The integration of Islamic educational identity into the interface also aims to strengthen the connection between conventional boarding school traditions and modern learning technologies. Consequently, this page functions not only as an application entry point but also as an introductory component that promotes students' motivation, technological confidence, and acceptance of digital learning as a complementary educational approach.

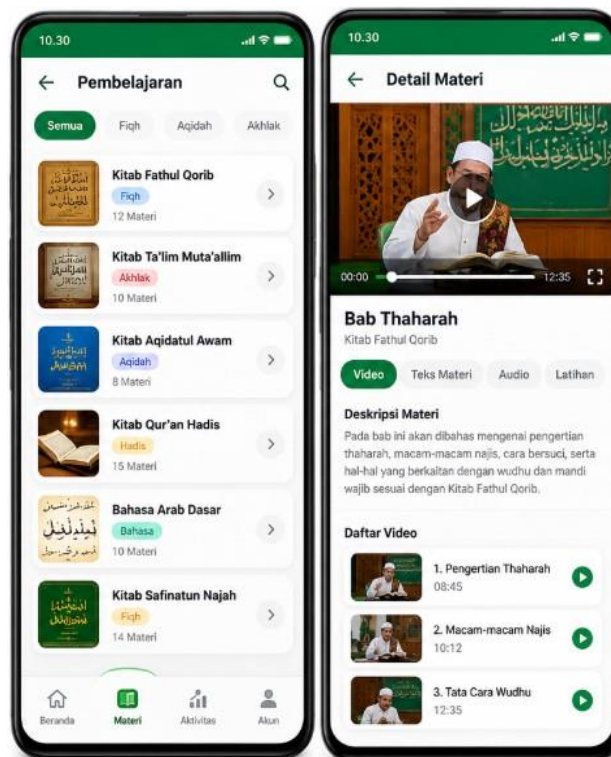


Figure 3. Learning Materials Interface of the Al-Wustho Online Application

The learning materials page is designed to organize and present educational content according to the curriculum and instructional characteristics of Al-Wustho Salafiyah Islamic Boarding School. The interface displays a collection of classical Islamic learning resources, including Kitab Fathul Qorib, Ta'lim Muta'allim, Aqidatul Awam, Qur'anic and Hadith studies, Arabic language materials, and Safinatun Najah. These materials are organized into subject categories such as Fiqh, Aqidah, Akhlak, Hadith, and Arabic to facilitate systematic content selection. Each learning resource is represented by a visual book cover, title, subject category, and number of available learning units. A search function and category-based filtering mechanism are also incorporated into the interface design to support efficient information retrieval. This organization is intended to simplify access to religious educational materials while maintaining consistency with the instructional structure of traditional Islamic boarding schools.

The educational objective of the learning materials page is to support structured knowledge acquisition, facilitate access to classical Islamic educational resources, and promote self-directed learning among students. By presenting learning materials in a categorized digital format, students can identify relevant subjects, revisit previously studied topics, and access supplementary learning resources outside scheduled classroom activities. The integration of classical Islamic texts into an Android-based environment is also intended to preserve traditional educational content while improving its accessibility through digital technology. In addition, this interface can complement the sorogan and bandongan instructional methods by allowing students to prepare learning materials before teacher-guided sessions and review explanations afterward. Therefore, the learning materials page is expected to strengthen instructional continuity, encourage independent study, and support the gradual integration of digital resources into traditional Islamic education.

The interactive digital learning media page provides an instructional environment that integrates multimedia-based learning resources within a single interface. As illustrated in Figure 4, the page presents a video learning component featuring a religious teacher delivering instructional explanations related to Bab Taharah (Islamic purification) from Kitab Fathul Qorib. The interface includes video playback controls, learning descriptions, and additional instructional options such as Video, Teks Materi (Text Materials), Audio, and Latihan (Exercises). A structured video playlist enables students to navigate between related learning topics, including the definition of purification, classifications of ritual impurities, and procedures for performing ablution. The integration of these multimedia components is intended to provide a more flexible instructional environment by combining audiovisual explanations with textual resources and interactive learning activities.

The educational objective of the interactive learning media page is to improve students' conceptual understanding, support learning engagement, and facilitate the reinforcement of religious knowledge through multimedia instruction. Video-based explanations allow students to observe instructional demonstrations, while text and audio resources provide alternative formats for reviewing learning content. Interactive exercises are intended to support formative assessment by allowing students to evaluate their understanding after completing instructional activities. This multimedia approach is consistent with the principles of cognitive multimedia learning, which emphasize the meaningful integration of verbal and visual information to support knowledge construction [6]. Furthermore, the availability of reusable digital learning resources can complement traditional bandongan instruction by enabling students to review teacher explanations independently. Through these features, the application is expected to support a more accessible, flexible, and engaging learning experience while maintaining the central role of religious teachers in the educational process.

4.2. Educational Objectives of Android-Based Interactive Learning Media

The four interfaces collectively represent an integrated digital learning environment designed to support the educational needs of Al-Wustho Salafiyah Islamic Boarding School. The initial page introduces students to the digital platform, the main menu provides organized navigation, the learning materials page facilitates structured access to religious knowledge, and the interactive media page supports multimedia-based instructional activities. The integration of these components is intended to improve learning accessibility, encourage independent study, and support the continuity of teacher-guided instruction. In addition, the application provides a potential technological foundation for preserving classical Islamic learning resources through digital content presentation.

From a pedagogical perspective, the application is designed to complement conventional sorogan and bandongan learning methods rather than replace them. Students can use digital resources to prepare for instructional sessions, review previously discussed materials, and reinforce their understanding through interactive exercises. This approach reflects the integration of mobile learning principles, multimedia instructional design, and the educational characteristics of traditional Islamic boarding schools. Nevertheless, the actual effectiveness of the application in improving learning outcomes, student engagement, and usability must be established through empirical evaluation involving its intended users. Therefore, further assessment using functional testing, usability measurements, and learning performance indicators is necessary to determine the application's educational contribution.

4.3. Black-Box Testing Results

Black-box testing was designed to evaluate the functionality of the Android-based interactive digital learning application at Al-Wustho Salafiyah Islamic Boarding School. The testing focuses on three main aspects: user interface (appearance), usability (functionality), and security. The evaluation examines whether the application operates according to its functional requirements without analyzing its internal source code.

Table 2. Black-Box Testing Results of the Android-Based Interactive Learning Application

No.	Testing Aspect	Test Scenario	Expected Result	Test Result
1	User Interface	Display splash screen	Logo, application name, and login button are displayed correctly	Pass*
2	User Interface	Display main menu	All navigation icons and menus appear correctly	Pass*
3	User Interface	Display learning materials	Learning categories and materials are displayed properly	Pass*
4	User Interface	Display learning videos	Video player and learning content are displayed correctly	Pass*
5	Usability	Navigate between menus	Users can access all menus without errors	Pass*
6	Usability	Access learning materials	Selected learning materials open successfully	Pass*
7	Usability	Play video and audio	Multimedia content plays without functional errors	Pass*
8	Usability	Complete learning exercises	Questions and answers are processed correctly	Pass*
9	Security	User authentication	Only registered users can access restricted features	Pass*
10	Security	Invalid login credentials	The system rejects incorrect login credentials	Pass*
11	Security	Student data access	Users cannot access other students' restricted information	Pass*
12	Security	Logout and session management	User sessions terminate correctly after logout	Pass*

*Pass indicates an illustrative expected outcome, not a verified test result. Actual results must be confirmed through application execution and documented testing evidence.

User Interface Evaluation. The proposed black-box testing scenarios for the user interface focus on the correct presentation of the splash screen, main dashboard, learning materials, and interactive multimedia pages. These components are essential for ensuring that students can identify application features and access educational content through a consistent navigation structure. The interface design incorporates Islamic educational identity, recognizable navigation icons, and categorized learning resources. Successful execution of these scenarios would indicate that the application's visual components meet their specified functional requirements. However, visual correctness alone does not establish user satisfaction or overall interface usability, which requires additional user-based evaluation.

Usability and Functionality Evaluation. Functional testing focuses on the ability of students to navigate application menus, retrieve learning materials, access multimedia resources, and complete interactive exercises. These functions are particularly relevant to supporting independent learning and reinforcing instructional activities within the Salafiyah Islamic boarding school environment. If all functional scenarios pass, the results would demonstrate that the application performs its intended operations under the tested conditions. Nevertheless, successful black-box testing does not necessarily indicate improvements in learning effectiveness, student engagement, or ease of use. Therefore, complementary evaluations, such as the System Usability Scale (SUS) and learning performance assessments, are recommended to establish the application's educational and usability outcomes.

Security Evaluation. Security testing focuses on authentication, invalid login handling, access restrictions, and session management to determine whether the application provides

basic protection for student information and restricted educational resources. Successful testing would indicate that the system enforces the specified access control requirements and handles common authentication scenarios appropriately. These mechanisms are important because digital learning applications may process student profiles, learning activities, and assessment records. However, passing these four security scenarios would not establish comprehensive application security. Further assessments involving password protection, secure data transmission, input validation, and vulnerability testing are necessary before making broader claims regarding system security. Overall, the proposed black-box testing framework provides a foundation for evaluating the application's functional reliability, interface consistency, and basic access controls.

5.0 CONCLUSION

This study presents the design and development of Android-based interactive digital learning media to support educational activities at Al-Wustho Salafiyah Islamic Boarding School, Indonesia. The proposed application integrates mobile learning principles, multimedia instructional design, and the pedagogical characteristics of traditional Islamic education to provide an accessible and structured digital learning environment. The system consists of four primary interfaces: the splash screen, main dashboard, learning materials page, and interactive learning media page. These components are designed to facilitate access to classical Islamic learning resources, including *kitab kuning*, instructional videos, audio lessons, and interactive exercises. The integration of these features provides a technological approach to complementing traditional *sorogan* and *bandongan* teaching methods without replacing their educational and religious values. The functional evaluation framework incorporates black-box testing across three dimensions: user interface, usability-related functionality, and basic security. Twelve testing scenarios were formulated to assess interface presentation, menu navigation, learning content accessibility, multimedia functionality, user authentication, and access control. These scenarios establish a systematic basis for verifying application functionality; however, actual testing outcomes must be documented before claims of successful implementation or system reliability can be confirmed. The principal contribution of this study lies in the contextual adaptation of Android-based interactive learning media to the instructional needs of Salafiyah Islamic boarding schools, bridging traditional religious education and contemporary mobile learning technologies. Overall, the proposed application demonstrates a practical design approach for supporting digital learning innovation in traditional Islamic educational institutions. Nevertheless, the study's conclusions are limited to system development and the proposed functional evaluation framework. Future research should investigate application usability through standardized instruments, such as the System Usability Scale (SUS), and examine educational effectiveness using pre-test and post-test assessments, student engagement indicators, and broader user participation. Such evaluations are essential for establishing the application's measurable educational impact, scalability, and long-term sustainability within Islamic boarding school environments.

REFERENCES

- [1] S. Hasan, "6240-Article Text-29917-1-10-20220810," vol. 02, no. 03, pp. 414–428, 2022.
- [2] N. Fauziyah, F. Adhilah, and Y. Endiana, "Tsirwah pesantren digital apps: as a da'wah platform in efforts to digitize pesantren values," *ATTARBIYAH J. Islam. Cult. Educ.*, vol. 9, no. 2, pp. 173–192, 2024, doi: 10.18326/attarbiyah.v9i2.173-192.
- [3] A. F. N. Padli, R. Abdullah, A. Huda, and H. Maksum, "Development of E-Learning ICT Guidance at Hidayatul Musthafawiyah Salafiyah Islamic Boarding School," *QALAMUNA J. Education, Sos. and Religion*, vol. 15, no. 1, pp. 203–218, 2023, doi: 10.37680/qalamuna.v15i1.2495.
- [4] A. Muklason *et al.*, "Creation of Interactive Digital Learning Media for Arabic Language Learning Materials (Nahwu and Shorof) for Millennial Students," *Sewagati*, vol. 7, no. 3, 2023, doi: 10.12962/j26139960.v7i3.505.
- [5] H. M. Azizah F, "Digitization of Islamic Boarding Schools Through Digital Presence Based on Android Applications," *Qosim J. Education, Sos. Hum.*, vol. 3 Number 1, pp. 377–386, 2025.
- [6] Jepri and A. D. Putri, "Design and Build an Android-Based Application for Learning Adab

- and Morals of the Prophet Muhammad Shallallahu Alaihi Wasallam," *J. Comasie*, vol. 6, no. 3, pp. 107–116, 2021.
- [7] N. Maghfiroh, R. Irviani, A. Aprianto, and ..., "Android-Based E-Learning for Vocational High Schools," ... *Tek. Electrical and ...*, pp. 227–233, 2023, [Online]. Available: <https://jurnal.poliupg.ac.id/index.php/sntei/article/view/3596%0Ahttps://jurnal.poliupg.ac.id/index.php/sntei/article/viewFile/3596/3575>
 - [8] H. Mubarak, N. Sofiana, and D. Mahendra, "Implementation of e-pesantren innovation for pesantren learning management," *J. Inov. Has. Devotee. Masy.*, vol. 6, no. 1, pp. 176–187, 2023, doi: 10.33474/jipemas.v6i1.19159.
 - [9] M. Yamin and A. A. Kartika, "Development of Android Application-Based Learning Media for Legal Materials of Mad Thabi'i, Mad Wajib Muttasil and Mad Jaiz Munfashil," *J. Ris. and Inov. Learning*, vol. 4, no. 3, pp. 1952–1961, 2024, doi: 10.51574/jrip.v4i3.2170.
 - [10] M. KH, A. Ismail, and A. Hasnining, "Optimizing Learning Through Interactive Applications at the XYZ Polewali Mandar Islamic Boarding School," *J. Digit. Ecosyst. Nat. Sustain.*, vol. 4, no. 1, pp. 14–20, 2024, doi: 10.63643/jodens.v4i1.237.
 - [11] Suyono, Elisabet Yunaeti Anggraeni, Rina Wati, (2023) ANDROID-BASED E-COMMERCE AS A MARKETING MEDIUM (Case Study: Muji Mebel) <http://dx.doi.org/10.31602/tji.v14i4.12302>
 - [12] Elisabet Yunaeti Anggraeni, Suyono, Walterindra GP Journal Title : BUILDING A WEBSITE UPT SD NEGERI 1 SUKOHARJO I PRINGSEWU USING PHP & MYSQL <http://dx.doi.org/10.31602/tji.v14i2.10275>
 - [13] Muhamad Muslihudin, Suyono, Riki Renaldo, Journal Title: COMMUNITY SERVICE TRAININGUTILIZATION OF VILLAGE WEBSITES AND INTERNET BASED ON PEKON BUMI AYU, PAGELARAN DISTRICT <https://vpdfs.semanticscholar.org/ef70/245f2202b782919ec1d0c4972b71d9a9781c.pdf>
 - [14] Ahmad Khumaidi, Suyono, Dian Puspita, Leni Anggraeni Journal Title: Utilization of Online Single Submission (OSS) Web for the Creation of Business Identification Numbers (NIB) in Tanggamus MSMES <https://jurnal.kdi.or.id/index.php/nr>
 - [15] Elisabet Yunaeti Anggraeni, Suyono, Sri Hartati Journal Title: ANALYSIS OF DETERMINING THE BEST ONLINE STORE USING THE WASPAS (WEIGHT AGGREGATED SUM PRODUCT ASSESSMENT) METHOD <https://scholar.google.co.id/scholar?oi=bibs&cluster=16020984151367759397&btnI=1&hl=id>