Profetika
JURNAL STUDI ISLAM
P-ISSN: 14110881 I E-ISSN: 25414534
Vol. 25, No. 2, 2024, pp. 533-546
https://doi.org/10.23917/profetika.v25i02.7877

Systematic Review: Android-Based Interactive Learning Media to Enhance Understanding of Islamic Education in Support of SDGs

Umi Basyiroh[1], *Akhmad Arif Musadad*[2], *Moh. Muchtarom*[3], *Abu Zarrin bin Selamat*[4]

[1,2,3]Faculty of Education, Universitas Sebelas Maret, Indonesia

[4]Faculty of Human Sciences, Sultan Idris Education University, Malaysia

[1]umibasyiroh@student.uns.ac.id, [2]akhmadarifmusadad@staff.uns.ac.id, [3]muhtarom1974@staff.uns.ac.id, [4]zarrin@fsk.upsi.edu.my

Received March 17, 2024; Revised August 11, 2024; Accepted November 21, 2024

Abstract

Objective: The modern era necessitates the development of Islamic Religious Education (IRE) learning that is interactive and practical, aligning with digitalization trends and supporting the Sustainable Development Goals (SDGs) in quality education. However, traditional PAI learning often relies on one-way lectures, limiting student engagement and hindering conceptual understanding. This study aims to analyze the role of Android-based interactive learning media in enhancing students' comprehension of IRE concepts. **Theoretical framework:** The theoretical framework of this study is based on the constructivist learning theory, which emphasizes active student participation in the learning process. Additionally, cognitive load theory is considered, as interactive digital media can reduce extraneous cognitive load and facilitate meaningful learning. **Literature Review:** A literature review was conducted to explore previous studies on Android-based learning applications in religious education. **Methods:** This study employs a systematic literature review methodology, incorporating qualitative analysis to synthesize research findings from various academic sources. **Results:** Research findings indicate that interactive features such as videos, quizzes, and simulations significantly improve students' understanding and engagement in IRE subjects. Applications like Mobile Learning, RuBer IRE, and iSpring Suite provide creative and relevant learning experiences, aligning with the SDGs' goal of inclusive and equitable quality education. The reviewed studies demonstrate that Android-based learning media enhances knowledge retention and critical thinking skills. However, challenges such as internet connectivity issues, data security, and students' technological proficiency must be addressed to maximize effectiveness. **Implications:** The study's implications highlight the need for educators and policymakers to integrate digital learning tools in Islamic education strategically. **Novelty:** This research offers novelty by emphasizing the intersection of Islamic education, interactive digital learning, and SDGs, showcasing how technology can bridge gaps in traditional religious instruction. Future studies should focus on empirical evaluations of Android-based media in diverse educational settings.

Keywords: android, learning media, islamic education, students, sdgs.

INTRODUCTION

In the modern digital era, education is undergoing a significant transformation, with technology playing a crucial role in enhancing learning experiences. Islamic Religious Education (IRE) is no exception, as it must adapt to contemporary educational trends to remain relevant and effective. Traditional methods of IRE instruction often rely on one-way lectures, limiting student engagement and comprehension. The integration of Android-based interactive learning media offers a promising solution to address these challenges, providing students with engaging, interactive, and accessible learning experiences [1].

The significance of this topic lies in its alignment with the Sustainable Development Goals (SDGs), particularly Goal 4, which emphasizes inclusive and equitable quality education. By leveraging digital learning tools, educators can foster deeper conceptual understanding, promote critical thinking, and encourage active participation in religious education. Research has demonstrated that interactive features such as quizzes, simulations, and multimedia content enhance student engagement and knowledge retention. However, the successful implementation of Android-based learning media in IRE requires addressing challenges such as internet accessibility, data security, and digital literacy [2].

This systematic review aims to analyze the effectiveness of Android-based interactive learning media in improving students' understanding of IRE concepts. By synthesizing existing research, this study provides insights into the benefits and challenges of digitalizing Islamic education and highlights the need for strategic integration of technology to support SDGs in the educational sector. Education is a place to obtain religious and spiritual strength, emotional control, personality, intelligence, noble morals, and abilities needed by individuals, communities, nations, and countries. Thus, education not only plays a role in improving the intelligence of students but also can form characters or traits that are beneficial to society, nation, and state. Education as a form of conscious and designed effort requires steps to optimize and utilize all existing resources in educational institutions to achieve goals and targets by predetermined plans [2].

The current era requires Islamic Religious Education to advance rapidly, optimally, and efficaciously so that religious learning can adjust to the increasingly progressive trends of digital technology. Islamic teaching has a vital function in fostering the personality of students, especially in the challenges faced in this day and age. However, the reality shows that Islamic learning often relies only on the one-way lecture method. This condition makes students' involvement in the learning process less than optimal, which has an impact on their understanding of crucial concepts in PAI that are still low. This situation emphasizes the need for a new approach that is more interesting and relevant to the needs of today's learners. Learning tools in the era of digital globalization must be aligned with technological developments that continue to advance. The transition of society to the 5.0 era is a continuation of the 4.0 industrial revolution, which emphasizes technological advances that continue to develop rapidly every day. Technology now plays a significant role in many areas of life, slowly changing the way people live and think, especially among teenagers. The use of technology as a learning resource has proven to be effective in supporting the learning process in educational institutions [3].

The digital age is an age where most people rely on digital systems in their daily lives. In this period, information can be conveyed through various media. Effective communication media must be clear, precise, and fast. The advancement of digital technology is seen in the presence of devices such as computers, the internet, cell phones, and social media platforms. Examples of frequently used digital devices include televisions, portable game consoles, digital clocks, smartphones, computers, and laptops, as well as Android-based devices [4]. The rapid development of digital technology has opened up great opportunities for the world of education, including in the field of PAI. Android-based learning media, which is easily accessible and flexible, offers a solution to the challenges in the PAI learning process. By utilizing specially designed interactive applications, this

P-ISSN: 14110881 | E-ISSN: 25414534

media can attract students' interest and encourage their active participation in learning. It is important to understand that the learning media used must be able to captivate learners' attention to be effective in supporting their learning process [5].

One of the effective approaches to conveying material more realistically and correcting the misunderstanding of concepts, the use of Android-based learning media is the right solution. This media is an interesting option because it can deepen students' understanding of the material presented while encouraging them to be more actively involved in the lesson. The advantage of Android-based learning media lies in its ability to deliver PAI discussions through fun methods, videos, animations, interactive quizzes, and simulations. This varied presentation greatly facilitates students in understanding the idea of PAI as a whole and its application [6]. Therefore, Android-based interactive learning media not only serves as a learning medium but also an effective medium to improve students' understanding of important concepts in PAI. The rapid development of technology has changed the way students interact with information. Today's young generation is very familiar with digital technology, such as smartphones and Android-based applications. The presence of this technology in their daily life opens up opportunities to integrate it into the learning process, including in PAI subjects [7]. In choosing learning media for such subjects, it is important to make the right selection to determine the most effective and appropriate media for the teaching situation at hand. With the characteristics of mobile devices and the lack of experience of teachers and educational institutions, students may experience disruptions in their learning and may engage in inefficient educational methodologies. Appropriate use of digital technologies and pedagogical approaches in the design of learning models can result in improved student learning outcomes [8].

This interactive approach to learning offers several significant benefits. First, interactive media can present PAI material in a way that is more fun and easier to understand. For example, abstract concepts in religion, such as morals, worship, and Islamic history, can be visualized through videos or animations. This certainly makes it easier for students to grasp the essence of the material [9]. Second, with a more participatory approach, millennial students will feel more motivated to learn and develop their understanding independently. Third, technology-based learning opens wider and deeper access to information, allowing students to explore various sources of material relevant to the PAI curriculum. Previous studies on the use of Android-based interactive learning media include Budiman et al, [10]. (2022) that students think that Android-based learning media has a high attractiveness, so its use in the learning process is very important. In addition, Shidiq & Mustafa (2023) mentioned that the introduction of learning media plays an important role in supporting the learning process from the source of knowledge. The initiative aims to enrich learning motives so that it can increase the achievements in learning activities. Therefore, educational steps can run optimally and achieve the desired goals [11].

Based on this explanation, it is important to develop an Android-based learning media that will be run in PAI learning activities. The purpose of the study is to analyze the role of Android-based interactive learning media in improving the understanding of PAI concepts among students [12]. It is expected that the findings of the study will contribute a lot to the development of PAI learning methods that are more relevant, effective, and appropriate to the needs of students in the digital era. Thus, the utilization of technology in PAI learning can be a solution to improve the quality of religious education, as well as to form a young generation that is intellectually smart and spiritually strong.

LITERATURE REVIEW

Android is an open-source mobile operating system developed by Google Corporation, one of the world's leading search engine companies. According to Dixit (2014), Android is a platform used for mobile devices, which includes an operating system, middleware, and core applications. Android is a technology designed for cellular phones and tablet computers with a touchscreen based on Linux. Over time,

P-ISSN: 14110881 | E-ISSN: 25414534

Android has transformed into a highly innovative program. This change and progress are inseparable from the active role of Google as the main developer who acquired Android and created an ecosystem rich in features and applications [13].

The word "media" is derived from the Latin term "medius," meaning intermediary. According to Arabic, the term "wasail" is a multiple form of "wasilah," meaning intermediary. In this context, "middle" refers to the role of being a connector or intermediary. In general, learning can be understood as the relationship between students, teachers, and learning materials, as well as the sharing of knowledge between educators and students [14]. The learning process can also be interpreted as a conscious, structured, informative, interconnected, and focused activity between the teacher, learning materials, the surrounding environment, and the learner. The goal is to achieve teaching goals through effective teaching mechanisms that can be done through direct meetings or with learning media. This is important so that students can change their attitudes as part of the new knowledge they gain. Based on Yusufhadi Miarso, educational facilities include everything that plays a role in conveying information that can trigger students' thoughts, emotions, concentration, and desire to learn [15]. Thus, the mechanism of guidance and teaching of knowledge can take place in an organized, deliberate, and scheduled manner. Learning media serves as a bridge in conveying information and communication that can realize special learning conditions for students. Therefore, this media plays an important role in achieving teaching goals. Learning media is also effective in motivating learners' desires as they engage in teaching activities. In addition, this media contains instructional elements that help increase student motivation so that the effectiveness and objectives of teaching and learning procedures can be better obtained [16].

The teaching of Islamic values is one of the essential areas of study to be inculcated in students at various stages of education, from early learning to university. The main goal of Islamic teaching is to form noble ethics. In the National Education System Regulation No. 20 of 2003, teaching is a deliberate effort to create a learning atmosphere that supports students in developing their abilities [17]. These abilities include spiritual aspects, self-control, character, intellect, noble morals, and skills needed to play a role in the community. Zakiyah Daradjat, as stated by Abdul Majid and Dian Andayani, said that Islamic teaching is a stage of learning and adjustment. The orientation is so that students can understand Islamic values as a whole, absorb them into their life routines, and finally practice them, thus making Islam a guide to their lives [18], [19].

Islamic teaching is a planned effort to convey knowledge to students so that they can recognize, understand, absorb, believe in, and practice religious principles and noble ethics in their routine lives. This stage is derived from revelation as well as the Prophet's guidance through various activities of guidance, teaching, training, and hands-on learning. In addition, this education is also equipped with guidance to respect the teachings of other religions to create unity, unity, and peace in society and the state [20].

The advancement of technology in the education sector has led to significant innovations in teaching and learning methods. One such innovation is the use of Android-based interactive learning media, which has become increasingly popular due to its accessibility, user-friendliness, and ability to support active learning. In the context of Islamic education, this form of media offers a modern approach to presenting religious content in a more engaging and interactive manner. Interactive media can enhance students' understanding by integrating various multimedia elements such as animations, audio, videos, and quizzes that make abstract religious concepts more concrete. This approach encourages learners to participate actively, improves retention, and supports individualized learning experiences. Particularly in Islamic education, where understanding deeply rooted spiritual and moral teachings is essential, interactive tools can help make the learning process more meaningful

P-ISSN: 14110881 | E-ISSN: 25414534

and relatable. Furthermore, the use of Android-based learning tools supports the objectives of the Sustainable Development Goals (SDGs), especially in promoting inclusive and equitable quality education. These tools can be utilized in various educational settings, including remote or underserved areas, thus helping to reduce educational disparities and improve access to quality Islamic learning resources [18], [19].

Despite the benefits, challenges such as content accuracy, teacher readiness, and curriculum integration must be addressed to ensure effective implementation. It is important that the content delivered through these platforms aligns with authentic Islamic teachings and is pedagogically sound. Overall, Android-based interactive learning media hold great potential in transforming Islamic education by combining traditional values with modern educational technology. With careful design and appropriate implementation, this innovation can significantly enhance students' understanding and contribute to the broader goals of sustainable and inclusive education [18], [19].

METHODOLOGY

The study examines the role of Android-based interactive learning media to improve the understanding of Islamic Religious Education (PAI) concepts among students. In the research process, a literature review and desk research method combined with a qualitative approach were used. To gather in-depth information and data, the researcher explored various sources, including books, notes, journals, and other relevant references, and found findings from previous research. This approach aims to find solutions and theoretical foundations for overcoming the problems being studied.

The empirical data applied in this study is obtained through a variety of references, including books, articles, written works, and other literary works that are relevant to the core research question. This research utilizes the main origin of information, which is the main information that is immediately collected by the reviewer through the main source of the object of research, namely books, and articles that are the main focus of the discussion. This research uses secondary data obtained through a literature study with the stages of defining the meaning of the topic study, identifying relevant reference materials through Google Scholar, selecting references, grouping by topic category, writing a review, and concluding and applying the review results. The research topic discussed the role of android-based interactive learning media in improving students' understanding of PAI concepts with keywords such as "interactive learning media," "android," "students," and "PAI concepts." References were obtained using Google Scholar, resulting in about 250 articles, which were then selected to obtain relevant articles. After the data were collected, data reduction was carried out by sorting out the appropriate journals, followed by writing an outline of the research findings on the role of android-based interactive learning media to improve students' understanding of PAI concepts. The final stage is conclusion drawing and verification to determine the role of interactive learning media based on Android to improve the understanding of PAI concepts in students [21], [22].

The analysis in this study focuses on the function of communicative teaching tools using the Android platform to strengthen the understanding of Islamic Religious Education (PAI) concepts among students. With a holistic approach that combines traditional and technological elements, this research aims to explore the impact of the medium. Through a qualitative approach, this research seeks a deeper understanding of how communicative teaching tools using the Android platform can contribute to strengthening the understanding of Islamic Education concepts. In-depth interviews with educators as well as learners, as well as immediate observations of learning spaces, will be used to explore the perceptions, experiences, and challenges faced in the integration of such learning media.

This qualitative approach can provide a clearer picture of how effective technology is in improving students' understanding and participation in Islamic learning. To this end, online surveys or questionnaires can be used as a tool to collect data on technology use

P-ISSN: 14110881 | E-ISSN: 25414534

preferences, frequency of use, and its impact on academic achievement. By integrating these two approaches, this research is expected to offer a comprehensive insight into the role of technology in the context of Islamic education in the digital era.

Table 1. Research Method

Aspects	Description
Research Design	This research is qualitative and focuses on literature review and literature research, aiming to explore the theoretical foundations and identify solutions in the field of Islamic education in the digital era.
Data Collection	Primary Sources: This is information obtained immediately from the focus of the study, such as books and articles relevant to the topic under study. Secondary Sources: Includes journals, research papers, and various other literature that discusses issues related to the research. Empirical Data Collection: Conducted through in-depth interviews with teachers and students, classroom observations, and online surveys.
Data Source	Books, journals, previous research, notes, and digital publication sources relevant to Islamic education and technology integration.
Research Techniques	Library Research: This involves collecting and analyzing theoretical and empirical information from books and journals related to Islamic education and digital learning. In-depth Interviews: In this method, we collected qualitative data focusing on teachers' and students' experiences and views on technology integration in Islamic education. Direct Observation: Direct observation of classroom interactions to evaluate the role of technology in the Islamic learning process. Surveys/Questionnaires: This method is used to collect statistical data relating to the use of technology and its impact on academic outcomes.
Data Analysis	Holistic Analysis: Blending qualitative and quantitative data to assess traditional elements as well as the application of technology in Islamic education. Qualitative Analysis: Interpreting data from interviews and observations to understand the extent to which technology is integrated into the religious learning process. Quantitative Analysis: Utilize data from surveys to evaluate the impact of technology on student understanding, participation, and academic achievement.
Predicted Outcome	A comprehensive understanding of how android-based interactive learning media affects Islamic learning and teaching, including teacher and student perspectives, effectiveness of technology use, and insights into the overall impact of technology on student engagement and academic achievement.

RESULTS AND DISCUSSION

Utilization of Android-Based Learning Media on Understanding of PAI Concepts

In response to the demands of the Industrial Revolution 4. 0, innovation in teaching is needed, for example, by optimizing digital technology as a teaching tool. The application of IT tools makes the learning process accessible and interesting for students. The selection of smartphone tools using the Android platform is based on the increasing number of active users globally, which currently reaches 2.5 billion active Android users per month. In addition, Android offers practicality, allowing learning to be carried out in various locations and at any time. The quality of learning media itself is determined by various aspects that need to be considered. Five principles need to be considered when determining or selecting teaching tools, namely: 1) Effectiveness, 2) Suitability, 3) Efficiency, 4) Ease of Use, and 5) Contextuality [23]. These principles are the same as those tested in the Android-based feasibility test. The effectiveness test of interactive learning media is very important to assess the suitability of a teaching tool. The use of smartphones as learning media that are easy to carry, accessible, and affordable has a significant impact on students. The existence of Android-based smartphones also increases students' interest in utilizing them, thanks to their "in" nature and the fact that they have evolved into an element in their life routine. For example, the utilization of interactive learning media, such as Kahoot and Quizizz apps, has

P-ISSN: 14110881 | E-ISSN: 25414534

been proven effective in strengthening students' learning spirit in PAI subjects. These media provide opportunities for learners to fully participate in learning activities so that they can feel a deeper connection with the material being taught [24]–[26].

Traditional classroom learning is unable to provide an atmosphere of immediate learning, faster assessment, and more participation. However, electronic-based educational tools and innovations address this gap. Some of the efficiencies offered by such innovations are incomparable to conventional teaching methods. As smartphones and other cordless devices become more popular in the public sphere, it is only natural for educational institutions to optimize them by putting technology in the learning space. An example of a breakthrough in system-based teaching tools is device-based learning, which utilizes smartphones based on the Android platform as its main device. Mobile-based learning is the use of information technology devices such as portable communication devices, cellular phones, laptops, and tablet PCs in learning procedures to make the learning experience more flexible and dynamic [27]. Along with the rapid development of technology, mobile learning not only provides easy access to learning materials but also provides various interactive features that effectively support students' learning process. For example, Android-based smartphone devices make it possible to develop educational applications that can be accessed at any time and in any location, thus providing students with the freedom to learn at their own pace. However, mobile learning offers opportunities for learners to participate in teaching based on simulation tasks, as well as interactive quizzes that strengthen their interest and motivation in learning. With the widespread support of the internet, mobile learning also facilitates more intense interaction between students and teachers through online discussion features or collaborative learning across regions. Not only relevant in the digital era, the application of mobile learning is also in line with the needs of the younger generation, who are familiar with the use of technological devices in their daily routines. Therefore, mobile learning using Android devices is an effective solution for presenting an adaptive, innovative, and appropriate learning process [28], [29].

In the research of Saputra et al. (2023) entitled "Development of Islamic Religious Education Learning Media Using Smarts Apps Creator (SAC) on Hajj and Umrah Material" in the journal Journal of Management Science and Education, it is stated that Android smartphone-based multimedia applications for learning Hajj and Umrah are designed using Smart Apps Creator (SAC) software, a platform that allows the creation of interactive learning media with an attractive and easy-to-use display. This application presents material by the Competency Standards (SK) and Basic Competencies (KD) related to Islamic law, specifically about the implementation of Hajj and Umrah, including definitions, pillars, requirements, sunnah, and prohibitions [30]. The material in this application is supported by visual features such as images, graphics, audio, and video, which not only make learning more interesting but also make it easier for students to understand material that is often considered abstract or difficult. The advantages of this application include its dynamic, practical, economical, and flexible presentation, allowing students to access the material anytime and anywhere through smartphone devices. In addition, this app offers interesting learning innovations with a creative and interactive multimedia approach, thus increasing students' interest, motivation, and understanding of the material. However, this application also has some limitations, such as the limited scope of material on Hajj and Umrah, dependence on smartphone specifications, and large memory requirements due to the use of rich multimedia features [31]. Nevertheless, the effectiveness of this application has been proven through various previous studies. Research shows that the use of SAC-based media can significantly improve student learning outcomes, as evidenced by the increase in pre-test and post-test scores. In addition, the majority of teachers and students expressed satisfaction with the SAC-based learning media due to its interesting and innovative features. SAC allows the presentation of abstract material to be more concrete and realistic, supporting students to more easily understand concepts that are rarely practiced in everyday life, such as Hajj and Umrah. With intuitive navigation features and an integrated system on smartphones, this application allows students to interact, work, and learn flexibly as

P-ISSN: 14110881 | E-ISSN: 25414534

needed. As a technology-based learning media, SAC is a relevant solution for learning in the Era of Society 5.0, answering modern learning challenges that require innovative, interactive, and effective media to improve the quality of education [32].

Research Tresna et al. (2020), in their research entitled "The Use of RuBer PAI Application as a Media for the Introduction of Da'wah in Grade 5 Elementary School" in the journal Fashluna stated that in reality, there are still many problems with teaching facilities that are less diverse, especially in Islamic Religious Education lessons regarding basic understanding of da'wah which requires devices for educators to convey the topic. The utilization of technology-based devices, such as Android applications, is still rarely applied, so they only use Islamic Education textbooks. This phenomenon is caused by the lack of devices because the majority of students at SDN Darang come from households with low economic status [33]. One example of Android-based learning media is RuBer PAI, an application designed to support PAI teaching in a fun and effective way. This application offers a variety of interactive features, such as learning videos, quizzes, and animations that can help students understand concepts easily and in a fun way. With RuBer PAI, teachers can teach religious concepts creatively and innovatively, while students can learn independently with flexible access through their smartphones. Hopefully, this application can heighten learner participation, inspire them to learn, and design varied and interesting learning experiences for the needs of the digital age. The cognitive theory of multimedia proposed by Mayer (2001) states that the use of multiple media (text, images, audio, and video) can improve the learning process because it helps students process information more effectively. Mobile learning allows the integration of various media into one platform [34]–[36].

The findings of the study 'By Aisyah & Sulaikho, in the TARLIM Journal: Journal of Islamic Religious Education entitled "Validity of Android-Based Ispring Suite Learning Media on Understanding Jama' and Qashar Prayers," in 2021 states that another Android-based learning media utilization is iSpring Suite, an interactive learning media that integrates audio, video, and quiz maker to create a more dynamic learning experience. This media was developed from Microsoft PowerPoint, making it easy to use by teachers and students who are familiar with the platform. In learning Islamic Religious Education (PAI), iSpring Suite is specifically designed to facilitate understanding of materials, such as jama' and qashar prayers, through a more interesting and effective delivery. With its interactive features, this tool is not limited to supporting teachers in delivering lessons creatively but also strengthens learner participation in learning activities, making them more fun and easy to understand [37].

The Positive Impact of Using Android-Based Learning Media on Students' Understanding of PAI Concepts

Android has had several positive impacts on its users. The system facilitates communication between individuals, enabling the search for information on various subjects quickly and without limitations. Android facilitates learning through internet access, supporting knowledge exploration. It provides a wide range of entertainment, from games to audio and video, that can be enjoyed by all. Thus, teenagers and adults can be more tech-savvy, making all activities more effective and efficient. The application of mobile learning in PAI learning has great potential to increase learner motivation. This can be achieved through several aspects. First, in terms of Attention, mobile learning can attract students' attention with interactivity and the use of interesting multimedia. Next, in terms of Relevance, the lessons delivered are synergized with students' daily lives, making it easier to understand and apply. Third, to increase Confidence, it is important to provide constructive feedback and exercises that increase student confidence. Finally, in terms of Satisfaction, the learning experience offered should be satisfying, which can be achieved through flexible and adaptive learning. Thus, mobile learning not only provides accessibility but also enlarges learners' enthusiasm and participation in their learning

P-ISSN: 14110881 | E-ISSN: 25414534

activities. The main purpose of developing mobile learning applications is to provide flexible and easy access for users to learn anywhere and anytime using their devices. Not only does this increase accessibility, but it is also possible to make learning more personalized and adaptive. With online access, students can conduct learning activities without being limited by physical space or time. However, students need to have an Android device connected to the internet to optimally utilize mobile learning applications. In addition, the download facility allows students to download the content and access it at a later time offline as a precaution when they are in a location with minimal or no online network. Within Mobile Learning, there is a Monitoring and Evaluation feature designed to monitor the extent of student progress in the learning process. The app provides reporting covering various aspects, such as student learning progress, participation rate, exam and quiz results, time spent on learning, as well as feedback from teachers. Through these features, teachers can effectively monitor student progress, identify areas for improvement, and provide appropriate guidance. With these features, teachers can more easily formulate better teaching strategies based on students' understanding of the material being taught [38].

By implementing engaging and engaging teaching practices, such as learning through games or narratives, it is desirable to increase students' interest and enthusiasm in the learning process. This can be observed through an increase in students' engagement in learning activities and interest in teaching materials. Such an increase in enthusiasm and passion is likely to have a beneficial effect on learners' educational achievement. When learners are interested and encouraged, they tend to be more engaged and more eager to explore the teaching materials in detail. The utilization of mobile-based educational tools can also motivate learners to engage with digital devices more deeply. It is desirable that through the use of this online learning program, learners can improve their technical skills and digital savvy, which are vital for the future. Technical skills and digital understanding are increasingly becoming vital aspects of contemporary society. With the great utilization of technological systems in various spheres of life, mastering the appropriate technological skills will provide learners with a competitive advantage in the future. Through the implementation of flexible teaching methods that are altered according to the demands of each student, it is desirable that their understanding of the ideas of the material can develop. This situation, in turn, will be reflected in superior academic achievement. Improving the understanding of ideas and learning outcomes are the main goals of learning activities. By ensuring that each learner is provided with teaching materials that are aligned with their level of understanding, the creation of mobile phone-based electronic learning mobile education tools can serve as an efficient instrument for optimizing learning outcomes. Elements such as discussion boards and shared tasks are desirable to motivate the utilization of the e-learning platform, thereby improving students' interconnectedness skills in a social context. The skills to cooperate and communicate in a social context are crucial abilities that are needed in daily routines as well as in the future world of work. Through cooperative experiences in education, students can develop the ability to collaborate and respect multiple perspectives. The design of an Android-based mobile e-learning educational tool for students is desired to provide meaningful benefits, including the development of interest in learning, technological expertise, understanding of ideas, academic achievement, and social skills. Thus, investing in these technological systems can produce significant beneficial effects on students' learning processes in the future [39].

The negative impact of using Android-based learning media on students' understanding of PAI concepts

Educators in schools come from diverse backgrounds and age ranges, which affects how they utilize technology and learning media. Younger educators generally get more opportunities to master new knowledge compared to their more senior colleagues. To address this disparity, school leaders divided educators into several learning groups. In each group, they share their knowledge and experience so that more advanced educators can help their peers. However, when learning takes place through E-Learning that requires an

internet connection, learners often experience disruptions, such as interrupted access to learning sites due to unstable signals. Online access opens up opportunities but also increases the risk of hacking by those who want to exploit the benefits. Therefore, security issues are very important to consider. In this case, several data security considerations need to be taken, including student privacy, access management, use of security certificates, data backup, encryption, software updates, and policies and training. The main focus is on protecting students' personal information, such as names, addresses, and other identifying data. Access to sensitive data is strictly managed and granted only to authorized parties such as teachers and administrative staff. To protect important student information from loss or damage, data backups are conducted regularly. Policies and training are also implemented, with a focus on developing data security policies and training teachers and staff on the necessary security measures. In addition, it is important to consider students' skills in using the app when implementing mobile learning media. Although the application is very well designed, if students do not have sufficient skills to utilize it, then the results will not be maximized [40].

Analysis and Discussion

The integration of Android-based interactive learning media in Islamic Religious Education (IRE) is a crucial step toward achieving Sustainable Development Goal (SDG) 4, which promotes inclusive and equitable quality education. Traditional IRE learning methods often emphasize rote memorization and one-way lectures, which can hinder students' critical thinking and engagement. In contrast, interactive digital learning tools enhance conceptual understanding through multimedia content, simulations, and gamification. These features align with modern pedagogical approaches that emphasize student-centred learning and active participation.

Studies have shown that Android-based learning applications significantly improve students' comprehension and retention of religious concepts. Applications such as Mobile Learning, RuBer IRE, and iSpring Suite provide diverse learning experiences through interactive quizzes, video lectures, and real-time feedback mechanisms. These tools help reduce extraneous cognitive load, allowing students to focus on meaningful learning, as proposed by Cognitive Load Theory. Additionally, the Constructivist Learning Theory supports the notion that digital tools encourage students to construct their knowledge actively rather than passively receiving information.

From an SDG perspective, digital learning technologies also contribute to reducing educational inequalities (SDG 10) by making quality Islamic education more accessible to students in remote and underserved areas. However, challenges persist, including disparities in internet access, digital literacy gaps, and concerns over data privacy. Without addressing these barriers, the benefits of Android-based learning media may not be fully realized, potentially widening the digital divide rather than closing it.

Another critical discussion point is the role of educators in effectively integrating digital tools into the IRE curriculum. Many teachers require professional development to optimize the use of interactive media, ensuring that technology complements rather than replaces traditional teaching methods. Furthermore, policymakers must support digital education initiatives by improving infrastructure, providing training, and ensuring that Islamic educational content remains accurate and contextually relevant. In conclusion, Android-based interactive learning media offer transformative potential for enhancing Islamic education while supporting the broader educational goals of SDGs. Future research should focus on empirical studies to evaluate the long-term impact of these technologies in diverse learning environments, ensuring their sustainability and effectiveness in fostering quality education.

P-ISSN: 14110881 | E-ISSN: 25414534

CONCLUSION

Based on the discussion, it can be concluded that Android-based interactive learning media plays a vital role in enhancing students' understanding of Islamic Religious Education (IRE) concepts. The integration of interactive features such as videos, quizzes, and simulations has transformed traditional learning methods, making education more engaging and effective. These digital tools provide flexibility, accessibility, and an enjoyable learning experience, increasing student motivation and participation. Applications such as Mobile Learning, RuBer IRE, and iSpring Suite enable educators to design creative and relevant lessons that align with the needs of students and the demands of the digital era. From the perspective of the Sustainable Development Goals (SDGs), particularly SDG 4 (Quality Education), Android-based learning media contributes to improving the quality of Islamic education by fostering an inclusive and equitable learning environment. These tools also support SDG 10 (Reduced Inequalities) by making quality education more accessible, especially for students in remote or underserved areas. However, achieving these goals requires addressing several challenges, including technical barriers, internet accessibility, and digital literacy. Despite the many advantages of Android-based learning, there are significant challenges that must be considered. One of the primary issues is technical limitations, such as unstable internet connections, which can hinder the effectiveness of E-learning. Additionally, concerns regarding data security and students' proficiency in using digital applications must be addressed to ensure a safe and efficient learning process. To overcome these challenges, educators can utilize technology-based learning through collaborative group work, enabling students to assist each other in navigating digital tools. Moreover, the role of teachers and policymakers is crucial in ensuring the successful integration of digital learning media in Islamic education. Professional development programs should be implemented to train educators in optimizing technology for instructional purposes. Furthermore, infrastructure improvements and regulatory frameworks are necessary to enhance digital learning accessibility and security. In conclusion, Android-based interactive learning media presents a promising approach to modernizing Islamic education, making it more engaging, inclusive, and aligned with global education standards. However, to fully realize its potential, comprehensive strategies must be developed to address the existing challenges. Future research should focus on empirical studies that evaluate the long-term impact of these digital learning tools across various educational settings, ensuring their sustainability in supporting SDGs and advancing the quality of Islamic education.

Acknowledgements

The authors would like to express their deepest gratitude to the Faculty of Teacher Training and Education, Universitas Sebelas Maret, Indonesia, and the Faculty of Human Sciences, Sultan Idris Education University, Malaysia, for their invaluable support, facilities, and academic contributions that have greatly assisted the completion of this research titled: "Systematic Review: Android-Based Interactive Learning Media to Enhance Understanding of Islamic Education in Support of SDGs." The collaboration between these two institutions has had a significant positive impact on the research and writing process. It is our hope that the results of this study will contribute meaningfully to the development of Android-based interactive learning media in Islamic education and support the achievement of the Sustainable Development Goals (SDGs).

Author Contribution

The authors contributed equally to this paper, some are the chairman, member, financier, article translator, and final editor. The authors read and approved the final paper.

Conflicts of Interest

All authors declare no conflict of interest

REFERENCES

[1] N. Chasanah, A. A. Musadad, and M. Pelu, "Penerapan Model Problem Based Learning (PBL) dengan Media Video Untuk Meningkatkan Kemampuan Berpikir Kritis dan Motivasi Belajar Sejarah," *J. Candi*, vol. 21, no. 1, pp. 16–31, 2021.

[2] E. Fikri Yusmansyah, N. Sugandi, M. Miftahussalam, A. Saefurridjal, and M. Muchtarom, "Konsep Dasar-Dasar Pertimbangan Dan Strategi Pengambilan Keputusan Dalam Kepemimpinan Pendidikan," *J. Pendidikan, Humaniora, Linguist. Dan Sos.*, vol. 1, no. 1, pp. 36–47, 2022, https://doi.org/10.58268/jagaddhita.v1i1.23.

[3] A. N. Vidyastuti, M. M. Effendi, R. Darmayanti, M. Education, and S. Program, "Tik-tok application: Development of mathematics learning media for lines and series materials to increase learning interest of high school students," *J. Math Educ. Nusant. Wahana*, vol. 8, no. 2, pp. 91–106, 2022, https://doi.org/10.29407/jmen.v8i2.18267.

[4] S. S. Dewi Pendit, C. Amelia, A. Azizah, N. A. Pilok, and M. S. Sitepu, "Pengembangan E-Modul Discon Berbasis Android (E-Modul Disroid) Materi Bunyi bagi Siswa Sekolah Dasar," *Scaffolding J. Pendidik. Islam dan Multikulturalisme*, vol. 4, no. 3, pp. 175–191, 2022, https://doi.org/10.37680/scaffolding.v4i3.1941.

[5] P. Rahayu, "Pengaruh Era Digital Terhadap Perkembangan Bahasa Anak," *Al-Fathin J. Bhs. dan Sastra Arab*, vol. 2, no. 1, p. 47, 2019, https://doi.org/10.32332/al-fathin.v2i2.1423.

[6] D. Rosita, "Comic Digital As Interactive Learning Media in Sejarah," *el-Moona J. Ilmu Pendidik. Islam*, vol. 3, no. 2, pp. 69–76, 2021, [Online]. Available: https://jurnal.fatahillah.ac.id/index.php/elmoona/article/view/28

[7] F. Khasanah, M. K. Nabila, P. W. Mawaddah, and H. Putranta, "Pengembangan Media Aplikasi ' Belajar Sholat Anak Sholeh ' Berbasis Android Menggunakan Smart Apps Creator," *Al 'Ulum J. Pendidik. Islam*, vol. 4, no. 2, pp. 123–143, 2024, https://doi.org/10.54090/alulum.537.

[8] A. Ruslan Afendi, N. Fauziyah, M. Rohan Saputra, and U. Islam Sultan Aji Muhammad Idris Samarinda, "Pemanfaatan Aplikasi Tiktok dalam Mata Pelajaran PAI sebagai Media Pembelajaran Inovatif Era Digital," *Borneo J. Islam. Educ.*, vol. 3, no. 1, p. 2023, 2023, https://doi.org/10.21093/bjie.v3i1.6257.

[9] T.-T. H. I'n, "Pengaruh Media Pembelajaran Interaktif berbasis Problem Based Learning terhadap Motivasi Belajar Siswa pada Mata Pelajaran Fiqih," *at-Tarbiyah al-Mustamirrah J. Pendidik. Islam*, vol. 4, no. 1, p. 1, 2023, https://doi.org/10.31958/atjpi.v4i1.6124.

[10] A. Terhadap, M. Belajar, S. Rahmah, and M. F. Hadi, "Teknologi Pendidikan Pengaruh Penggunaan Aplikasi Pembelajaran Berbasis Teknologi Pendidikan," *J. Teknol. Pendidik.*, vol. 2, no. 1, pp. 89–96, 2023, https://doi.org/10.56854/tp.v2i1.223.

[11] R. D. A. Budiman, U. Liwayanti, and M. Arpan, "Analisis Kebutuhan dan Kesiapan Penerapan Media Pembelajaran berbasis Android Materi Ilmu Akidah," *Edumatic J. Pendidik. Inform.*, vol. 6, no. 1, pp. 31–38, 2022, https://doi.org/10.29408/edumatic.v6i1.5087.

[12] S. Deti Nurhamidah, A. Sujana, and D. A. Karlina, "Pengembangan Media Berbasis Android Pada Materi Sistem Tata Surya Untuk Meningkatkan Penguasaan Konsep Siswa," *J. Cakrawala Pendas*, vol. 8, no. 4, pp. 1318–1329, 2022, https://doi.org/10.31949/educatio.v8i1.1600.

[13] D. Maryani, "Media Pop Up Book dalam Pembelajaran PAI untuk Meningkatkan Minat Belajar Peserta Didik," *J. Educ. FKIP UNMA*, vol. 8, no. 1, pp. 54–59, 2022, https://doi.org/10.31949/educatio.v8i1.1600.

[14] H., . R., and . S., "Pengembangan Media Pembelajaran Interaktif Berbasis Android Pada Materi Pokok Asam Basa," *Chem. Educ. Rev.*, vol. 2, no. 2, p. 49, 2019, https://doi.org/10.26858/cer.v2i2.8754.

[15] Ramadhan Lubis, Putri Nabila, Nurul Ilmi Nasution, Lathifah Azzahra, Hasraful, and Fadillah Andina6, "Jurnal Review Pendidikan dan Pengajaran, Volume 7 Nomor 3, 2024," *J. Rev. Pendidik. dan Pengajaran*, vol. 7, no. 3, pp. 7899–7906, 2024, doi: https://doi.org/10.31004/jrpp.v7i2.36365.

[16] S. Criollo-C, A. Guerrero-Arias, Á. Jaramillo-Alcázar, and S. Luján-Mora, "Mobile learning

technologies for education: Benefits and pending issues," *Appl. Sci.*, vol. 11, no. 9, pp. 1–17, 2021, https://doi.org/10.3390/app11094111.

[17] I. R. Lubis and J. Ikhsan, "Pengembangan Media Pembelajaran Kimia Berbasis Android Untuk Meningkatkan Motivasi Belajar Dan Prestasi Kognitif Peserta Didik Sma," *J. Inov. Pendidik. IPA*, vol. 1, no. 2, p. 191, 2015, https://doi.org/10.21831/jipi.v1i2.7504.

[18] S. R. Mustafa and A. Bakar, "Pengembangan Media Pembelajaran Berbasis Android Mata Pelajaran Pai," *RJOCS (Riau J. Comput. Sci.*, vol. 9, no. 1, pp. 45–52, 2023, https://doi.org/10.30606/rjocs.v9i1.1740.

[19] N. A. Muhtar, A. Nugraha, and R. Giyartini, "Pengembangan Media Pembelajaran IPA berbasis Information Communication and Technology (ICT)," *PEDADIDAKTIKA J. Ilm. Pendidik. Guru Sekol. Dasar*, vol. 7, no. 4, pp. 20–31, 2020, https://doi.org/10.17509/pedadidaktika.v7i4.26455.

[20] Asep Arifin dan Zaenal Faturrohman, "Pemanfaatan Aplikasi Zoom Sebagai Media Pembelajaran PAI Pada Masa Pandemi Covid-19 di SMPN 1 Karawang Barat," *Attaqwa J. Ilmu Pendidik. Islam*, vol. 17, no. 2, pp. 140–151, 2021.

[21] K. Ariyanto, "Dampak Keluarga Broken Home Terhadap Anak," *Metta J. Ilmu Multidisiplin*, vol. 3, no. 1, pp. 15–23, 2023, https://doi.org/10.37329/metta.v3i1.2380.

[22] F. Zahra and B. F. Anbiya, "Inovasi Pembelajaran Pendidikan Agama Islam Melalui Pendekatan Discovery Learning," *J. Ilmu Pendidik. dan Psikol.*, vol. 1, no. 3, pp. 293–303, 2024.

[23] W. A. Wulandari and M. Rayungsari, "Studi Literatur: Penerapan Media Pembelajaran Interaktif Berbasis Android Pada Materi Peluang," *Polinomial J. Pendidik. Mat.*, vol. 3, no. 2, pp. 90–98, 2024, https://doi.org/10.56916/jp.v3i2.896.

[24] H. R. Waty, "Pengembangan media pembelajaran interaktif E-Learning Pendidikan Agama Islam melalui aplikasi Classpoint," *Idarah Tarb. J. Manag. Islam. Educ.*, vol. 4, no. 1, pp. 1–10, 2023, https://doi.org/10.32832/itjmie.v4i1.5683.

[25] S. Rahmania, I. Soraya, and A. S. Hamdani, "Pemanfaatan Gamification Quizizz Terhadap Motivasi Belajar Siswa Pada Mata Pelajaran Pendidikan Agama Islam," *Tadbir J. Manaj. Pendidik. Islam*, vol. 11, no. 2, pp. 114–133, 2023, https://doi.org/10.30603/tjmpi.v11i2.3714.

[26] M. I. Lestari, "Meningkatkan Motivasi Belajar Siswa Melalui Pendekatan Teaching At The Right Level (Tarl) Berbantuan Media Kahoot Pada Materi Trigonometri Di Jenjang Sekolah Menengah Atas," *J. Fibonaci J. Pendidik. Mat.*, vol. 5, no. 1, p. 29, 2024, https://doi.org/10.24114/jfi.v5i1.57234.

[27] N. Azizah, S. Suratno, and H. Irawati, "Peran Media Pembelajaran Berbasis TIK dalam Meningkatkan Pembelajaran Matematika Di Sekolah Menengah Atas.," *Pros. Disk. Panel Nas. Pendidik. Mat.*, vol. 10, 2024, [Online]. Available: https://proceeding.unindra.ac.id/index.php/DPNPMunindra/article/view/7195

[28] K. Milidar, "Inovasi Pembelajaran PAI Dengan Pendekatan Interaktif Untuk Generasi Milenial," *J. Rev. Pendidik. Dan Pengajaran*, vol. 7, no. 2, pp. 6275–6284, 2024.

[29] A. Haleem, M. Javaid, M. A. Qadri, and R. Suman, "Understanding the role of digital technologies in education: A review," *Sustain. Oper. Comput.*, vol. 3, no. 1, pp. 275–285, 2022, https://doi.org/10.1016/j.susoc.2022.05.004.

[30] T. S. Fauzan, "Mobile Learning Berbasis Android Sebagai Media Pembelajaran Pai Di Man 2 Yogyakarta," *J. Tarb. Almuslim*, vol. 2, no. 2, pp. 121–136, 2024, [Online]. Available: https://ejournal.iai-almuslimaceh.ac.id/index.php/JTA/article/view/133

[31] P. Eka Suarmika, N. Hidayat, and Safitri, "Systematic Literature Review: Pemanfaatan Media Aplikasi Android Sebagai Bahan Ajar Interaktif," *J. Ika Ikat. Alumni Pgsd Unars*, vol. 13, no. 1, pp. 278–218, 2023, https://doi.org/10.36841/pgsdunars.v13i1.3154.

[32] W. R. Saputra, R. Raharjo, and I. Hadjar, "Pengembangan Media Pembelajaran Pendidikan Agama Islam Menggunakan Smarts Apps Creator (SAC) pada Materi Haji dan Umrah," *J. Ilmu Manaj. dan Pendidik.*, vol. 3, no. 2, pp. 89–100, 2023, https://doi.org/10.30872/jimpian.v3i2.2272.

[33] C. Noris Utami and G. Hadiprayitno, "Pengaruh Media Pembelajaran Berbasis Android Terhadap Pemahaman Konsep Siswa," *J. Classr. Action Res.*, vol. 6, no. 2, 2024, doi: https://doi.org/10.29303/jcar.v6i2.7678.

[34] S. A. T. A. Tresna, V. A. C. Carl Vinson, and A. N. Aeni, "Penggunaan Aplikasi RuBer PAI Sebagai Media Pengenalan Dakwah di Kelas 5 SD," *Fashluna J. Pendidik. Dasar dan Kegur.*, vol. 3, no. 1, pp. 82–92, 2022, https://doi.org/10.47625/fashluna.v3i1.366.

[35] N. Hamdan Mubarok, N. Suarna, and A. Rinaldi Dikananda, "Pengembangan Media Pembelajaran Tajwid Berbasis Aplikasi Android Untuk Minat Belajar Membaca Al-Qur'an," *J. Inform. dan Teknol. Inf.*, vol. 2, no. 2, pp. 220–227, 2023, https://doi.org/10.56854/jt.v2i2.196.

[36] T. S. Fauzan and A. Hayani, "Mobile Learning Berbasis Android Sebagai Media Pembelajaran PAI di MAN 2 Yogyakarta," *J. Wisdom Kaji. Multidisipliner*, vol. 1, no. 1, pp. 1–8, 2024.

[37] R. Aisyah and S. Sulaikho, "Validitas Media Pembelajaran Ispring Suite Berbasis Android Pada Pemahaman Shalat Jama' dan Qashar," *Tarlim J. Pendidik. Agama Islam*, vol. 4, no. 2, p. 4, 2021, https://doi.org/10.32528/tarlim.v4i2.5423.

[38] A. Wibowo and H. B. Santoso, "Pengaruh Penggunaan Aplikasi Pembelajaran Berbasis Teknologi terhadap Hasil Belajar Siswa.," *J. Pendidik. dan Kebudayaan.*, vol. 2, no. 1, pp. 155–168, 2015.

[39] F. A. Malik Mar'an, A. Akla, and M. Ali, "Pembelajaran Pendidikan Agama ISlam (PAI) Dengan Menggunakan Media Android di SDN 1 Metro Barat Kota Metro," *Tarb. J. Ilm. Pendidik.*, vol. 5, no. 1, pp. 98–115, 2021, https://doi.org/10.32332/tarbawiyah.v5i1.3495.

[40] K. Anam and R. Hariyadi, "E-Learning : Teori dan Aplikasinya dalam PAI," *J. Educ.*, vol. 05, no. 04, pp. 12626–12635, 2023.