

Development of The Android Application Suka EduPAI as An Interactive Learning Media for Islamic Religious Education

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Abstract: Lack of interactivity inside and outside the classroom can be a problem in learning. Android apps can help increase the level of interactivity among students, teachers and subject matter. Preliminary studies show that PAI teachers need Android applications to support the learning process in class and outside the classroom. This research aims to develop interactive learning media Suka EduPAI for Islamic Religious Education on Umayyad in Andalusia material. The population was taken from all class VII of SMP Negeri 2 Sewon with a sample of Class VII H. The research method used the APPEL model (Analysis, Design, Production, Evaluation and Dissemination). Data collected from ongoing evaluation, and alpha testing from media experts, material experts and instructional experts shows that the application is valid and suitable for use. The assessment for this media from the material expert gets a high category of assessment of 73.3%, the media expert assessment gets a very high category of 88%, the instructional expert assessment gets a very high category with a score of 90%, and the student response gets a very high satisfaction with a score of 94%. Thus, the Suka EduPAI application is feasible and can be implemented in a classroom setting.

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INTRODUCTION

The integration of technology in education is a prominent focus in modern educational practices, as highlighted across various research papers. Educational technology plays a crucial role in enhancing student learning experiences through the utilization of audio-visual equipment, innovative media, and software applications (Álvarez Rodríguez et al., 2023; Joshi, 2023). In Ministry of Education and Culture Regulation Number 103 of 2014 about Learning In Elementary School Education and High School Education, it is stated that the use of information and communication technology is one of the principles in the standard learning process, which is used to increase the efficiency and effectiveness of learning. This shows that technological developments have implications for all aspects of human life, including welcoming the success of 21st-century education. Therefore, one of the skills that an educator and students should master in carrying out learning in the 21st century is media and technology literacy skills (Gut, 2011).

Apart from that, android-based interactive multimedia has become an important tool in 21st-century education, especially during the COVID-19 pandemic. In a survey report from Statista in August 2023, Android dominated the smartphone operating system market share in Indonesia with nearly 89% (Statista, 2023). Also, students have shown a willingness to adopt interactive multimedia for learning, as evidenced by their positive perceptions and preferences for this type of media (Utami et al., 2023a). The use of Android in 21st-century learning has facilitated independent and engaging learning experiences for students, meeting the demands of the digital era (Bakri et al., 2021). With the various functions offered, Android can be used and utilized by various groups (Annisa & Kuswanto, 2022; Rahmah & Juhriah, 2022; Utami et al., 2023b). Through its open-source system, Android has advantages, especially in terms of

application development (Sarkar et al., 2019). Additionally, the Android ecosystem is rich and diverse, with a wide range of applications that cater to various needs, enhancing users' daily activities (Setiawan et al., 2020).

One form of manifestation of the use of Android in the world of education is developing an application as an interactive learning medium (Devi et al., 2022). The use of media in the form of Android-based learning applications certainly offers great opportunities, including changing students' strategies for learning and obtaining information as well as providing opportunities for teachers to carry out learning activities optimally. Android-based learning media has been developed in various studies to enhance the learning process. These studies have shown that Android-based learning media can improve students' understanding and retention of abstract concepts in a subject (Harahap & Saragih, 2023).

Previous research has revealed various problems faced by teachers in optimizing the use of media in learning. One of the results of such research is the discovery that many teachers face challenges in integrating technology and learning media into their curriculum (Setiawan, 2019). In essence, learning media is one of the main factors in improving the quality of learning (Lubis et al., 2023). As a learning intermediary, learning media requires a touch of innovation and needs to be designed systematically and in such a way as to achieve learning objectives (Afnita et al., 2022). The better the quality of learning media, the level of learning ability will also increase, as will the quality of education. In the current era, teachers are indeed required to possess the skills to develop learning media due to the significant impact it has on student learning outcomes. Research emphasizes the importance of utilizing various forms of media, such as comic media, games like crossword puzzles, and learning videos, to enhance the learning process and improve student understanding (Miranda et al., 2022; Riyani et al., 2023; Suryani, 2023). Also, integrating technology into learning media is a new challenge for a teacher in the current technology and information period (Zain & Cahyono, 2022).

This is also related to the notion that learning media is still a scourge and a fundamental problem in organizing learning activities, including Islamic Religious Education (IRE) learning. IRE learning is considered not to have maximized the use of technology as a learning medium and teachers were not able to catch digital competence of their learning environment (Budiyanti et al., 2022). The media used is still limited to books and writing on blackboards, which are non-interactive and, of course, cannot attract the interest and attention of students. This problem makes students quickly bored, not focused on listening to the lesson material, and even failing to understand the material presented (Hefniy & Harmonis, 2020; Windawati & Koeswanti, 2021).

A range of studies have explored the development of Android-based learning media for Islamic education. Sibilana, (2016) and Saputra & Muharni (2023) both developed effective Android-based learning media for Islamic education, with Sibilana focusing on class XI in a specific school and Saputra on SMK Islam Bina Khalifah Bangsa. 'Aini (2021) further enhanced this by developing an interactive multimedia learning media for the study of Tajwid, a specific aspect of Islamic education. Desmira & Fauzi (2015) expanded the scope of early childhood education, creating an Android-based application for introducing Islamic education to young children. These studies collectively demonstrate the potential of Android-based learning media in enhancing Islamic education. While existing research has explored the development of learning media and its student responses, there remains a notable absence in the consideration of the history of Islam, especially in Bani Umayyah and Andalusia material. This study addresses this gap by developing, implementing, and evaluating an Android-based learning media.

Based on the background above, the author considers that PAI teachers need an Android application to support the learning process, both in class and outside of class. The aim is to increase students' understanding of concepts and learning motivation. As for this research, the author developed the Suka EduPAI application as an interactive learning medium on Umayyad in Andalusia material for class VII SMP. This Android-based learning media is hoped to become a new strategy for teachers to organize more interesting and interactive learning. Apart from being able to increase students' understanding of concepts and interest in learning, flexibility in accessing learning materials is one of the advantages of using this interactive learning media. Specifically, the following research questions (RQs) will be addressed:

RQ1: How to develop Suka EduPAI android-based learning media for Bani Umayyah in Andalusia

material in Grade VII IRE subject?

RQ2: What are experts validation of Suka EduPAI android-based learning media for Bani Umayyah in Andalusia material in Grade VII IRE subject?

RQ3: How do students respond to Suka EduPAI android-based learning media for Bani Umayyah in Andalusia material in the Grade VII IRE subject?

METHOD

The type of research used is research and development (R&D). In simple terms, development research or R&D is a research method that is deliberately and systematically used to discover, formulate, improve, develop, produce, and test the effectiveness of certain products, models, methods or strategies, services, and procedures that are superior, new, effective, efficient, productive and meaningful (Gay et al., 2012; Klein, 2014; Sugiyono, 2012). The development model used is the APPED model. This model consists of 5 steps, namely analysis and initial research, design, production, evaluation and dissemination (Surjono, 2017).

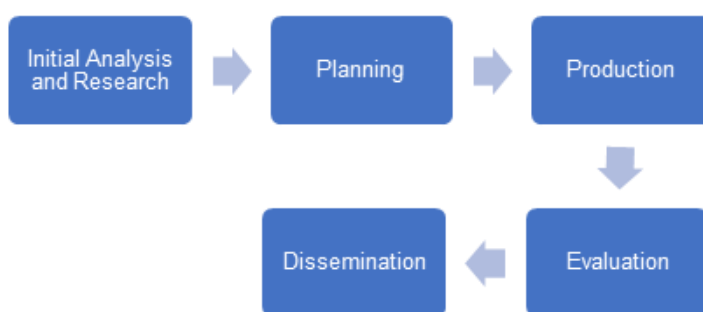


Figure 1. APPED Model

Initial Analysis and Research

The first step is analysis and initial research. This step includes analysis activities regarding student characteristics and technological facilities owned by educational institutions, analysis of material coverage and learning outcomes, and analysis related to the use of interactive learning multimedia in the classroom. To gather relevant data, researchers conducted observations and interviews with key stakeholders, including the Deputy Head of School for Curriculum and PAI teachers at SMP Negeri 2 Sewon. These interviews provided valuable insights into the specific needs and challenges faced by educators and students, informing the design and development of the learning media. Observations allowed the researchers to see firsthand the classroom dynamics and the effectiveness of existing teaching methods, further guiding the creation of a more effective and engaging learning tool.

Planning

The second step in the development process, exclusively undertaken by the researchers, is the design phase. Researchers use the results of the analysis and initial research conducted in the first step as the foundation for the instructional design. This process includes creating a detailed outline of the material, summarized in an outline table of multimedia content, and a comprehensive flow diagram that maps out the sequence and structure of the learning activities and content delivery. Following this, researchers create detailed screen designs and storyboards. Screen designs specify the visual layout for a user-friendly and appealing interface, while storyboards provide a visual representation of how the content will be presented and interacted with. The design document, compiling the outline, flowchart, screen designs, and storyboards, serves as a critical guide for the production stage. This document ensures cohesive integration of all elements, aligning the final product with instructional goals and user needs, and maintaining consistency and quality throughout the development process.

Production

The production stage involves combining and developing previously existing components, such as

outlines, flowcharts, screen designs, and storyboards. This process requires packaging and adapting these elements so that they can form a multimedia product that functions as an interactive learning tool. During development, these components can be enriched with images, animation, and video. At this stage, several touches are also needed, including editing tools and authoring tools. At this stage, it is important to use authoring tools, namely special software designed to make it easier to create and develop interactive multimedia. Authoring tools provide a variety of features and functionality that enable users to compose interactive content more efficiently. By using authoring tools, developers can arrange the layout of multimedia elements, arrange transitions between screens, insert images or animations, and combine videos in learning multimedia..

Evaluation

The fourth stage is the evaluation stage, which involves testing and launching the application. Testing is carried out to find bugs and problems in the application and ensure the application works properly. Evaluation in this research uses ongoing evaluation, alpha testing, and beta testing. Ongoing evaluation is carried out from the beginning of the development stage until the completion of the program carried out by the researcher. Researchers run all system programs that have been created and test all components to ensure they run well. Evaluation of alpha testing with aspects of content and appearance was carried out by PAI teachers at SMP Negeri 2 Sewon. Meanwhile, the alpha testing evaluation with instructional aspects was carried out by PAI lecturers at UIN Sunan Kalijaga Yogyakarta. The following evaluation is beta testing evaluation, which is a comprehensive evaluation by users of products that have been repaired in the alpha testing stage. The procedure for implementing this activity is the selection of student respondents at SMP Negeri 2 Sewon. Beta testing evaluation is carried out by implementing the learning media and collecting students' responses.

Dissemination

The final step is the dissemination of interactive learning multimedia products, as the developer's responsibility is to socialize the product and test whether the product is truly effective for learning. At this stage, it means that the developer will socialize the product to the public through various efforts, one of which is through teacher forums and going directly to target educational institutions. It includes strategies to make the developed learning media accessible and known to relevant stakeholders, such as educators, students, educational institutions, and potentially the broader community.

RESULT AND DISCUSSION

Initial Analysis and Research

Based on the analysis and initial research that was carried out through the observation and interview process, the researchers obtained the following results. Regarding the characteristics of students, Mr. Abdurrachman Lathiif, S.Pd. as a PAI teacher at SMP Negeri 2 Sewon explained that one of the factors that influences students' interest and skills in participating in PAI learning activities is the environment/place they live in. Students who live in Islamic boarding school environments tend to have more interest/interest than students who live in non-Islamic boarding school environments. Regarding skills, such as the ability to read the Koran, students who come from Islamic boarding school environments are also considered more capable. However, the factors above cannot be used as the main benchmark. Based on this, the role of PAI teachers to innovate learning to create an interesting, interactive and fun learning climate is needed. If this kind of learning environment is created, students with various backgrounds can participate in learning activities well and optimally achieve learning goals.

There are differences in the curriculum currently used at SMP Negeri 2 Sewon. For class VII, the curriculum used in all subjects is the Merdeka Curriculum. Meanwhile, classes VIII and IX still use the 2013 Curriculum. The scope of material used to develop this interactive learning media is the material "Umayyads in Andalusia" for class VII even semester. The choice of material was motivated by students' low interest in studying historical materials. This is because historical material is considered to place more emphasis on memorization, and learning tends to be boring. This idea closely aligns with the criticism of Islamic Cultural History (SKI) learning in Madrasahs/Schools is the stigma that emphasizes memorization (Rofik, 2015). . Addressing these challenges and prioritizing student motivation is essential

for improving the learning experience. Apart from that, the limited PAI lesson hours in schools with comprehensive material coverage do not allow students to master the material completely. Therefore, appropriate strategies are needed to achieve the targeted history learning objectives.

The strategy that can be used to overcome the above problems is to develop interactive learning media for PAI (Islamic History) material to support students' learning activities, both in the classroom and outside the classroom. This means that students can freely and flexibly access it wherever and whenever. This media also supports independent learning activities while creating learning independence for students. Moreover, at SMP Negeri 2 Sewon, PAI teachers still often use learning media in the form of textbooks and worksheets, although occasionally, they have started to use LCDs as a tool for carrying out learning activities. However, so far, teachers have never used or developed Android-based learning applications as interactive learning media for students.

Planning

The initial design of the overall structure of the Suka EduPAI application was carried out using an outline. This outline includes various interrelated parts, such as the intro screen, introduction, material map, and test section. Each section in the outline has its function and purpose in the learning process. Figure 2 shows the outline used for this development.



Figure 2. Outline

As seen in Fig 2. In the designed outline that has been developed, when students open the Suka EduPAI application, they first encounter an introductory screen followed by a prayer screen. The main menu offers several choices, including a content map. Students can navigate through the learning materials in sequence, starting from a pretest and progressing to a posttest. This sequential approach is chosen because it ensures that the material is presented in a structured manner. However, the design also allows for flexibility with features that enable users to move between different screens as needed.

Additional screens include features like profiles, participant data, and a login page specifically designed for teachers.

Production

Following the outline, the development team proceeds to create each screen individually. This process involves translating the conceptual design into tangible visual and interactive components. Each screen is carefully crafted to align with the instructional goals and user experience objectives identified during the design phase. The production process uses several authoring tools: Canva, Fillout, Visual Studio Code, and Figma. The use of several authoring tools such as Canva, Fillout, Visual Studio Code, and Figma in the production process can provide flexibility and reliability for media products.



Figure 3. Material Map

In the application production process, Canva and Figma are used to design graphic elements and user interfaces (UI/UX). With the help of Canva, researchers created images and other graphic elements to improve the app's visual appearance. This is used to create interactive and responsive UI/UX designs. By using these two tools, developers can create visually appealing applications. Apart from the visual aspect, this process also aims to make the application more attractive to users. An attractive design and a good user interface not only capture users' interest in using the application but also contribute to a pleasant experience. This aligns with the dual-channel hypothesis, which suggests that people have distinct channels for processing visual and aural information (Mayer, 2009). The visual-pictorial channel interprets words and images on a screen, while the auditory-verbal channel processes spoken words.

Furthermore, Fillout is used in the exercise activity process. This tool allows developers to create interactive forms that can be used to collect data before and after users test an application. By using Fillout, developers can set questions and answer options to test the level of learning success with exercise activities and involve users in application evaluation. Once the Fillout form has been created, the developer can insert the form into the application using an embed code. This process aims to enable application users to fill in exercise forms without leaving the application. In this way, educators can obtain learning outcomes. Finally, the export process is carried out via Visual Studio Code to produce application files that can be installed on Android devices. Visual Studio Code provides powerful development tools for managing software development projects. By using the right features and extensions, developers can build applications into .apk format that users can install and use on Android devices. By utilizing Canva, Figma, Fillout, and Visual Studio Code in the application production process, developers can create visually attractive applications, involve users in evaluation, and produce application files that are ready to be used on Android devices.

Evaluation

Evaluation plays a crucial role in the iterative process of developing any system, particularly in the realm of educational media. It is a systematic method for assessing the effectiveness, functionality, and overall quality of the product under development (Surjono, 2017). By conducting thorough evaluations, researchers can gain insights into various aspects of the learning media, such as its usability, relevance to educational objectives, engagement level of learners, and alignment with cognitive processes. The questionnaire results obtained from instructional experts, media experts, content experts, and students' responses are analyzed and interpreted based on the table below.

Table 1. Score Criteria

Score Range	Category
81%-100%	Very High
61%-80%	High
41%-60%	Moderate
21%-40%	Poor
0-20%	Very Poor

Ongoing evaluation is carried out by the developers or researchers themselves. The ongoing evaluation process stage involves ongoing assessments carried out by researchers to collect relevant data and information throughout the development or research process. Ongoing evaluation pays attention to three aspects: function aspects, content aspects, and appearance aspects. The results of the ongoing evaluation can be seen in Table 2. Ongoing Evaluation

Table 2. Ongoing Evaluation

Aspects	Decision
Functional Aspect	
All buttons used work	Valid
The media does not error	Valid
The use of elements is not excessive	Valid
Content Aspect	
The concept and material are correct	Valid
No grammatical errors	Valid
Material is not confusing	Valid
Display Aspect	
Appropriate font	Valid
Appropriate color	Valid
Aligned layout	Valid

Table 3 shows the results of the material validation assessment carried out by the IRE teacher at SMP Negeri 2 Sewon, Mr. Muhammad Fahri, S.Pd.

Table 3. Material Validation

Aspects	Score
Suitability of Material to Learning Objectives	3
The Validity of the Structure of Matter	3
Accuracy of Material Content	4
Grammatical Correctness	4
Spelling Correctness	4
Correctness of Terms	4
Correct Punctuation	3
Correctness Matching the level of difficulty to the user	3
Material dependence on a particular culture or ethnicity	5
Total	33
Percentage	73.3%

The results of the media validation assessment were carried out by the PAI teacher at SMP Negeri 2 Sewon, Mr. Abdurrachman Lathif, S.Pd. Table 4 below shows the result.

Table 4. Media Validation

Aspects	Score
Layout	5
Use of Color	5
Text Quality (Size, Font Type, Color)	4

Aspects	Score
Image Quality	4
Animation Quality	5
Audio/Video Quality	5
Navigation Function	3
Navigation Consistency	5
Background Contrast with Foreground Objects	5
Space	3
Total	44
Percentage	88%

The results of the instructional validation assessment were carried out by the IRE Study Program Lecturer, Sunan Kalijaga State Islamic University, Yogyakarta, Mrs. Yuli Kuswandari, S.Pd., M.Hum.

Table 5. Instructional Validation

Aspects	Score
Theme Accuracy	5
Methodology (Way of Thinking)	5
Interactivity	3
Cognitive Capacity	4
Learning Strategies	4
User Control	5
Question Quality	5
Feedback Quality	5
Total	36
Percentage	90%

The results of user (student) responses can be displayed in the following table.

Respondents	User Satisfaction	Display	Navigation	Content Usefulness	App is Recommended
R1	5	5	5	5	5
R2	5	5	5	5	5
R3	5	5	5	5	5
...
R25	5	5	5	4	5
Mean	4.68	4.72	4.72	4.76	4.64
Total Mean					4.704
Percentage					94%

The data collected from ongoing evaluation, alpha testing from various experts, and student responses paint a promising picture regarding the validity and suitability of the application for use in educational settings. The assessments provided by material experts, media experts, and instructional experts all indicate high levels of approval and confidence in the application's effectiveness. Firstly, the assessment from material experts garnered a commendable score, with a high category assessment of 73.3%. This suggests that the application aligns well with the content expertise and standards set forth by material experts, indicating its appropriateness for delivering educational content.

Moreover, the assessment from media experts stands out significantly, with a very high category assessment of 88%. This underscores the application's proficiency in utilizing media elements effectively, such as visuals, interactivity, and storytelling techniques, to engage learners and enhance the overall learning experience. Additionally, the assessment from instructional experts further reinforces the application's suitability for educational use, receiving a very high category assessment with an impressive score of 90%. This indicates that the application effectively supports instructional goals and aligns closely

with curriculum standards, ensuring its relevance and efficacy in facilitating learning objectives.

Furthermore, the overwhelmingly positive response from students further validates the application's success, with a very high satisfaction score of 94%. This indicates that learners find the application engaging, user-friendly, and beneficial to their learning experience, further cementing its effectiveness and suitability for use in educational contexts. Nevertheless, this summative assessment remains in the category of reactions and has not yet advanced to learning, behavior, and results, by Kirkpatrick's evaluation model (Kirkpatrick & Kirkpatrick, 2016). Although the gathered data offers insightful information on stakeholders' first reactions and application satisfaction levels, it does not directly indicate how the application affects learning outcomes, behavioral changes, or more general organizational outcomes. Overall, the comprehensive evaluation data from various stakeholders underscores the application's validity and suitability for educational use, highlighting its potential to positively impact teaching and learning outcomes.

Dissemination

Dissemination involves initially introducing and socializing the Suka EduPAI application directly to PAI teachers through personal interactions. Once this initial phase is completed, the dissemination effort progresses by extending the socialization to other teachers at SMP Negeri 2 Sewon. This approach ensures that the benefits and features of the Suka EduPAI application are effectively communicated and understood within the educational community. By demonstrating its interactive features and suitability for teaching and learning activities, this dissemination process aims to gain acceptance and endorsement from a broader audience. Ultimately, through these efforts, it becomes evident that the Suka EduPAI application enhances educational practices, making it a preferred choice for integrating technology into the classroom environment. can be accepted by the wider community. The Suka EduPAI application as an interactive learning media is proven to be more

CONCLUSION

The outcomes of this research highlight significant achievements in the development and evaluation of Suka EduPAI. First and foremost, Suka EduPAI has been successfully developed as a robust learning media platform. The assessment from various expert perspectives underscores its quality and effectiveness: material experts evaluated it at 73.3%, indicating a solid endorsement of its content relevance and accuracy. Media experts gave it an impressive rating of 88%, reflecting its high usability and engagement features. Additionally, instructional experts rated Suka EduPAI highly at 90%, affirming its strong instructional design and pedagogical effectiveness. Moreover, student feedback has been overwhelmingly positive, with a satisfaction score of 94%. This indicates that students find Suka EduPAI highly beneficial and engaging in their learning experiences. Collectively, these findings demonstrate that Suka EduPAI not only meets rigorous expert standards but also effectively meets the needs and preferences of its users, enhancing teaching and learning practices in PAI education..

Despite achieving validation from experts, it's important to acknowledge the limitations of this study. One significant limitation is the absence of an experimental design to directly test the effectiveness of the Suka EduPAI application beyond the realm of reactions. While the assessments from material experts, media experts, instructional experts, and students provide valuable insights into stakeholders'. Therefore, future research efforts should consider incorporating experimental designs, such as randomized controlled trials or quasi-experimental designs, to rigorously evaluate the effectiveness of the learning media. By systematically manipulating variables and comparing outcomes between experimental and control groups, researchers can provide more substantial evidence of the application's efficacy and its potential impact on learning.

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