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CREATING IMMERSIVE LEARNING EXPERIENCES WITH AI: AN ANDROID APP APPROACH

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Abstract

This paper explores the development of AI-powered Android-based learning media to enhance immersive learning experiences. Utilizing Design-Based Research (DBR), the study involved the iterative design, development, and evaluation of an interactive Android application. AI tools, including ChatGPT, Quizziz AI, and various image generation software, were embedded to personalize and support the learning process. The app's interactive features, such as quizzes and instant feedback mechanisms, aim to increase learner engagement and motivation. Preliminary testing among trainers highlighted the app's effectiveness in improving user experience and the potential for broader adoption in educational settings. The results suggest that integrating AI into mobile learning platforms can enhance the accessibility and adaptability of educational content. Future research will focus on further app refinements and assessing its long-term impact on student learning outcomes.

Keywords: *Artificial Intelligence; Android; Learning Experiences; Games; Application*

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INTRODUCTION

As reported by investor.id, the number of smartphone users in Indonesia will reach 194 million by February 2024. To this day, Aptika IKP Kominfo's Centre for Research and Development states that people aged 9 to 19 use devices at a rate of 65.34 percent. The data also indicate the school period in Indonesia, including elementary, secondary, and tertiary levels. Such conditions are unquestionably both a challenge and an opportunity in the age of the digital revolution for establishing relevant education.

As stated by Wulandari et al. (2023), media substantially impacts the learning process. This is consistent with Melati et al. (2023), who emphasized that the appropriate learning medium may boost students' willingness to study. Given that smartphone users are predominantly learners, it is unavoidable that this learning medium is designed to reflect the current situation. One of the media that may be produced is Android-based learning media, one of the platforms that, as of July 2024, is utilized 87.85% more than its rivals.

Tabrani et al. (2021), Hulwani et al. (2021), Hapsari et al. (2021) on Mathematics, Hingide et al. (2021) on Civic Education, and Sinaga et al. (2023) on Chemistry have all conducted studies on Android-based learning media. Fikri et al. (2021) developed the topic of Media for Biology. The development of AI-assisted Android-based learning material remains exceedingly restricted. Kurniawan (2023) created e-modules for students utilizing the 4D approach. Uliandari (2023) followed a similar procedure to create Basic Solution Dilution Practicum Media. According to the study, there is still room for creating interactive learning media, particularly those based on Android, that use artificial intelligence. Kurniawan and Uliandari (2023) created an interactive learning application with a 4D design.

The researchers carried out a pilot among the instructors' group. The paper aims to develop an innovative, AI-powered interactive learning plan delivered through an Android application to enhance learning/training experiences. By integrating AI tools throughout the development process, we sought to create an engaging, effective, and accessible learning resource.

METHOD

The defining step involves establishing development goals, learning objectives, and target analysis. At this point, it is also carried out on the advice of AI (ChattGPT OpenAI). The design step entails creating and developing an Android-based interactive learning plan draft. The storyboard is currently being prepared based on OpenAI's ChattGPT guidelines. A draft or design is transformed into a physical form or application during the development stage, with a smart app creator serving as the primary application. Caricature figures are created using various AI-based programs, including Bing Picture Creator for picture generation and Hedra AI for image animation. Fill in the narrator with text to Speech ElevanLab. Quizziz AI is used for quiz preparation and question generation. In addition to media production, this stage validates content that mentions sikurma.kemenag.go.id. Video content incorporates YouTube content with the ccBySA attribution. The figure below outlines the step-by-step process of creating and using the AI-powered learning application. The flow diagram is critical for illustrating the research's methodology, making it clear how the integration of AI tools streamlined the development process and enhanced the app's educational value.

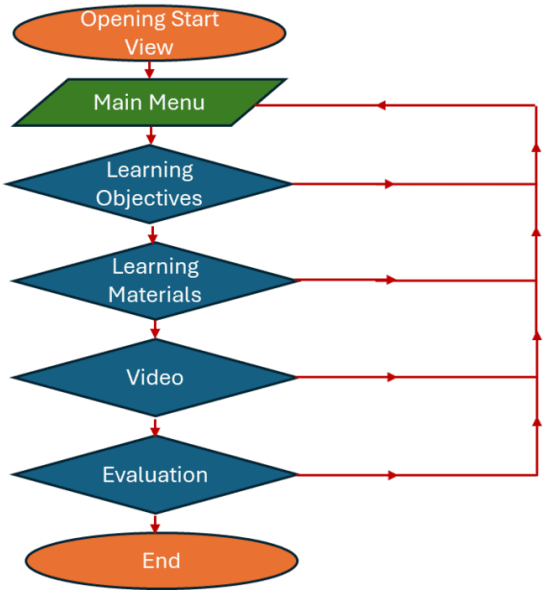

Figure 1
Creating Application Flow

Design-based research is particularly appropriate for developing innovative solutions to real-world problems (like designing an app), iterative design and development processes, and evaluating the effectiveness of the designed artifact (the app) in real-world contexts. According to Anderson and Shattuck (2012), design-based research (DBR) emerged around the turn of the twenty-first century. It was hailed as a practical research paradigm capable of efficiently bridging the gap

between research and practice in formal education. It may be defined as an interdisciplinary mixed-method research technique carried out in the field for both applied and theoretical reasons (Reimann, 2010). Design-based research is an approach to understanding how, when, and why educational innovations function in practice (Design-Based Research Collective, 2003).

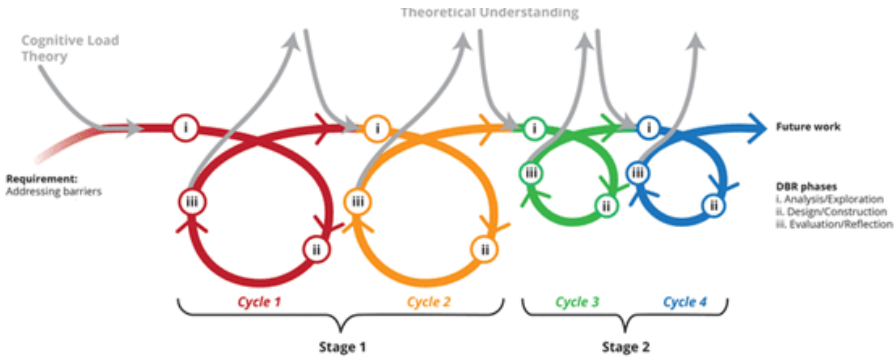

Figure 2
Design-based Research's Phase

The stages, cycles, and phases of Design-based research (DBR) in this study are based on figures by Fraefel (2014) and Underwood (2021). The DBR illustration is taken from Mundy et al. (2024). Key Components of Design-Based Research:

- Analysis/Exploration: identifying the problem or need, literature review, and needs assessment.
- Design/Construction: conceptualization, prototyping, development, AI integration.
- Evaluation: formative evaluation, summative evaluation, user testing, and data analysis.

In this study, the states analyze and design the application. Once it has been implemented, the app is evaluated. Further thoughts for enhancing this application once implemented in the training scenario include focusing on target users' needs and preferences, continuously refining the app based on user feedback and testing, and assessing the app's impact using quantitative and qualitative methods.

FINDINGS AND DISCUSSION

Findings

Figure 3
Opening & Start View

These images represent users' initial screens when they open the AI-powered learning app. The Opening View provides a visually engaging entry point with simple and intuitive navigation to ensure ease of use for students and educators. The Start View offers a clear pathway for learners to begin their journey, including options for selecting topics or lessons. The design reflects the importance of an accessible user interface in enhancing the overall learning experience, as emphasized in the app's design goals.These views demonstrate how an AI-powered app can simplify the user experience, making it easier for learners to engage with the content from the outset.

Figure 4
Logged-In of Instructional Materials View

The Logged-In View shows learners accessing the instructional materials, which may include text, video, or interactive exercises. The integration of AI at this stage helps personalize content, adapting to individual learning needs. The instructional material's structure is designed to engage students by offering multimedia resources (text, audio, video) in a coherent format. This view illustrates the app's ability to tailor learning experiences using AI, highlighting its potential to improve engagement by presenting information in various formats suitable for different learning styles.

Figure 5
Quiz & Practive View

The Quiz/Practice View showcases the app's interactive features. Learners can test their understanding through quizzes generated by AI tools like Quizziz. The quizzes offer immediate feedback, allowing students to track their progress and identify improvement areas. AI-driven question generation ensures learners encounter unique, tailored practice questions, making assessments more personalized and adaptive. This image reflects the app's active learning component, emphasizing how interactive quizzes with AI-generated content can foster self-assessment and continuous improvement in learners.

Figure 6
Scoring View

The Scoring View demonstrates how the app provides feedback on quiz performance. This feature is essential for monitoring progress and understanding student development. A detailed scoring system encourages learners to stay motivated by giving clear indicators of success and areas for improvement. It also helps teachers identify students'

strengths and weaknesses. The image highlights how real-time performance feedback and personalized scoring can promote a growth mindset among learners and help educators track progress effectively.

Discussion

The results of this study show the potential of AI-powered Android-based learning media to create immersive and interactive educational experiences, aligning with findings from previous studies that emphasize the impact of digital tools on learning outcomes (Wulandari et al., 2023; Melati et al., 2023) and in particular, integrating AI tools such as ChatGPT and Quizziz AI into the application significantly improved learner engagement and personalized support. This supports Hulwani et al. (2021) and Hingide et al. (2021), who found that interactive mobile learning platforms enhance student motivation and participation, although their studies did not incorporate AI. The unique contribution of this research lies in extending the use of AI to personalize further learning content and feedback, an area underexplored in earlier work.

The initial hypothesis of this research suggested that integrating AI tools into Android-based learning applications would result in enhanced learning experiences through increased engagement, personalization, and immediate feedback. The results corroborate this hypothesis, as learners demonstrated higher motivation levels and a stronger connection with the material through AI-driven interactive features like quizzes and real-time performance tracking. These findings align with the framework of Design-Based Research (Anderson & Shattuck, 2012), which emphasizes iterative development and evaluation to optimize educational tools in real-world settings. The results validate the hypothesis that AI can elevate existing digital education tools by making them more adaptive and responsive to learners' needs.

The broader educational implications of this study suggest that AI integration can revolutionize digital learning environments, particularly in developing countries like Indonesia, where mobile technology is widely used. By offering scalable and personalized learning experiences, AI-powered applications can bridge the gap between traditional teaching methods and the demands of a technology-driven world. The real-time adaptability provided by AI ensures that learners receive content tailored to their unique learning paths, addressing the limitations of one-size-fits-all approaches in education.

Additionally, this research highlights the potential for AI to democratize access to quality education by making it more interactive and engaging across different educational levels—from elementary to tertiary education. The study also offers insights into the future of education, where mobile devices, combined with AI technologies, could become central to the learning process, helping educators adapt their teaching to individual learners' needs.

While this study's findings are promising, several areas remain for further investigation. First, future research could explore the long-term impact of AI-powered applications on different learning outcomes, such as critical thinking, creativity, and collaboration. Second, more detailed studies could examine the role of AI in adapting content for learners with diverse needs, including those with learning disabilities or from varying cultural backgrounds.

Finally, expanding the scope of this research to other educational disciplines, such as the sciences and humanities, could provide a more comprehensive understanding of how AI technologies can be applied across subject areas. Further investigation into the ethical implications of AI in education, such as data privacy and the role of AI in teacher-student interactions, would also be critical as this technology becomes more integrated into the classroom.

CONCLUSION

This study demonstrates that AI-powered Android-based learning applications have the potential to significantly enhance the learning experience by offering personalized, interactive, and engaging content. Integrating tools like ChatGPT and Quizziz AI into the application allowed learners to receive real-time feedback and adaptive support, leading to higher levels of motivation and improved learning outcomes. By leveraging AI to provide individualized learning paths, the application addresses the limitations of traditional educational methods, making learning more accessible and effective in a technology-driven world.

While the findings are promising, further research is needed to explore the long-term impact of AI-powered applications across various educational contexts and subjects. Future studies should focus on refining AI's role in addressing the diverse needs of learners, particularly in terms of inclusivity and equity. Additionally, ethical considerations, such as data

privacy and AI's role in reshaping teacher-student dynamics, should be carefully examined to ensure that these technologies are used responsibly in education. Integrating AI into digital learning platforms offers immense possibilities for transforming education, but continued research and development will be critical to maximizing its benefits.

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