Android-Based Smart Application Development for Adolescent Mental Health

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Abstract

Background: Mental health issues among adolescents, including anxiety and depression, are increasingly prevalent and can adversely affect their academic performance, social relationships, and quality of life. Utilizing technology for mental health interventions in adolescents is gaining traction as a response to these challenges. Methods: This study aimed to develop and evaluate a smart application on the Android platform designed to improve adolescent mental health using the ADDIE Model for instructional design. The study involved 201 respondents from various educational institutions across multiple Indonesian provinces. User perceptions were evaluated in terms of visual design, ease of operation, material presentation, and language usage, with data analyzed statistically. Results: The application received positive feedback on its visual aspects, with 97.50% of users rating it as good, though 2.50% suggested improvements. Usability was rated favorably by 94.82% of users, while 5.18% reported difficulties. Material presentation was appropriate for 97.50% of users, with 2.50% suggesting refinements. Language usage was easy for 96.50% of users, although 3.50% found it challenging. Discussion: The positive feedback indicates the application's potential as a valuable tool for adolescent mental health interventions. However, the suggestions for improvement highlight areas for enhancing visual design, usability, material presentation, and language accessibility. Conclusion: This study demonstrated the effectiveness of smart applications in supporting adolescent mental health, providing key insights for the development and refinement of digital mental health tools. The findings contribute to the broader field of digital mental health interventions, emphasizing the importance of early intervention and user-centered design.

Keywords: Adolescent mental health, Smart application, Android platform, ADDIE Model, Usability evaluation

Introduction

Adolescents today face numerous challenges that can significantly impact their mental health. Factors such as social media influence, academic pressures, and evolving family dynamics are crucial in shaping their well-being. With the omnipresence of technology, particularly smartphones, in their lives, there is a growing necessity for innovative interventions that can positively influence their mental health (Wood et al., 2023). Research has shown that adolescents are particularly vulnerable to mental health conditions due to the significant changes they undergo during this transitional phase. The need to promote skills for healthy functioning and prevent the onset of mental health issues is emphasized, especially considering the barriers adolescents face in accessing appropriate

Significance | This study showed the potential of Android-based applications to enhance mental health education among adolescents, emphasizing the importance of user-centered design and iterative feedback for effective intervention.

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care (Laurenzi et al., 2020). Studies have also indicated that disruptions in daily routines, such as increased sedentary behavior and heightened smartphone usage, can contribute to mental health problems among adolescents (Humer et al., 2022). In addressing these challenges, interventions like mental health nursing models have been proposed to enhance protective factors and mitigate risk factors that influence adolescents' mental health (Sulistiowati et al., 2023). It is crucial to identify and implement effective interventions to combat the burden of mental health disorders among adolescents (Mehra et al., 2022).

This research focuses on developing a smart application tailored specifically for adolescents, leveraging the widespread use of Android platforms. The study employs the ADDIE Model. The ADDIE Model, consisting of the Analysis, Design, Development, Implementation, and Evaluation phases, provides a systematic instructional design framework (Cho et al., 2022). By combining educational content with interactive features, the aim is to create a user-friendly tool that promotes mental health awareness, resilience, and coping strategies among young users. Developing a smart application tailored for adolescents to promote mental health awareness, resilience, and coping strategies is a crucial endeavor. Research has shown that mobile technology and smartphone applications have the potential to positively influence adolescents' health-related behaviors (Eswaramoorthi et al., 2022). Moreover, sustaining these behavioral changes over time remains a challenge. Research by Alcântara et al., (2019) suggests that digital technologies can play a significant role in promoting healthy eating habits among teenagers. They emphasize the need for technology to be adapted to teenagers' experiences and integrated into leisure activities and school settings to educate adolescents on nutrition and prevent chronic diseases effectively.

The development process includes designing interactive and engaging content tailored to adolescent needs, incorporating evidence-based mental health education modules, and integrating features such as self-assessment tools and access to support resources. A usability evaluation was conducted to ensure the application's user-friendliness and effectiveness in delivering educational content on mental health. To develop an effective mental health education application tailored to adolescents, it is crucial to consider various aspects supported by research. Incorporating evidence-based mental health education modules (Burger et al., 2024; Overstreet, 2023; Simkiss et al., 2022) is essential to ensure the content's quality and relevance. Additionally, integrating features such as self-assessment tools and access to support resources (Høgsdal et al., 2023; Weinberg et al., 2019) can enhance the application's usability and effectiveness in delivering educational content on mental health.

Despite the growing awareness of mental health issues among adolescents, there remains a gap in accessible and engaging educational resources specifically tailored to address their mental well-being. There is a recognized need for accessible and engaging educational resources tailored to address the mental well-being of adolescents. Despite the increasing rates of mental health problems among this age group, there are significant barriers to seeking help and utilizing mental health resources (Velasco et al., 2020). Adolescents are at high risk for mental health disorders, yet many do not receive treatment, indicating a gap in mental health care accessibility (Roberts et al., 2021). Therefore, an Android-based technology approach could be a solution for teenagers to improve their mental health. although it is necessary to monitor its use.

Methodology

This research utilizes a systematic approach for developing a smart application focused on educating adolescents about mental health on the Android platform (Figure 1). The methodology follows the ADDIE Model, which consists of five phases: Analysis, Design, Development, Implementation, and Evaluation.

Analysis Phase: (1) Conducting a thorough needs assessment to understand the target audience's mental health challenges, preferences, and educational needs. (2) Gathering data through surveys, interviews, and literature review to identify key mental health topics, preferred learning styles, and existing resources.

Design Phase: (1) Creating a detailed design plan based on the analysis findings, outlining the app's objectives, content structure, features, and user interface. (2) Developing wireframes, storyboards, and mock-ups to visualize the app's layout, navigation flow, and interactive elements.

Development Phase: (1) Utilizing development tools (Kodular io) to build the app according to the design specifications. (1) Incorporating multimedia elements, such as videos, mental health literature, surveys, and interactive exercises, to enhance user engagement and learning experience.

Implementation Phase: (1) Launching the app for distribution to the target audience. (2) Conducting testing and gathering feedback from users to identify any issues, usability concerns, or areas for improvement. The study involved 201 respondents from multiple provinces.

Evaluation Phase: (1) Assessing the app's effectiveness in educating adolescents about mental health topics through quantitative methods. (2) Using surveys, user analytics, and focus groups to measure user satisfaction, knowledge retention, behavior change, and overall impact. (3) Iterating and refining the app based on evaluation results to enhance its educational value, usability, and relevance to the target audience. *(This will be done for the next research).*

This research methodology ensures a systematic and iterative approach to developing a smart application for education media on adolescent mental health, focusing on user needs, instructional
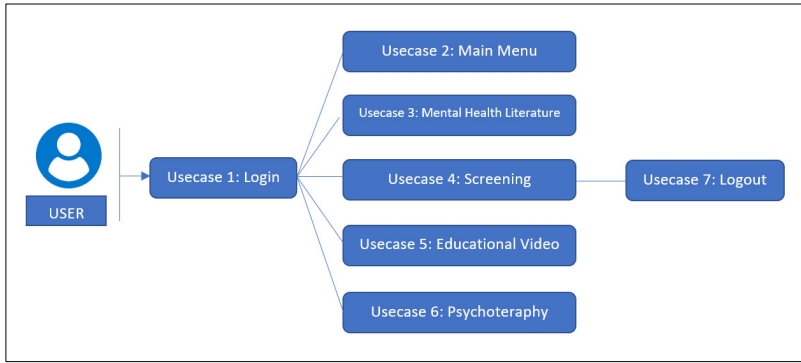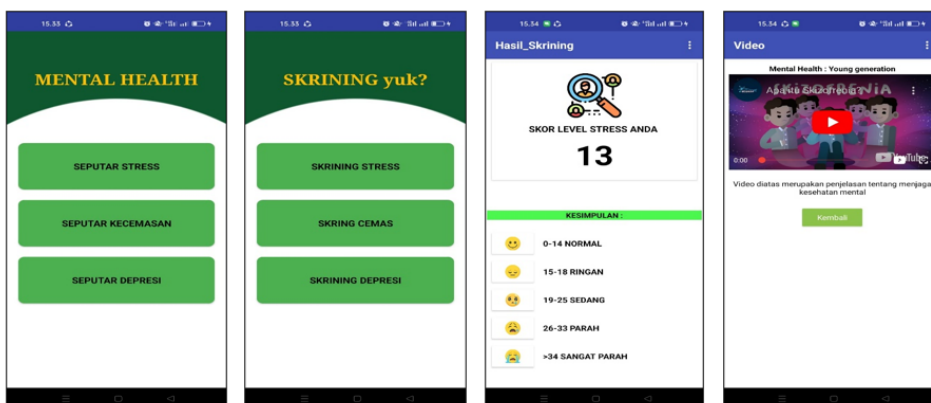
Figure 1. Use cases Diagram on Developing a Smart Application as an Education Media on The Mental Health of Adolescents
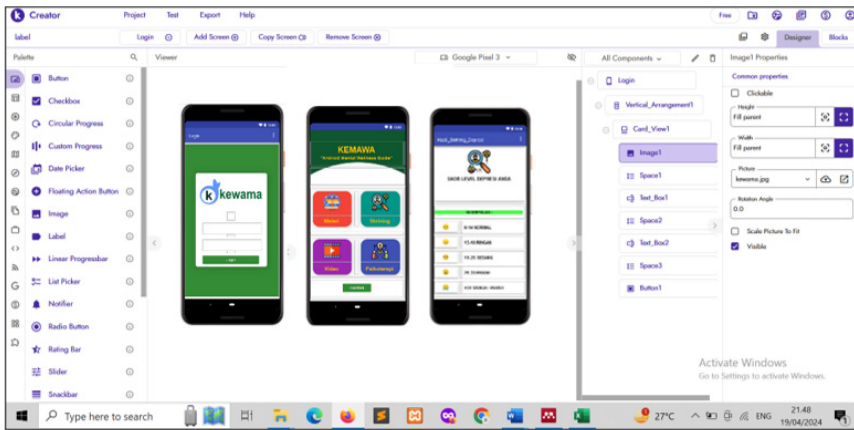
Figure 2. Application Design Development in Kodular.io
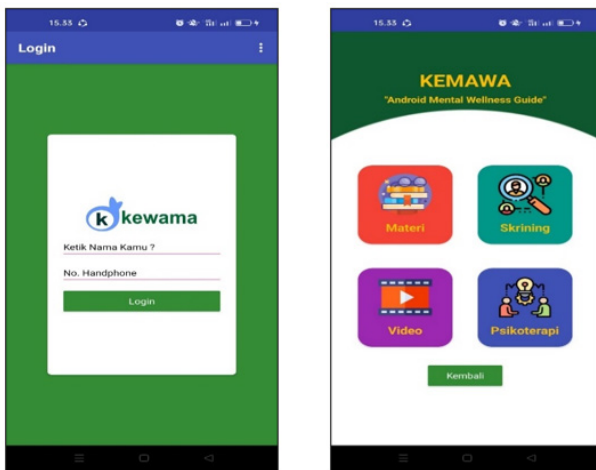
Figure 3. Application interface and main features of KEWAMA App

Figure 4. Application of features of KEWAMA App

Table 1. Percentage of Evaluation of the Usefulness of Smart Applications as an Education Media on the Mental Health of Adolescents

No	Application Indicator of KEWAMA App	Description			Mean	Std. Deviation
		Number (n)	Percentage (%)	Total (%)		
1	Application View					
	Good	196	97,50 %	N=201		
	Not good	5	2.50 %	(100%)	0,98	0,156
2	Application Operation					
	Easy	189	94.82%	N=201		
	Difficult	12	5.18%	(100%)	0,94	0,238
3	Material Presentation					
	Appropriate	196	97,50 %	N=201		
	Inappropriate	5	2.50 %	(100%)	0,98	0,156
4	Use of Language					
	Easy	194	96,50%	N=201		
	Difficult	7	3,50%	(100%)	0,97	0,184

design principles, technological implementation, user feedback, and continuous improvement.

Results

The study aimed to develop a smart application for education media focused on enhancing the mental health of adolescents using Android technology. The researchers followed the ADDIE Model (Analysis, Design, Development, Implementation, Evaluation) to create the application. In the analysis phase, extensive research was conducted to understand the mental health challenges faced by adolescents and the role of technology in addressing these issues (Figure 2). Surveys and interviews were conducted with both students and mental health professionals to gather insights and identify key features needed in the application. Based on the analysis, the design phase began with the creation of wireframes and prototypes. The user interface was designed to be intuitive and engaging, with features such as mental health literature, surveys, educational resources on mental health, and interactive exercises for self-care.

The design of this application leveraging the versatile platform of Kodular.io, this endeavor merges technology with the sensitivity of mental health education. The initial phase entails meticulous planning, aligning with the systematic ADDIE Model (Analysis, Design, Development, Implementation, and Evaluation). Through an analysis, the unique needs and challenges faced by adolescents regarding mental health are identified. This insight forms the cornerstone of the application's design and content strategy. The Design phase encapsulates creativity and user-centricity. Utilizing Kodular.io's intuitive interface, the application's layout, navigation flow, and interactive elements are crafted with precision (Figure 3). Engaging visuals, user-friendly features, and a seamless experience are prioritized to enhance user engagement and learning retention. During the development phase, the application is built using Kodular io. Testing and debugging are performed to ensure functionality across devices and operating systems. The implementation phase includes launching the application to users or teenagers involving 201 respondents from multiple provinces (Bengkulu, West Java, Riau, Central Sulawesi, Jakarta, and East Kalimantan), evaluating the application's usability. Lastly, the evaluation phase utilized quantitative methods to assess the app's effectiveness in improving adolescents' mental health (Figure 4, Table 1)). User feedback and app usage data.

Discussion

The study successfully developed a smart application tailored to adolescent mental health needs, demonstrating the effectiveness of the ADDIE Model in guiding the development process. The application's positive impact on user satisfaction, knowledge retention, and behavior change underscores the potential of

leveraging technology to address mental health challenges among adolescents. Future iterations will focus on continuous improvement based on ongoing user feedback and evaluation results.

Developing a Smart Application is a significant endeavor focusing on leveraging technology to address mental health issues among adolescents. This project utilizes the ADDIE Model, a systematic instructional design framework, to guide the development process of the Android-based application. The systematic planning process for developing an application to address mental health needs in adolescents aligns with the ADDIE Model, encompassing Analysis, Design, Development, Implementation, and Evaluation (Meherali et al., 2021). Understanding the unique challenges faced by adolescents regarding mental health is crucial for designing effective interventions (Velasco et al., 2020). Early intervention services during the critical transitional phase of youth mental health can modify the trajectory of mental illness (Arunachaleeswaran & Bhan, 2022). Poor mental health in adolescents can lead to long-term challenges compromising their growth and potential (Pillay, 2022).

Application View:

the data shows that a vast majority, approximately 97.50%, rated the application view as good, indicating a positive reception among users. However, there were also 5 users, accounting for 2.50%, who found the application view not good. This analysis suggests that the majority of users had a positive experience with the application's visual aspects, which is a promising outcome. However, the feedback from the minority who found the view not good is valuable and could provide insights for further improvements. Future iterations of the application could benefit from addressing the concerns raised by these users to enhance overall user satisfaction and engagement. Incorporating user feedback into ongoing development processes can lead to more effective and user-friendly educational tools for adolescent mental health support.

Application Operation:

The analysis reveals an important insight into the ease of operation of the application among users. The data indicates that a significant majority of users, approximately 94.82%, found the application easy to operate. This high percentage suggests a positive user experience and reflects the effectiveness of the application's design and interface in facilitating user interaction. However, it's worth noting that a small percentage of users, around 5.18%, reported finding the application difficult to operate. While this is a minority, it highlights areas for potential improvement in the application's usability and user interface. Future iterations of the application could focus on addressing these challenges to further enhance user satisfaction and engagement. Overall, the research findings indicate a strong foundation for the smart application's usability, with a majority of users finding it easy to use. By addressing the feedback from users

who found it difficult to operate, future versions of the application can strive for even greater accessibility and user-friendliness, ultimately contributing to its effectiveness as an educational tool for adolescent mental health.

Material Presentation:

The results indicate a significant majority of 97.50% found the material presentation appropriate, while a small percentage of 2.50% considered it inappropriate. In discussing these findings, it would be beneficial to delve deeper into why a minority felt the material presentation was inappropriate. Consider exploring their specific concerns or suggestions for improvement. Additionally, it could be valuable to gather more feedback from a broader range of participants to ensure a comprehensive understanding of users' perspectives. Looking ahead, incorporating user feedback into future iterations of the smart application could enhance its effectiveness and user satisfaction. This might involve refining content, design, or interactive features based on the insights gained from this analysis. Continuously evaluating and updating the application in response to user input can contribute to its positive impact on adolescent mental health. Several respondents have suggested incorporating music into educational materials aimed at reducing depression, stress, and anxiety among adolescents. Recognizing the need for comprehensive intervention has led to increased acknowledgment of the role of Music Intervention (Sahu & Singh, 2023).

Use of Language:

The data from your research on the use of language in the smart application for mental health education among adolescents suggests that the majority of users found language usage to be easy, with 96.50% of respondents indicating this. However, there were still 3.50% of users who found the language usage difficult. This analysis implies that while the current language approach is effective for most users, there is room for improvement to cater to those who find it challenging. For future iterations, considering user feedback and potentially implementing clearer language or additional support features could enhance the overall user experience and effectiveness of the application.

Conclusion

The research project "Developing a Smart Application for Education Media on the Mental Health of Adolescents Based on an Android" has yielded valuable insights into the reception and usability of the application among users. The data analysis presents a mixed but generally positive picture, highlighting areas of success as well as opportunities for refinement and improvement. Firstly, in terms of application view, the overwhelming majority of users rated it as good, indicating a positive reception. However, there were still a few users who found the view not satisfactory, suggesting a need for further enhancements in visual aspects to ensure a universally

positive user experience. Regarding application operation, the high percentage of users finding it easy to operate reflects the effectiveness of the design and interface. Nonetheless, the minority reporting difficulty signals a need to address usability challenges for a more inclusive user experience.

The material presentation was deemed appropriate by most users, yet understanding the concerns of the minority who found it inappropriate can guide refinements in content delivery and presentation methods. Lastly, the majority of users found the language usage easy, although a small percentage struggled with it. Incorporating clearer language and additional support features based on user feedback can enhance overall comprehension and engagement.

In conclusion, while the smart application shows promise in supporting adolescent mental health education, ongoing refinement based on user feedback is essential to ensure broader accessibility, usability, and effectiveness. Continuously evaluating and updating the application in response to user input can lead to more impactful interventions and improved user satisfaction.

Author contributions

A., S.D., S., N.N.S., L.J., R.H., D.L., A.H.S.D. conceptualized, conducted field works, analyzed data, wrote the original draft, reviewed, and edited the paper. All authors read and approved the paper for publication.

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Competing financial interests

The authors have no conflict of interest.

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