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Development Of An Artificial Intelligence-Based "Smart Counseling" Application To Improve The Professionality Of Guidance And Counseling Teachers In The Counseling Stage

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Abstract

This study aims to develop an Artificial Intelligence (AI)-based counseling service application to enhance the professionalism of school counselors. The research employed a Research and Development (R&D) method using the ADDIE model, including analysis, design, development, implementation, and evaluation stages. The subjects consisted of two expert validators and fifteen school counselors, with instruments in the form of validation and user response questionnaires. The results showed that the developed application was categorized as highly feasible, with an expert validation score of 88% and a user response score of 87.5% in the very good category. The study produced a counseling system based on a four-layer architecture, namely input layer, AI processing layer, knowledge layer, and output layer, enabling a systematic and data-driven counseling process. The findings indicate that the application assists counselors in structuring counseling stages, improving service efficiency, and supporting more structured decision-making. Therefore, this application contributes as an innovative technological solution to enhance the quality and professionalism of counseling services in schools.

Keywords: Artificial Intelligence, counselor professionalism, digital counseling

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INTRODUCTION

The development of digital technology in the era of Industry 4.0 and Society 5.0 has brought about fundamental changes in various aspects of human life, including education and guidance and counseling (GC) services. Digital transformation has not only altered the way learning takes place but has also influenced how educational support services—such as counseling—are delivered to students. A rapidly evolving technology that has become a focal point of this transformation is Artificial Intelligence (AI), a technology capable of simulating human intelligence in processes involving thinking, learning, and data-driven decision-making (Dwivedi, 2021). The advent of AI opens up new opportunities to enhance the effectiveness, efficiency, and quality of educational services through the use of intelligent systems that adapt to user needs.

In the realm of education, AI is utilized across various areas, ranging from adaptive learning systems and student performance analysis to recommendation systems tailored to individual needs (Holmes et al., 2019). AI enables personalized learning, allowing educational materials and strategies to be customized according to students' characteristics, abilities, and needs. Furthermore, the use of AI facilitates data-driven decision-making, thereby increasing accuracy and objectivity within the educational process (Tuomi, 2018). Research indicates that integrating AI into education can improve the efficiency of learning management while providing a more effective and meaningful learning experience (Hwang & Tu, 2021).

Alongside these developments, the application of AI is extending into the field of guidance and counseling services. As an integral part of the education system, guidance and counseling services play a crucial role in helping students overcome various academic, social, and emotional challenges. In practice, counseling services require strong analytical skills, the selection of appropriate techniques, and a systematic interaction process between the counselor and the client. However, the increasing complexity of the issues students face necessitates innovation in the delivery of guidance and counseling services to ensure greater effectiveness and efficiency (Kadafi, et al, 2021).

The utilization of AI in counseling services offers significant potential to enhance service quality. AI can be employed through chatbots, recommendation systems, and psychological data analysis to assist counselors in gaining a more comprehensive understanding of a client's condition (Zhou & Chen, 2022). Furthermore, advancements in Natural Language Processing (NLP) enable systems to comprehend human language, facilitating their use in initial client interactions and the analysis of counseling conversation data (Zhai, 2021). Research also indicates that AI can provide preliminary mental health support and improve access to counseling services (Laranjo, 2018).

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Moreover, AI possesses the capability to identify patterns within large datasets (big data), allowing it to offer more precise intervention recommendations based on similar cases (Rahman & Watanobe, 2023). In this context, AI functions as a decision support system, helping counselors determine service steps in a more systematic and data-driven manner. Thus, AI does not replace the counselor's role but rather strengthens their capacity to deliver higher-quality services.

Despite the immense potential of AI in guidance and counseling services, its practical implementation faces various challenges. A primary issue is the continued dominance of conventional methods used by guidance and counseling teachers when delivering services. Processes such as assessment, case analysis, and the selection of counseling techniques are often performed manually; this is time-consuming and carries the risk of introducing subjectivity into decision-making (Setiawan & Pratama, 2022). Additionally, counseling service documentation is frequently poorly managed, complicating the processes of service evaluation and reporting.

On the other hand, the professionalism of guidance and counseling teachers is a key factor in the success of counseling services. This professionalism encompasses the ability to conduct accurate assessments, select appropriate counseling techniques, and execute counseling stages in a systematic and structured manner (Corey, 2017). In practice, however, not all teachers possess optimal proficiency in carrying out these stages, particularly given constraints such as limited time and heavy workloads. This situation reveals a gap between professional expectations and the actual conditions on the ground.

With technological advancements, the digitalization of guidance and counseling (BK) services has emerged as a solution to address various existing challenges. Utilizing digital systems in these services enables more systematic data management, more efficient service processes, and more structured documentation (Sari & Nugroho, 2023). Furthermore, integrating AI into digital systems allows for the creation of counseling services that are more adaptive and responsive to students' needs.

However, most research and development regarding AI-based counseling service applications to date remain fragmented; they tend to focus on specific aspects—such as data recording, communication, or simple chatbots—without systematically integrating all stages of counseling into a single, unified platform. Additionally, there is limited research examining the implementation of AI systems as decision support tools to enhance the professionalism of guidance and counseling teachers in secondary school settings. This situation highlights a gap between the potential of AI technology and its actual implementation in school-based guidance and counseling services.

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Based on this context, the primary issues facing current guidance and counseling services include the lack of optimal, systematic execution of counseling stages, insufficient use of technology to support services, and the absence of a system capable of effectively integrating assessment, analysis, and documentation processes. Therefore, an innovation is needed—specifically, an AI-based counseling service application—to assist guidance and counseling teachers in performing their duties with greater professionalism.

Given these issues, the hypothesis of this study is that developing an AI-based counseling service application can enhance the professionalism of guidance and counseling teachers, particularly regarding service systematization, work efficiency, and the quality of counseling documentation. The designed application is expected to automatically provide recommendations for counseling stages based on user-inputted data, thereby assisting teachers in making more accurate, data-driven decisions.

To address these issues, this study develops an Artificial Intelligence-based application called "Konseling Cerdas" (Smart Counseling), designed to support school counselors in delivering counseling services. The application integrates various features—such as case assessment, AI-driven analysis, counseling technique recommendations, and service documentation—into a single, unified platform.

The novelty of this research lies in the development of an AI-based counseling service application that integrates the entire spectrum of school counseling services—from assessment, case analysis, and technique recommendations to service documentation—into a unified system based on a decision support system. Unlike previous studies that tended to focus on isolated components, this research offers a comprehensive approach that not only supports technical aspects but also enhances the overall professionalism of school counselors.

Thus, the objective of this study is to develop an AI-based guidance and counseling application that is both viable and effective, and to evaluate its capacity to enhance the professionalism of school counselors in conducting counseling processes systematically, efficiently, and based on data.

RESEARCH METHOD

This study employs a Research and Development (R&D) approach aimed at developing and testing the feasibility of an Artificial Intelligence (AI)-based guidance and counseling service application named "Konseling Cerdas" (Smart Counseling). This approach was selected because it enables the researcher to produce a product while simultaneously testing its effectiveness within

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the real-world context of school counseling services (Sugiyono, 2019). The development model utilized is ADDIE (Analysis, Design, Development, Implementation, Evaluation), which offers a systematic yet flexible framework for developing educational technology products (Branch, 2009). The materials used in this study include the "Konseling Cerdas" application as the primary product, instruments comprising expert validation questionnaires and user response questionnaires, and research subjects consisting of two expert validators (a media expert and a guidance and counseling expert) and fifteen guidance and counseling teachers acting as users. The questionnaires were used to evaluate aspects such as visual design, system functionality, and the appropriateness of counseling content, as well as to measure ease of use, service efficiency, and the systematic flow of counseling stages facilitated by the application (Suryahadikusumah & Nadya, 2022).

The product developed in this study is an AI-based counseling service application accessible online via the following link: https://ai-guide-counsel.lovable.app/. This application serves as the primary medium for the trial phase involving guidance and counseling teachers; users can create their own login accounts or use the following credentials: username: ida2@gmail.com, password: 123456.

The research procedure was carried out following the five stages of the ADDIE model: beginning with a needs analysis phase—conducted through observation and literature review to identify issues within guidance and counseling services—followed by a system design phase covering the application's workflow and user interface design, and finally, the development of the AI-based application, which incorporates features for assessment, case analysis, counseling technique recommendations, and service documentation. The subsequent phase is implementation—specifically, piloting the application with guidance and counseling teachers to assess its ease of use and service effectiveness—followed by an evaluation phase based on an analysis of expert validation results and user feedback. This study was conducted over approximately three months in a secondary school setting with active guidance and counseling services, encompassing the design, development, and pilot testing stages. The collected data underwent quantitative descriptive analysis using percentages to determine the application's feasibility and effectiveness, avoiding complex statistical analyses; this approach ensures the findings provide a clear, practical overview of the developed product's quality (Hwang & Tu, 2021; Rahman & Watanobe, 2023).

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RESULTS AND DISCUSSION

The "Smart Counseling" application developed in this study utilizes a layered system approach designed to ensure that the counseling service process operates systematically and is data-driven. Conceptually, the application comprises four primary, integrated layers—the input layer, AI processing layer, knowledge layer, and output layer—which collectively support the decision-making process for guidance and counseling services.

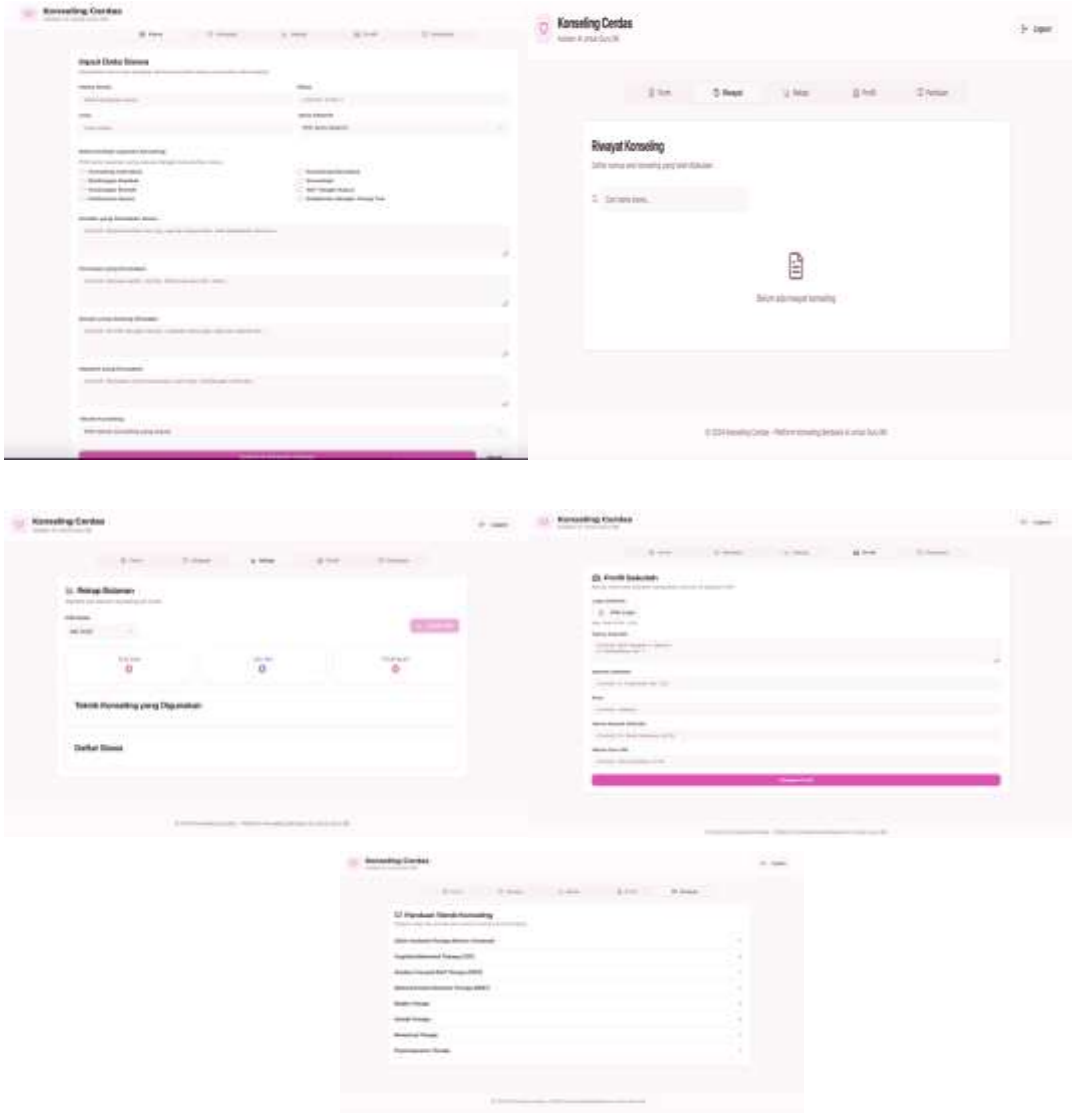


Figure 1.
5 Main Menus of the "Smart Counseling" Application

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The first layer is the input layer, serving as the initial stage of the service process where guidance and counseling teachers enter student data and descriptions of the issues at hand. This stage represents the assessment phase of counseling services, forming the foundation for a comprehensive understanding of the client's condition. Subsequently, the input data is processed in the AI processing layer—the system's core component—which analyzes student issues using artificial intelligence algorithms. At this stage, the system processes available information to identify problem patterns and potential, relevant intervention approaches.

This analysis process does not operate in isolation; it is supported by a knowledge layer containing a knowledge base of theories, principles, and techniques relevant to guidance and counseling. This layer serves as a conceptual reference, ensuring that all generated recommendations align with the scientific standards of counseling practice. Thus, the integration of the AI processing layer and the knowledge layer enables the system to produce analyses that are not only data-driven but also grounded in proven theories.

The results of this entire process are presented via the output layer in the form of recommended counseling service stages that guidance and counseling teachers can utilize in practice. These recommendations encompass systematic intervention steps tailored to the specific issues faced by the students. With this layered structure, the application functions not merely as an administrative tool but as a decision support system capable of enhancing the quality and professionalism of counseling services.

The four-layer system architecture design illustrated in Figure 1 demonstrates that the "Smart Counseling" (*Konseling Cerdas*) application was developed not merely as a digital tool, but as an integrated system combining assessment processes, AI-based analysis, and counseling theory within a systematic workflow. This layer integration ensures that user-inputted data is not only technically processed but also interpreted through relevant conceptual frameworks, resulting in service recommendations that are more targeted and scientifically grounded. Consequently, the application conceptually fulfills the criteria of a decision support system for guidance and counseling services.

However, a conceptually sound system design requires empirical validation to determine its practical feasibility and effectiveness. Therefore, to assess the extent to which the developed application can be optimally utilized by guidance and counseling teachers, this section presents research findings covering expert validation and user responses regarding the "Smart Counseling" application during actual field implementation.

These findings stem from the development process of the AI-based "Smart Counseling"

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application, which underwent expert validation and trials involving guidance and counseling teachers. The data obtained are not merely presented as numerical figures but are analyzed to understand their significance, trends, and implications for enhancing the professionalism of guidance and counseling teachers in delivering services. This approach is crucial because, in development research, the primary value lies not in the numbers themselves, but in the product's ability to make a tangible contribution to field practice.

Table 1. Expert Validation Results for the Smart Counseling Application

Aspect	Max. Score	Score Obtained	Percentage	Category
Interface	50	43	86%	Highly Worth It
System	50	44	88%	Highly Worth It
Guidance and Counseling Material	50	45	90%	Highly Worth It
Average	-	-	**88%**	**Highly Worth It**

Table 1 above shows that expert validation results place the application in the "highly feasible" category, with an average score of 88%. This figure not only demonstrates the application's usability but also indicates that the system's architecture meets professional standards for guidance and counseling services. The high score in the content aspect suggests that the developed AI system can generate recommendations aligned with existing counseling theories, particularly regarding the selection of intervention techniques. This aligns with the view that the quality of counseling services is largely determined by the alignment between the client's issues and the intervention techniques employed (Corey, 2017).

A deeper analysis reveals relatively small score variations across aspects (86%–90%), indicating consistent quality across all application components. From a descriptive statistical perspective, this suggests a homogeneous distribution of ratings; thus, the application does not excel in just one specific area but maintains balanced quality overall. This consistency serves as a key indicator that the application is reliable as a service support system rather than merely a limited aid. However, the slightly lower score for the interface aspect suggests that the user experience requires further development. In the context of educational technology, ease of use is a primary factor determining the level of user adoption (Hwang & Tu, 2021); therefore, enhancing this aspect is recommended for future development.

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Furthermore, trial results involving school counselors provide insight into the application's effectiveness in real-world counseling practice. User response data indicate that the application is not only theoretically sound but also practical and acceptable for use in the field.

Table 2. School Counselor Responses Regarding the Use of the Smart Counseling Application

Indicator	Max. Score	Score Obtained	Percentage
Ease of use	75	66	88%
Service efficiency	75	64	85%
Counseling methodology	75	68	90%
Service documentation	75	65	87%
Average	-	-	**87,50%**

Based on Table 2 above, user response results show an average of 87.5%, placing it in the "very good" category. The highest score was observed in the counseling systematization indicator, demonstrating that the application has the most significant impact on school counselors' ability to structure service stages. This finding is significant because a primary challenge in counseling practice is the lack of systematic execution of service stages. With AI support, school counselors are no longer required to determine service steps manually; instead, they can leverage data-driven recommendations provided by the system.

From a theoretical perspective, these findings support the concept of decision support systems, which posits that technology can enhance the quality of professional decision-making (Dwivedi, 2021). In this context, the application serves as a cognitive aid that reduces the user's cognitive load, allowing school counselors to focus more on interacting with students. This demonstrates that integrating AI into counseling services does not diminish the human role but rather strengthens it.

The service efficiency score of 85% indicates that the application successfully accelerates the service process, although it has not yet reached its maximum potential. This can be attributed to factors regarding user adaptation to the new system. Technology adoption theory suggests that the initial phase of usage is often characterized by an adjustment process that influences perceptions of efficiency (Rahman & Watanobe, 2023). Consequently, this score is expected to rise as users gain more experience with the application.

An analysis of the overall data reveals a narrow score range of 85% to 90%, indicating stable performance across all indicators. From a descriptive statistical standpoint, this suggests that the

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application is not merely effective in a single aspect but delivers a relatively consistent impact across all components of counseling services. This reinforces the argument that the developed application offers a comprehensive rather than a partial solution. To further clarify the data distribution, the results can be presented graphically.

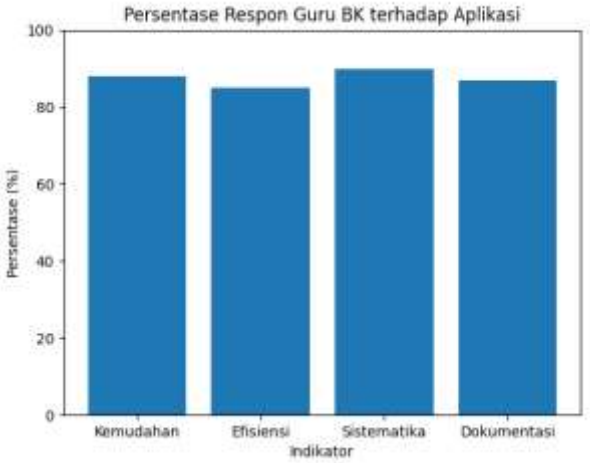


Figure 2. Bar chart showing the percentage of school counselor responses regarding the Smart Counseling Application.

Figure 2 shows that all indicators fall into the high category, with relatively balanced values. This indicates that the application is positively received by users and is capable of comprehensively meeting service needs.

Based on the overall results obtained, the research hypothesis stating that an Artificial Intelligence-based application can enhance the professionalism of guidance and counseling teachers is accepted. The rationale for accepting this hypothesis lies in the application's ability to simultaneously improve service systematization, work efficiency, and documentation quality. These three aspects are key indicators of professionalism in counseling services.

Compared to previous studies, this research demonstrates an advantage in terms of system integration. Some earlier studies showed improvements in only one specific aspect—such as efficiency or ease of use—without significantly impacting service quality. This difference can be attributed to the characteristics of the application developed in this study, which integrates all stages of service delivery into a single platform. Consequently, the application functions not merely as an administrative aid but as a comprehensive decision-support system.

The implications of these findings suggest that the use of AI in guidance and counseling

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services holds great potential for enhancing overall service quality. However, the results also indicate that technology cannot replace the human role in counseling services. Empathetic interaction, emotional understanding, and interpersonal relationships remain essential aspects that only a counselor can provide. Therefore, this application is best positioned as a professional tool that supports the performance of guidance and counseling teachers. Thus, this study contributes significantly to the development of technology-based guidance and counseling services while reinforcing the concept of AI integration in education as a means to sustainably improve service quality.

The results of this study demonstrate that the development of an Artificial Intelligence (AI)-based guidance and counseling application named "Konseling Cerdas" (Smart Counseling) has a positive impact on improving the quality of services provided by guidance and counseling teachers. These findings are based on expert validation and user responses, which indicate very high levels of feasibility and acceptance. However, beyond the numerical data, these results must be understood through an interpretation that links the empirical data with the theoretical framework employed in the study.

Based on expert validation results, the application achieved an average score placing it in the "highly suitable" category. The highest scores were recorded in the guidance and counseling content aspect, demonstrating the AI system's ability to generate recommendations aligned with theoretical counseling principles. This aligns with the theory proposed by Corey (2017), which emphasizes that the success of counseling services relies heavily on selecting intervention techniques appropriate to the client's specific issues. In this context, the application acts as a system that links input problem data with relevant counseling approaches, thereby minimizing the risk of errors in technique selection. Consequently, these findings reinforce the role of AI as a tool for enhancing the accuracy of theory-based counseling practices.

Furthermore, the validation results—showing consistent scores across various aspects—indicate that the application is not only substantively robust but also possesses good system stability. From an educational technology perspective, this aligns with the concept of system quality proposed by Hwang and Tu (2021), where an application's success is determined by the alignment of system functionality, ease of use, and suitability to user needs. However, the slightly lower score in the interface/display aspect suggests that the user experience requires further development. This is crucial, as technology adoption theory identifies ease of use as a primary factor in determining user acceptance of a system.

Trial results involving guidance and counseling teachers indicate that the application

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significantly impacts the systematization of counseling services. High scores in this area demonstrate the application's ability to assist teachers in structuring and systematizing the stages of service delivery. These findings are highly relevant to the concept of professionalism in counseling, which emphasizes the importance of executing service stages—ranging from assessment and diagnosis to intervention and evaluation—in a logical sequence (Corey, 2017). In conventional practice, these stages often fail to proceed optimally due to time constraints and the heavy workloads faced by guidance and counseling teachers. The AI-based application enables a more focused process, thereby improving the quality of the services provided.

From the perspective of decision support system theory, the study's findings indicate that the application serves as a tool capable of enhancing the quality of professional decision-making. Dwivedi et al. (2021) state that AI-based technology can assist humans in processing complex information into recommendations that are easier to understand and utilize. In this study, the application transforms assessment data into systematic counseling stage recommendations, thereby reducing the cognitive load on guidance counselors during the analysis process. This demonstrates that AI functions not merely as a technical tool but also as a partner in the professional thought process.

Regarding service efficiency, the results show that the application accelerates the delivery of counseling services, although it has not yet reached an optimal level. This can be explained by technology adoption theory, which posits that users require time to adapt to new systems before achieving peak efficiency (Rahman & Watanobe, 2023). Consequently, the slightly lower efficiency score—relative to other indicators—does not signify a system weakness but rather reflects the initial phase of technology adoption. As user experience grows, the efficiency of the application's usage is expected to improve.

Furthermore, the study reveals that the application contributes positively to counseling service documentation. The application's ability to digitally store and manage data signifies a shift from conventional practices toward a data-driven counseling approach. In modern educational theory, data-based decision-making is considered a key indicator of improved service quality (Tuomi, 2018). Systematic documentation enables guidance counselors to evaluate services more objectively and measurably.

Overall, the relatively even distribution of scores across all indicators demonstrates the application's consistent performance. From a descriptive statistical standpoint, this indicates that the application is not effective in only one specific area but delivers a balanced impact across all components of counseling services. This reinforces the argument that the developed application

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is comprehensive and capable of addressing service needs holistically.

Based on these results, the research hypothesis stating that Artificial Intelligence-based applications can enhance the professionalism of guidance and counseling teachers is accepted. The rationale for accepting this hypothesis lies in the interconnection between improved service systematization, work efficiency, and documentation quality—all of which are key indicators of professionalism. In other words, when these three aspects improve simultaneously, it can be concluded that the professionalism of guidance and counseling teachers also improves.

When compared to previous studies, the results of this research reveal significant differences. Some earlier studies showed improvements only in specific areas—such as efficiency or ease of use—without significantly impacting service quality. This discrepancy can be attributed to the integrated approach to application development adopted in this study. The application functions not merely as an administrative aid but as a system that integrates every stage of the counseling service process. This demonstrates that a comprehensive systems approach is more effective than a piecemeal one.

From a conceptual standpoint, these findings reinforce the idea that technology integration in counseling services must be holistic rather than simply adding digital features to existing processes. AI needs to be designed as part of a system that supports professional reasoning, rather than serving merely as an automation tool. Thus, the application's success in this study stems not only from the technology employed but also from how that technology is integrated with fundamental counseling principles.

Nevertheless, the findings also indicate that technology cannot entirely replace the human role in counseling services. Empathetic interaction, emotional understanding, and interpersonal relationships remain essential aspects that AI systems cannot replicate. Therefore, the application is best positioned as a supportive tool that aids, rather than replaces, the role of the guidance and counseling teacher. This aligns with the concept of human-AI collaboration, which emphasizes the importance of cooperation between humans and technology to enhance service quality (Dwivedi, 2021).

Consequently, this research makes a significant contribution to the development of technology-based guidance and counseling services while strengthening the theoretical foundation regarding AI integration in education. These findings indicate that the use of appropriately designed AI can significantly enhance service quality while opening up opportunities for further development in the field of technology-based counseling.

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CONCLUSION

Based on the research results and discussion, it can be concluded that the development of the Artificial Intelligence (AI)-based "Konseling Cerdas" (Smart Counseling) application has successfully produced a product that is viable and effective for use in school guidance and counseling services. This is evidenced by expert validation results falling into the "highly viable" category and user responses indicating a high level of acceptance. The application has proven capable of assisting school counselors in structuring counseling stages more systematically, enhancing service delivery efficiency, and facilitating digital documentation. These findings indicate that integrating AI into counseling services can serve as a decision-support system that fosters the professional development of school counselors without replacing their primary role as service providers. Nevertheless, certain aspects require further development, particularly regarding interface design and usage efficiency to ensure greater user adaptability. Therefore, future development should incorporate more interactive features, broader data integration, and increased AI system transparency to enhance user understanding. Additionally, further research should involve a larger participant pool and employ an experimental approach to rigorously evaluate the application's effectiveness regarding student counseling outcomes. Thus, this application holds potential not only as a technological innovation but also as a strategic solution for improving the quality of data-driven guidance and counseling services in the future.

FUTURE DIRECTIONS

The psychological issues faced by students are becoming increasingly complex. This compels counselors to continuously innovate in order to provide optimal services. One approach worth considering is the utilization of artificial intelligence in the future development of guidance and counseling services.

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