

Design and development of an interactive consultation application for mental health management and support

¹Muhammad Rizky & ²Ikrimach

Abstract

Mental health is a person's emotional and psychological state that affects how individuals feel and behave daily. Mental health issues are among the most discussed topics among adults, with increasing awareness of their impact on overall well-being. Against this background, the researcher decided to design and develop an interactive consultation application for mental health management and support. This research introduces a novel interactive mental health consultation application, uniquely combining real-time professional support with user-centric features like progress tracking, self-help activities, and educational mini-articles. The application's innovative design distinguishes it by offering a holistic platform integrating professional mental health consultations with evidence-based self-management tools. Unlike traditional therapy or standalone self-help apps, this solution bridges gaps in accessibility, affordability, and convenience, addressing challenges faced by individuals with limited access to in-person services due to time constraints, financial barriers, or geographic limitations. The findings underscore the app's transformative potential to democratize mental health care, making support accessible to diverse populations. By integrating professional expertise with user-friendly technology, this research sets a precedent for addressing growing mental health needs through scalable digital solutions. Future iterations could expand multilingual capabilities, further broadening its reach and impact.

Keywords: *design science research (DSR), digital, emotional, platform, psychological, therapy*

Article History:

Received: October 12, 2024

Revised: November 16, 2024

Accepted: November 18, 2024

Published online: November 27, 2024

Suggested Citation:

Rizky, M. & Ikrimach (2024). Design and development of an interactive consultation application for mental health management and support. *International Journal of Science, Technology, Engineering and Mathematics*, 4(4), 36-65. <https://doi.org/10.53378/ijstem.353130>

About the authors:

¹Corresponding author. University of Technology Yogyakarta, Yogyakarta, Indonesia. E-mail: chn.tgs23@gmail.com

²University of Technology Yogyakarta, Yogyakarta, Indonesia. Email: ikrimach@uty.ac.id

1. Introduction

Mental health issues have become a growing concern in today's fast-paced and demanding world, particularly since the outbreak of Covid-19. According to the World Health Organization (WHO), mental health conditions such as anxiety, depression, and stress are now among the leading causes of illness and disability globally (Alqahtani & Orji, 2020). The impact of these conditions extends far beyond individual suffering, affecting families, communities, and economies on a large scale. Recent global events have further exacerbated the prevalence of mental health disorders, as the pandemic has caused unprecedented disruptions to daily life and social interactions.

In Indonesia, the government's response to during the height of the Covid-19 has included urging citizens to restrict their activities and practice social distancing. These measures, while necessary for containing the spread of the virus, have had profound effects on people's psychological conditions (Geraldina et al., 2023). The World Health Organization (2020) reported a significant increase in the prevalence of depression and anxiety due to the pandemic (Pourfalatoun & Miller, 2023). In Indonesia alone, nearly 153 clients accessed online consultation services during the pandemic, with the majority reporting symptoms of anxiety and depression (Ramón-Arbués et al., 2020). This surge in mental health issues highlights the urgent need for accessible and effective support systems.

The pandemic has also increased digital technology usage as people turn to online platforms for socializing and maintaining connections. However, this shift has brought about new challenges, including a rise in cyberbullying (Sorrentino et al., 2023). Many individuals have been subjected to mental harassment within society, mainly due to concerns about potential reinfection. Cyberbullying has severely impacted numerous lives, with most cases being linked to depression, anxiety, and other health problems (Gunawan et al., 2020). This situation is highly concerning, given the significant impact of mental health disorders on individuals, families, and governments (Campion et al., 2022).

As leaders of community health services, medical professionals face these difficulties in hospitals and clinics. They are at the forefront of addressing the growing mental health crisis, often with limited resources and increasing demand for services. Through the Ministry of Health, the Indonesian government has attempted to implement some initiatives to assist in resolving issues with mental health in the country (Damayanti et al., 2020). However, the scale

and complexity of the problem call for innovative solutions that can reach a broader population and provide timely support.

In response to these challenges, community representatives must launch solutions to stem the increase in mental health issues. One promising approach is the creation of digital solutions that can complement traditional mental health services and support those who might otherwise struggle to access care. These digital tools can potentially overcome barriers such as geographical distance, stigma, and limited healthcare resources.

This research focuses on designing and developing an interactive consultation application aimed at mental health management and support. Developing an interactive consultation application for mental health management and support addresses several critical needs and issues in modern mental health care. The application is designed to be user-friendly, secure, and flexible, offering real-time consultations and mental health monitoring. By leveraging technology, this solution aims to bridge the gap between mental health professionals and individuals needing support, providing a platform that can be accessed anytime and anywhere. An interactive mental health consultation application can address accessibility, stigma, cost, availability, personalization, and education gaps, helping individuals manage and improve their mental health through a supportive, user-friendly platform. The development of such an application addresses the immediate need for mental health support during challenging times like the pandemic. It paves the way for long-term improvements in mental health care accessibility and effectiveness.

2. Literature review

2.1. Interactive Consultation

Interactive consultation is a collaborative process where patients and healthcare providers engage through technology to facilitate diagnosis and treatment (Richardson et al., 2020). It involves a dynamic, real-time exchange of information between individuals, such as patients or clients, and professionals like healthcare providers, therapists, or consultants (Kwame & Petrucka, 2020). This approach is often facilitated through digital platforms, enabling consultations to occur remotely via various means like video calls, chat, or other interactive tools (Moulaei et al., 2023).

In the context of mental health, mobile health apps facilitate service delivery by integrating interactive clinical interfaces with software. These apps support tasks such as

providing tips and tricks for handling mental health, sharing data, and delivering diagnostic results. Patient data can be efficiently collected through these platforms (Haleem et al., 2021). The goal is to provide faster, more flexible, and easily accessible consultations for all parties involved (Ge et al., 2024).

From a technical perspective, interactive consultation applications can employ various development methods. For instance, the Scrum method has been used in some applications, emphasizing team collaboration, flexibility, and continuous improvement. This approach allows development teams to respond quickly and effectively to changing client needs. Technologies such as PHP and MySQL are often used for data management, ensuring that applications can efficiently handle large amounts of information (Haun et al., 2024).

The application of interactive consultation extends beyond mental health to other sectors, such as education and business. In education, this method is used for online tutoring, where students can directly interact with teachers or mentors without meeting in person. In the business world, interactive consultation can be utilized for coaching or management consulting, enabling companies to support employees or business partners in various locations efficiently (Mosler et al., 2023).

2.2. Mental Health Management

Mental health management involves a systematic approach to maintaining and improving an individual's mental well-being, encompassing strategies, practices, treatments, and rehabilitation methods for addressing mental health issues (Graf-Vlachy et al., 2020). Effective management combines therapeutic interventions, medication management, and continuous monitoring. Therapeutic approaches include cognitive-behavioral therapy, counseling, and group therapy, while medication management is crucial for those requiring specific treatments. Regular supervision and evaluation ensure the effectiveness of these interventions (Appleton et al., 2023).

In the modern era, online consultation platforms have become vital tools in providing easier access to mental health care, offering convenience, flexibility, and privacy. These platforms are particularly beneficial for individuals in remote areas or those reluctant to visit clinics in person. The demand for such services has risen sharply during challenging times, such as the Covid-19 pandemic, with online consultations becoming essential to meet the growing need for mental health support (Appleton et al., 2023).

Continuous monitoring through online platforms allows mental health professionals to regularly evaluate patient progress and adjust treatment plans as needed, reducing the risk of relapse and supporting long-term recovery. In the context of this research, the proposed application aims to support mental health services by providing user-friendly features such as emotion tracking, consultation services, and personalized recommendations. These tools integrate professional support with accessible technology to meet the diverse needs of individuals seeking to improve and maintain their mental well-being (Marei, 2021).

However, there is a gap related to the previous literature that interactive consultation and mental health management lies in limited access to timely, personalized care, especially for individuals in remote or underserved areas. While online consultations and telehealth services offer convenience and flexibility, they often lack the depth of interaction in face-to-face consultations, where non-verbal cues play a significant role in diagnosis and therapy. Additionally, many mental health platforms focus on generic solutions rather than individualized, long-term management, which is crucial for effective treatment. These gaps lead to fragmented care, hindering progress for patients who require continuous support, personalized strategies, and a solid therapeutic alliance with their providers. Bridging this gap requires integrating more personalized, accessible, and continuous digital mental health support options that cater to diverse populations' nuanced needs.

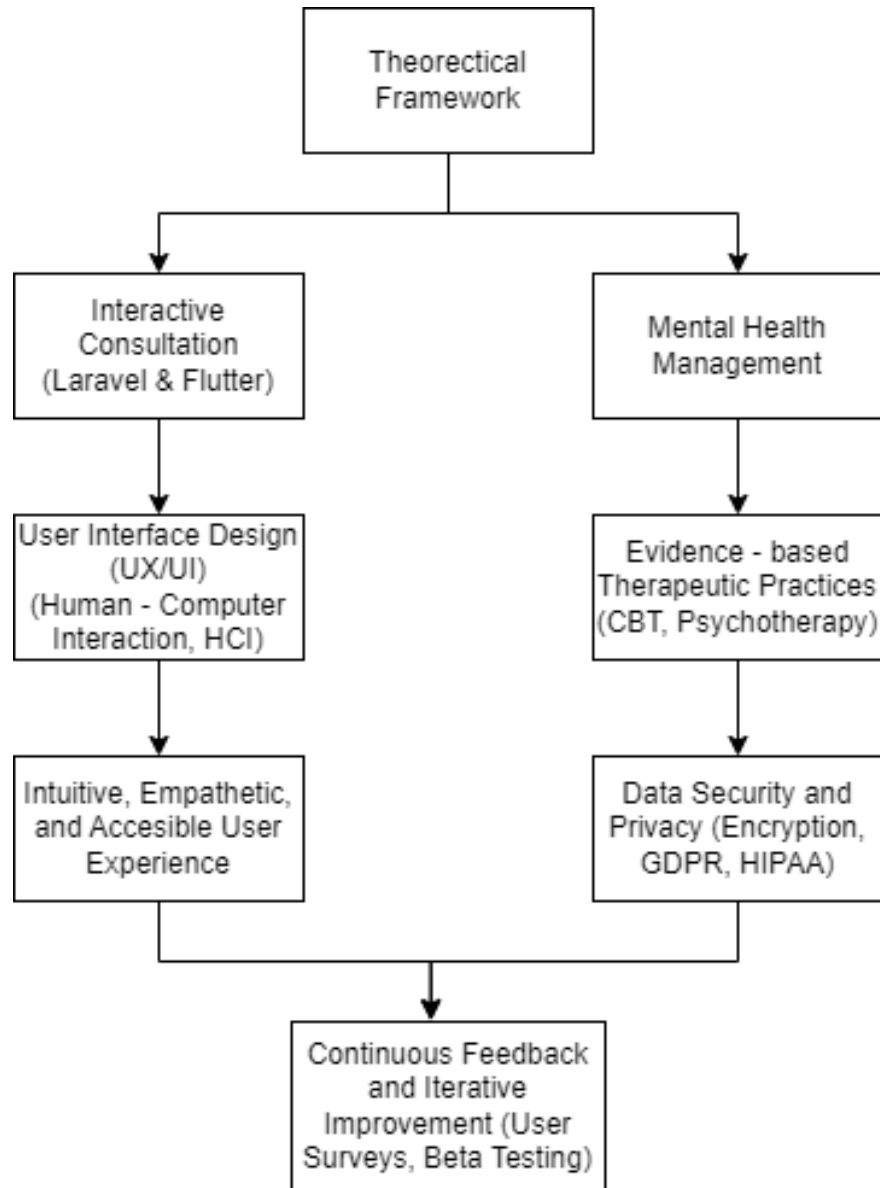
2.3. Theoretical Framework

Designing an online mental health consultation application with a comprehensive theoretical framework typically integrates several theories from psychology, technology, and health informatics to address interactive consultation and mental health management effectively. This framework includes User-Interface Design (UX/UI) and Human-Computer Interaction (HCI) to ensure the application meets users' specific needs, enhancing usability and engagement. Cognitive Behavioral Theory (CBT) principles are commonly applied to guide content and therapeutic approaches within the platform, allowing for evidence-based interventions in mental health management.

For interactive consultation, Media Richness Theory helps optimize communication modes to convey empathy and nonverbal cues effectively, addressing the complexity of mental health communication. This theory helps design an application that is engaging, effective, and accessible, as represented by the interaction between these two branches in figure 1.

Figure 1

Theoretical framework of interactive mental health consultation



The Interactive Consultation branch focuses on the application's technological and user experience aspects. It utilizes Laravel and Flutter for web and mobile development, respectively, ensuring a robust and scalable platform. The User Interface Design (UI/UX) is grounded in Human-Computer Interaction (HCI) principles, aiming to create an intuitive, empathetic, and accessible user experience. This approach is crucial for a mental health application, where ease of use can significantly impact user engagement and therapeutic outcomes (Lai et al., 2023).

The Mental Health Management branch incorporates evidence-based therapeutic practices, such as Cognitive Behavioral Therapy (CBT) and psychotherapy. These practices form the core of the application's mental health support system, ensuring users receive scientifically validated assistance. This branch also emphasizes data security and privacy, adhering to regulations like GDPR and HIPAA to protect sensitive user information, which is paramount in mental health applications (Luft et al., 2022).

Media Richness Theory (MRT), developed by Richard L. Daft and Robert H. Lengel in the 1980s, is a communication theory that explains how different types of media vary in their ability to convey information effectively. According to MRT, a medium's "richness" is its capacity to facilitate shared understanding within a communication context. Richer media are better suited to handle complex, ambiguous tasks, while "lean" media are more appropriate for simple, straightforward exchanges (Ishii et al., 2019).

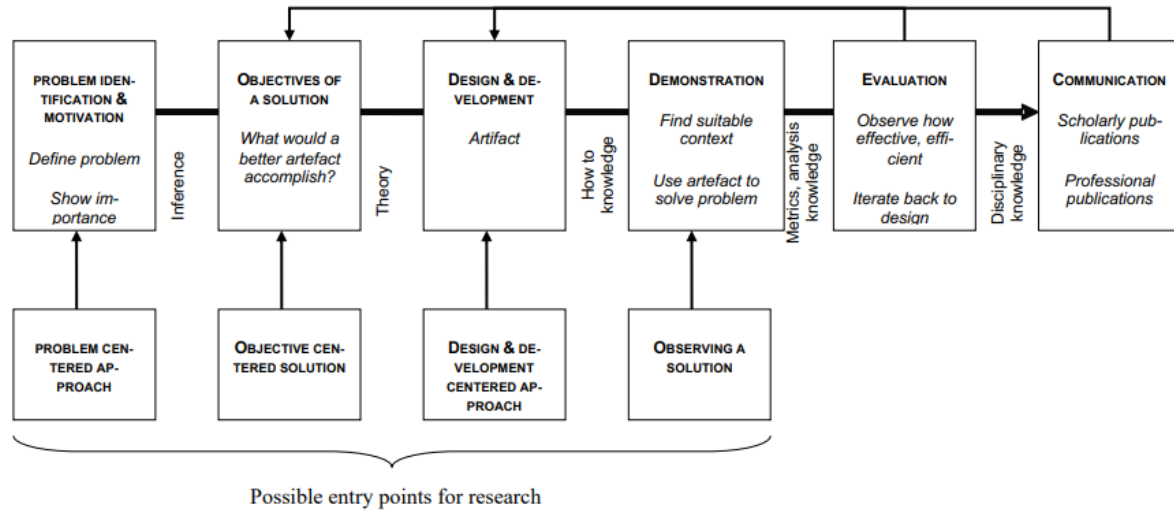
The framework integrates these branches through continuous feedback and iterative improvement. This involves regular user surveys and beta testing, allowing the application to evolve based on user needs and professional insights. By combining technological innovation with established psychological theories, the framework aims to create a tool that not only meets technical specifications but also aligns with users' psychological and emotional needs.

The success of this theoretical framework relies on its ability to balance technological capabilities with mental health principles. It must ensure that the application provides a safe, supportive environment while leveraging advanced features such as real-time chat, video consultations, and AI-powered support systems. By grounding the development in both HCI principles and psychological theories, the framework guides the creation of an application that is not only user-friendly but also therapeutically effective.

3. Methodology

3.1. Research Design

Design Science Research (DSR) is an approach in research that focuses on creating and evaluating artifacts designed to address specific problems or needs (Wiegmann et al., 2023). In the context of information systems, it emphasizes the development of innovative solutions, such as systems, models, or applications, which can be used to solve practical challenges (Peffer et al., 2020).

Figure 2*Design science research process model**Source:* Peffers et al. (2020)

In this research, the process model consists of six steps. The first step is problem identification, where the research problem is defined, and the value of solving it is justified. This is followed by the objectives of a solution, which involves inferring solution objectives from the problem definition, which can be either quantitative or qualitative. The third step is design and development, where the artifact is created, specifying its functionality and architecture. This step requires knowledge of relevant theories. Next is demonstration, which involves showing the artifact's efficacy through experimentation, simulation, or case studies, demonstrating how it solves the problem. The fifth step is evaluation, where the artifact's success in solving the problem is measured by comparing objectives to actual outcomes using metrics or client feedback. The final step is communication, which involves sharing the problem, artifact, and its effectiveness with researchers and relevant professionals through publications or other platforms. This systematic approach ensures a comprehensive development and assessment of the proposed solution.

3.2. Requirement Analysis

Requirement analysis is crucial in developing any system or application, ensuring user needs and expectations are met (Demirel & Das, 2018). The data collection method for this

research is through a survey and questionnaire. A survey involves distributing structured forms to a large number of users to gather quantitative data on their requirements (Jones et al., 2013).

A set of questions in the form of a questionnaire was distributed to respondents to determine the user needs for the application being developed. This questionnaire was used to collect data relevant to the research. The scale used in this research instrument is the Likert Scale, the most widely used psychometric scale in survey research taken from a psychologist named Rensis Likert (1932), who published a report describing attitude measurement techniques and instruments for measuring constructs that describe psychological and social phenomena (Kusmaryono et al., 2022). This scale consists of several statements that respondents answer by indicating their level of agreement or disagreement (Joshi et al., 2015).

The questionnaire comprises 20 well-structured questions to understand user needs and preferences for a mental health consultation app with a live chat feature. Each question targets different aspects of the user experience, allowing for the collection of valuable insights that guide the app's development. The questions cover various aspects, such as understanding user needs and the frequency of requiring mental health support, identifying barriers to seeking mental health help, and assessing comfort levels with using mobile apps for mental health consultations. Furthermore, the questionnaire aims to determine the importance of various app features, evaluate preferences for interaction methods and timing, and gauge the importance of data privacy and security. It also seeks to understand user expectations for response times, assess interest in additional features and self-help resources, and determine preferences for payment models.

The responses to this questionnaire serve as a foundational guide for building a user-centric mental health consultation app that addresses the specific needs and preferences of potential users. The app can provide a seamless, supportive, and secure mental health service tailored to its users by focusing on the identified barriers, preferences for communication, desired features, and payment models.

3.3. System Development

The development of this mental health application follows the Agile methodology, which allows for continuous feedback and adaptation, enabling the team to respond quickly to user needs and changes in requirements (Alsaqqa et al., 2020). The Agile process is simplified into six key steps:

1. **Meet:** The team and stakeholders gather to discuss the project, align objectives, and review the backlog of tasks and features.
2. **Plan:** The team plans the work for the current sprint, prioritizing tasks and features, determining the sprint scope, and setting goals and timelines.
3. **Design:** The team designs the architecture, user interface, and other product elements, creating mockups, prototypes, and wireframes to visualize the product.
4. **Develop:** This involves the actual coding, building, and implementation of the design, bringing features and functionality to life as outlined in the sprint plan.
5. **Test:** Ongoing testing, including unit testing, integration testing, and user acceptance testing, to identify and fix issues, ensuring the product meets quality standards.
6. **Evaluate:** At the end of each iteration, the team evaluates the product increment, gathering feedback from stakeholders and users to assess progress and plan for the next sprint.

The technology stack for this project includes Laravel for backend development, providing a secure framework to manage the application's server-side operations. Tailwind CSS creates a user-friendly experience for front-end development, while Flutter is employed to build the mobile application. Data management is handled through a MySQL database, allowing for efficient data storage and retrieval. The integration of web and mobile platforms is achieved through a RESTful API developed in Laravel, facilitating communication between the web and mobile interfaces. This approach ensures data consistency across both platforms and provides a seamless user experience.

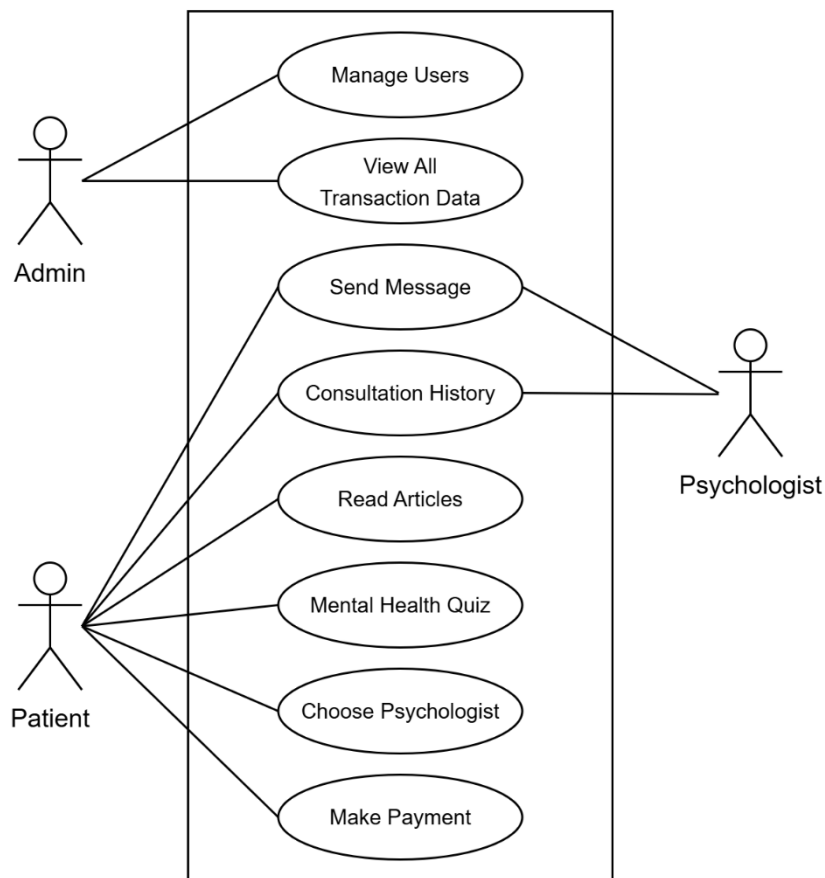
By adopting this Agile methodology and leveraging a robust technology stack, the development process aims to create a mental health application that is responsive to user needs, technically sound, and capable of evolving based on continuous feedback and evaluation.

3.4. System Design

The system design phase creates a blueprint for how the mental health application will function, including its components and interactions. This step ensures that the system is structured efficiently to meet the needs of all users.

Figure 3

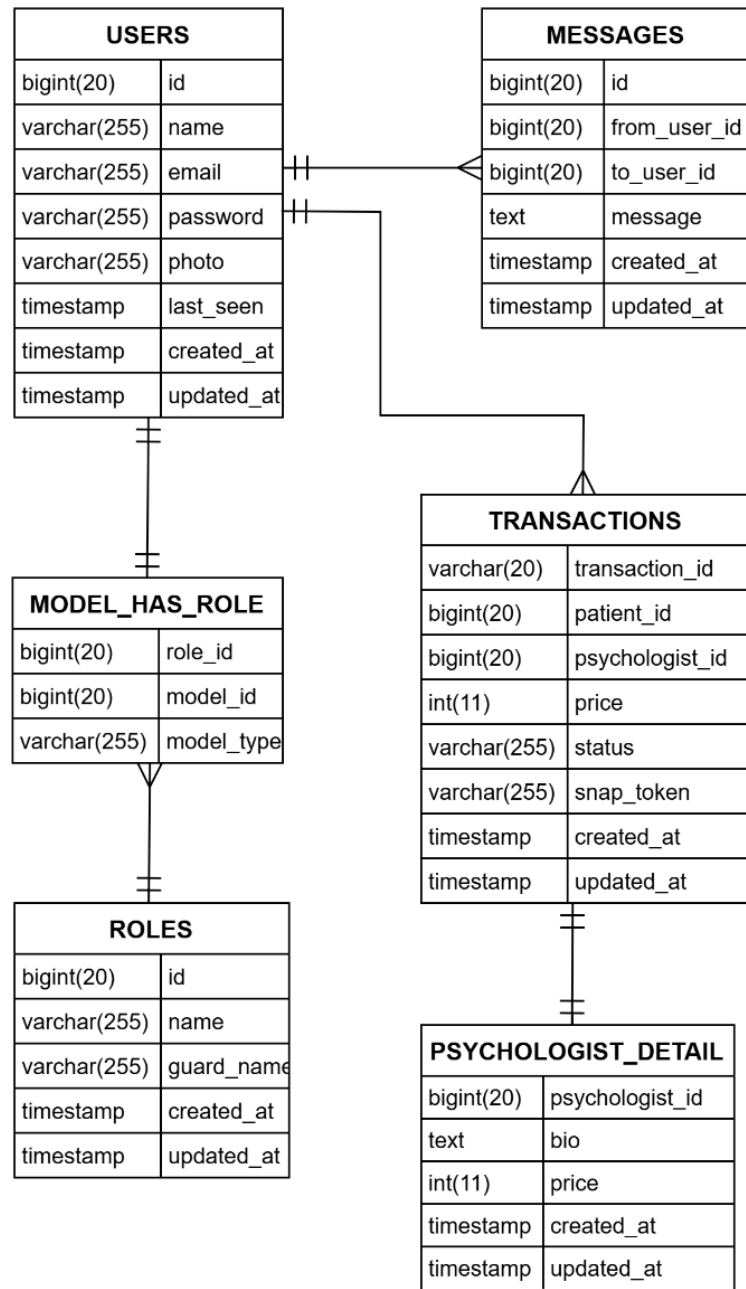
Use case diagram of the mental health management application



The use case diagram (figure 3) illustrates the interactions between user roles (admin, psychologist, and patient) and the system's functionalities. The admin can manage users and view all transaction data. Psychologists can send messages and access consultation history. Patients interact most with the system, including sending messages, accessing consultation history, reading articles, taking mental health quizzes, choosing psychologists, and making payments.

This use case diagram provides a clear overview of the system's main features and user interactions. It helps in understanding the scope of the application and ensures that all key functionalities are accounted for in the development process. By visualizing these interactions, developers can better plan the user interface and system architecture to support these features effectively. The diagram also highlights the importance of role-based access control within the application, ensuring each user type has access to the appropriate features and data. This separation of roles and responsibilities is crucial for maintaining the privacy and security of sensitive mental health information.

Figure 4
Entity-Relationship Diagram (ERD)
of the mental health management
application



The ERD (figure 4) outlines the application's database structure, showing the relationships between key entities. It includes tables for users, roles, model_has_role, messages, transactions, and psychologist_detail. The users table is central and connects to other tables to support various functionalities. The roles and model_has_role tables manage user permissions. The messages table facilitates communication between users. The transactions

table records payment information, while the `psychologist_detail` table stores specialized information about psychologists.

Key relationships in the database include the connection between users and roles through the `model_has_role` table, the link between messages and users via `from_user_id` and `to_user_id`, and the association of transactions with patients and psychologists. This database design ensures efficient data management and supports all the functionalities outlined in the use case diagram, providing a solid foundation for the mental health management application.

3.5. Ethical Consideration

Ethical considerations are paramount in the development of a mental health application to ensure user safety, privacy, and trust (Koh et al., 2022). These principles guide the design, development, and deployment of the system, ensuring it operates within acceptable legal and moral boundaries. The steps to ensuring the privacy and safety of data users are explained below.

1. ***Data Encryption.*** All sensitive data, including health records, assessments, and personal information, should be encrypted in transit and at rest.
2. ***Access Control.*** The system should implement strict role-based access control (RBAC) where only authorized personnel (such as users and their selected therapists).
3. ***Data Minimization.*** The application should collect only the minimum personal data necessary for its functionality (Ali & Arsalan, 2024).

Users should be required to give informed consent before using the app, meaning they understand what the application does, how their data will be used, and any potential risks involved.

3.6. Evaluation Methods

Comprehensive evaluation is essential to ensuring the effectiveness of the mental health application. This will help identify areas for improvement, ensure the application meets its goals, and gather user feedback. The evaluation methods focus on critical parameters aligned with user experience and application performance.

Application performance was assessed to ensure the app loads quickly and efficiently, which is crucial for user satisfaction and engagement. UI responsiveness was evaluated to measure how quickly the interface reacts to user inputs and how smoothly it renders changes. The evaluation also examined the smooth navigation between pages and menus, which is essential for a good user experience.

Application stability, including the ability to run without crashes or lag, was assessed over extended use periods to ensure user trust and continued engagement. Additionally, the ease of use of application features was evaluated to determine how intuitive and straightforward the functionalities are for users without extensive guidance.

These evaluation criteria were measured using various methods, including user testing sessions, surveys, and automated performance metrics. The results were analyzed using statistical measures such as mean scores and standard deviations to provide a comprehensive view of the application's performance and user satisfaction. By focusing on these critical areas, the mental health application is ensured to meet the technical standards and provides a smooth, efficient, and user-friendly experience that supports its primary goal of facilitating mental health management and support.

4. Findings and Discussion

4.1. User Requirement Analysis

To understand user needs and preferences for a mental health consultation application, a comprehensive survey was conducted with 156 respondents. Table 1 presents a summary of the key findings from this survey.

Recent survey findings reveal critical insights into mental health consultation applications. 46.8% of respondents reported frequent mental health support needs, reflecting increased demand, particularly following the COVID-19 pandemic (Xiong et al., 2020). Access to professionals remains a primary barrier (44.2% of respondents). However, 60.3% expressed comfort with mobile apps for mental health consultations, indicating an opportunity for digital solutions to bridge this gap (Munira et al., 2023).

Table 1

Survey results on user requirements for mental health consultation application

Brief Question	Main Results
Frequency of needing mental health support	46.8% Often
Main barriers in seeking mental health help	44.2% Lack of access to professionals
Comfort level using mobile app for consultation	60.3% Comfortable
Most important features in consultation app	Quick response time (highest ranking)
Importance of data privacy and security	46.2% Very important
Maximum acceptable response time	40.4% 1-5 minutes
Likelihood of using live chat feature	52.6% Likely
Most likely times to use live chat feature	41.7% Evening (5 PM – 9 PM)
Importance of choosing specific psychologist	49.4% Important
Factors making users more comfortable with live chat	58.3% Having a short bio of the psychologist
Importance of self-help resources	49.4% Very important
Interest in receiving follow-up messages	91% Yes
Importance of crisis support features	42.9% Very Important
Willingness to provide feedback	91% Yes
Importance of different chat options	44.9% Very important
Interest in scheduling recurring chat sessions	91% Yes
Comfort discussing sensitive topics via live chat	37.2% Somewhat more comfortable
Preferred payment model	44.9% Pay-per-session (fixed duration)
Importance of culturally sensitive support	44.2% Very important
Most valueable additional features	49.4% Educational articles on mental health

Note: Percentages represent the most frequent or highest-rated responses for each question.

User preferences strongly emphasize rapid response times (40.4% expecting responses within 1-5 minutes) and data privacy, with peak demand during evening hours (5 PM - 9 PM). The selection of empathetic professionals is crucial, with 49.4% prioritizing "sensitive" psychologists, aligning with research showing improved treatment outcomes through empathetic care (Gbollie et al., 2023). Additionally, 58.3% indicated that psychologist biographies would increase their comfort with live chat services.

Comprehensive support features proved essential, with 91% wanting follow-up messages and 49.4% valuing self-help resources. Research supports this approach, showing that continued support and self-help tools enhance engagement and reduce relapse rates (Gan et al., 2022). 42.9% and 44.2% of respondents rated crisis support and cultural sensitivity as necessary, respectively, while 44.9% preferred a pay-per-session model with a fixed duration.

These findings indicate that successful mental health applications should combine quick response times, data privacy, flexible evening scheduling, and comprehensive support features. The emphasis on empathetic care, cultural sensitivity, and educational resources (valued by 49.4% of respondents) suggests that digital platforms must carefully balance technological efficiency with human-centered care delivery. The high comfort level with mobile applications indicates strong potential for mobile-based platforms to address current mental health support gaps.

4.2. Application Design and Features

The mental health consultation application has been meticulously designed to cater to the diverse needs of administrators, psychologists, and patients. It offers a comprehensive suite of features accessible through web and mobile platforms, ensuring seamless user experience across devices. The web application, primarily designed for administrators and psychologists, provides robust tools for user management, consultation tracking, and professional profile maintenance. It features a clean, intuitive interface with a calming colour palette dominated by soothing blues and whites, creating a professional yet comforting environment conducive to mental health services.

User-friendly interfaces are essential in mental health apps as they directly impact user engagement, satisfaction, and effectiveness. Research suggests optimized user interfaces (UIs) based on UX design principles can significantly enhance user interaction with digital mental health interventions. For instance, a study comparing an optimized UI to a basic one found that participants using the optimized version were more engaged, generated more solutions, and found the intervention easier to understand, even though they reported feeling more overwhelmed (Hentati et al., 2021). This indicates that a well-designed UI can improve user experience and the app's overall impact. The web platform demonstrates these principles with a UI designed to be functional and emotionally supportive, which is crucial in mental health.

Figure 5

Web landing page

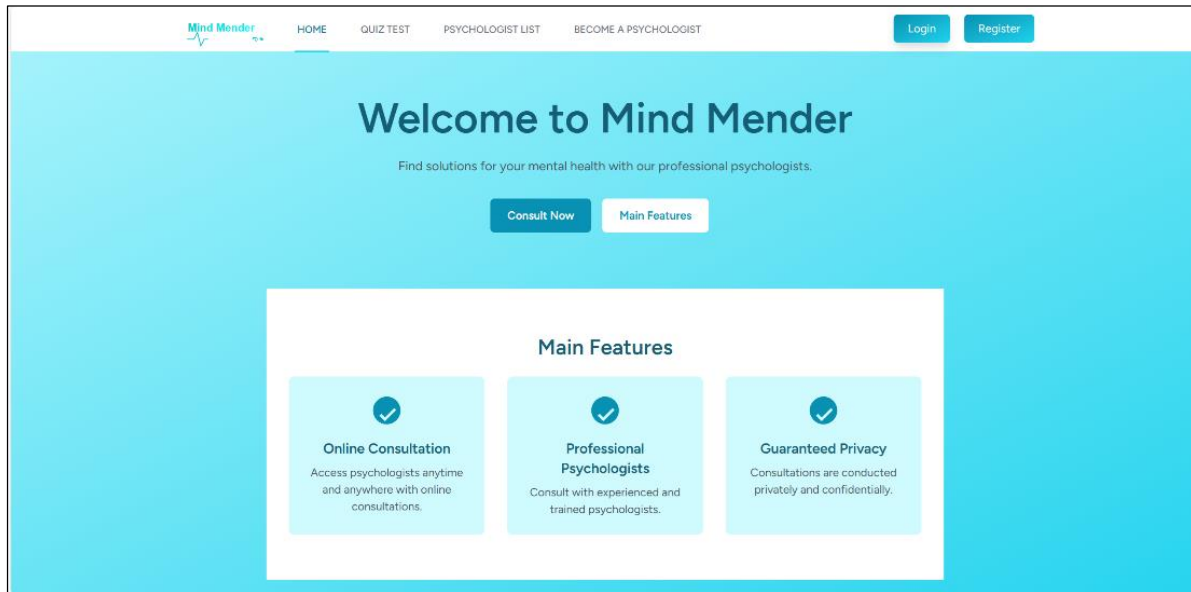


Figure 6

Web user management interface

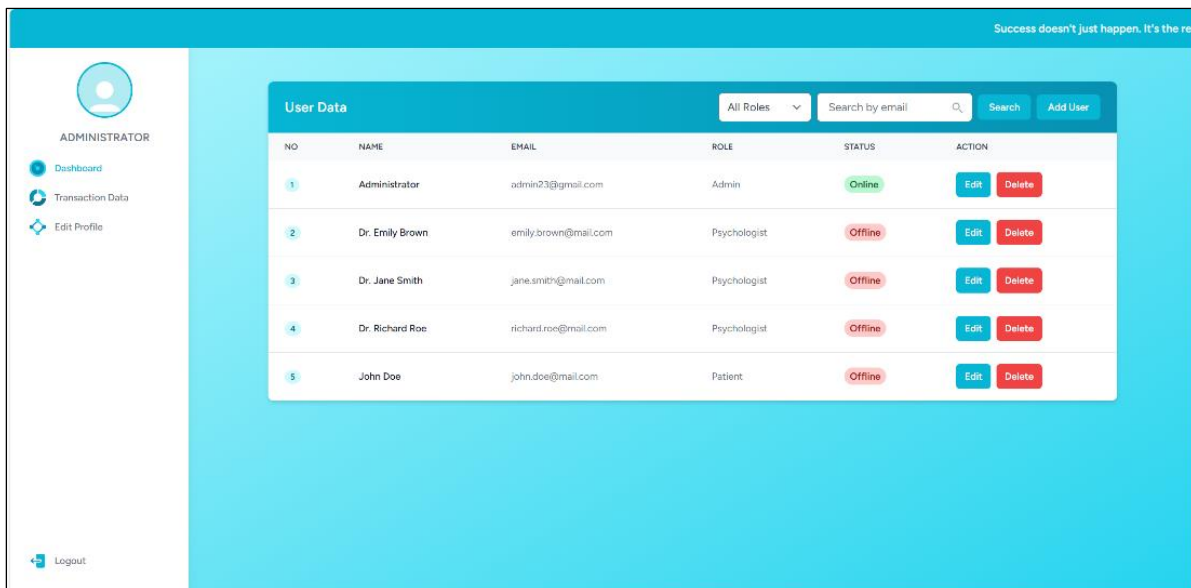


Figure 7
Web chat interface

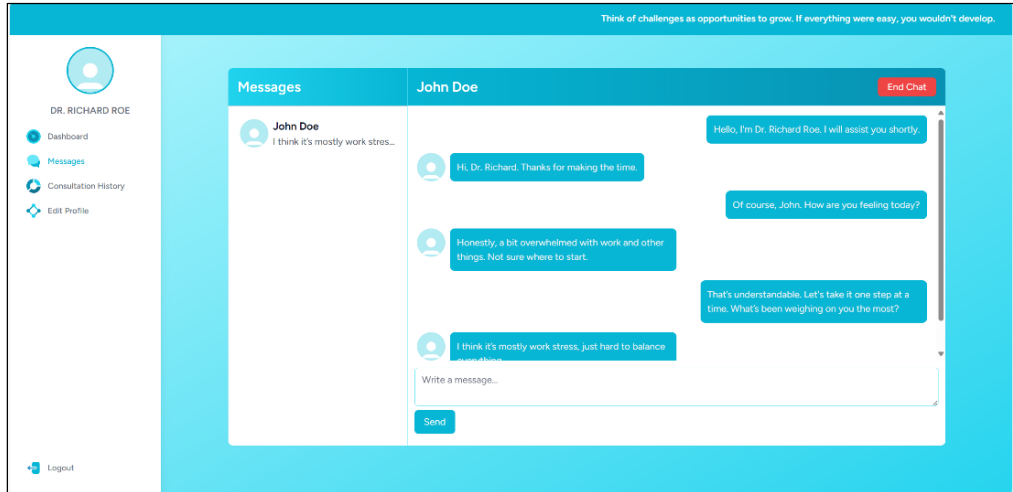


Figure 8
Web consultation history page

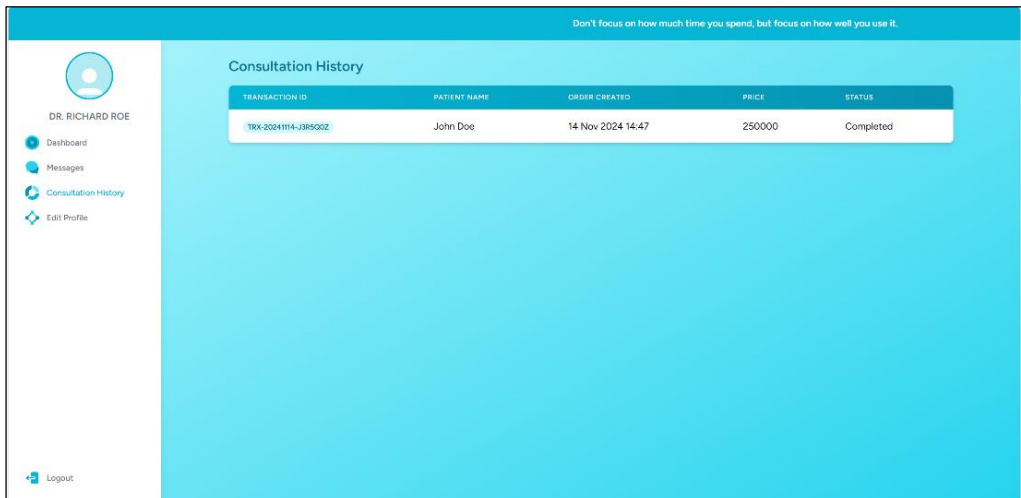
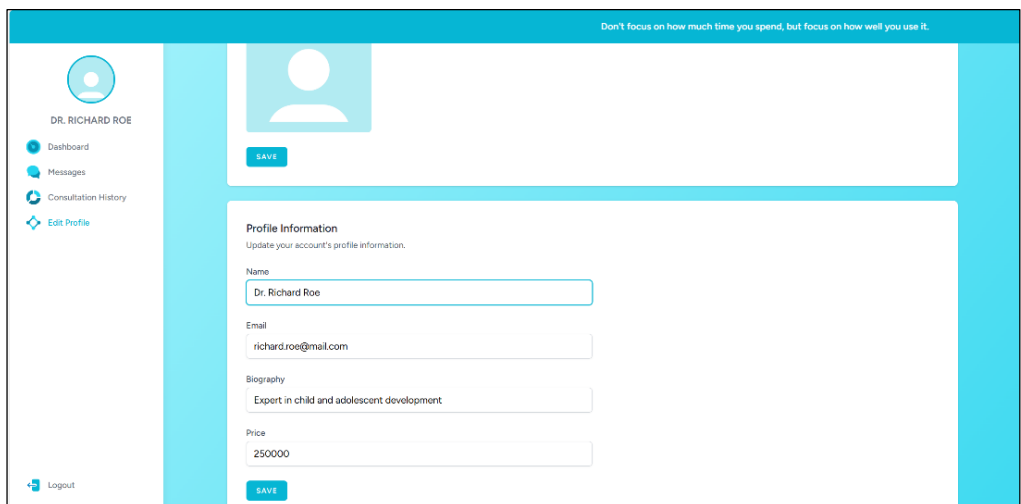


Figure 9
Web profile management page



A central web application feature is the advanced chat interface, which enables real-time consultations between psychologists and patients. This feature includes a user-friendly messaging system that ensures smooth communication while maintaining professional boundaries. The profile management section also allows psychologists to personalize their profiles, set consultation fees, and manage their availability. This helps optimize the matchmaking process between patients and appropriate mental health professionals.

The mobile application, designed for patient use, offers an intuitive, patient-centered experience. Upon opening, users are greeted with a personalized welcome message, creating a positive first impression. The home screen provides easy access to critical features such as psychologist listings, mental health quizzes, and educational articles. This design ensures that patients can navigate the app quickly, find the support they need with minimal effort, and engage with mental health resources in a seamless and accessible way.

Figure 10

Mobile home screen

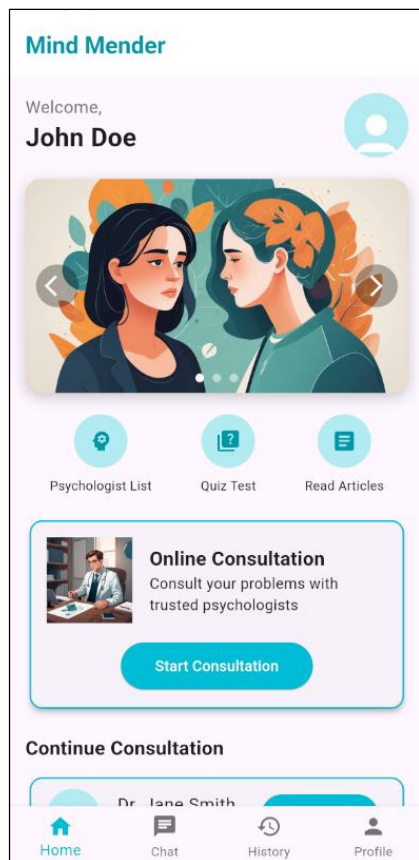


Figure 11

Mobile psychologist list

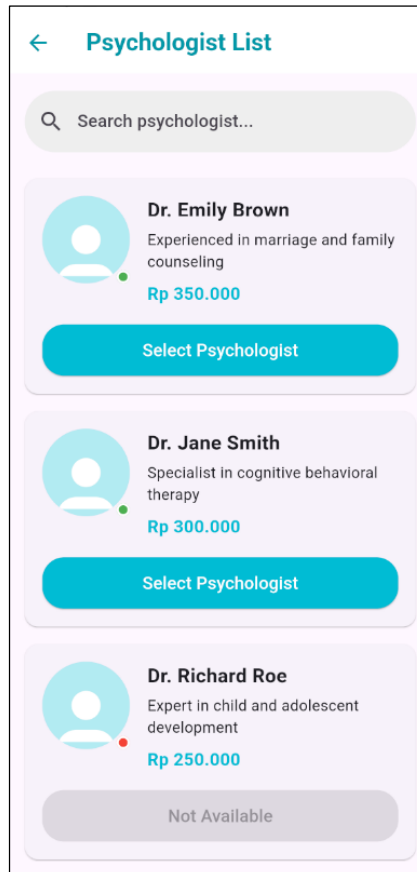


Figure 12

Mobile chat interface



Figure 13

Mobile consultation history

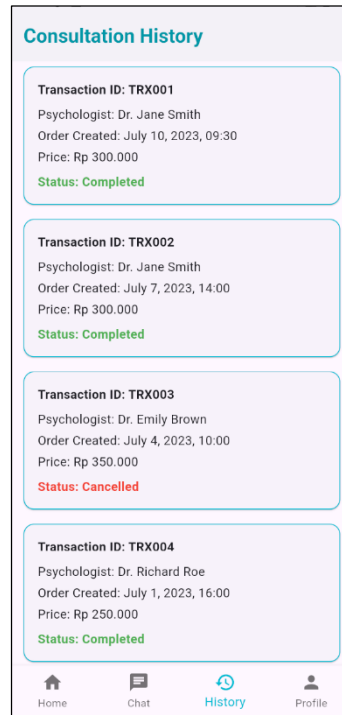
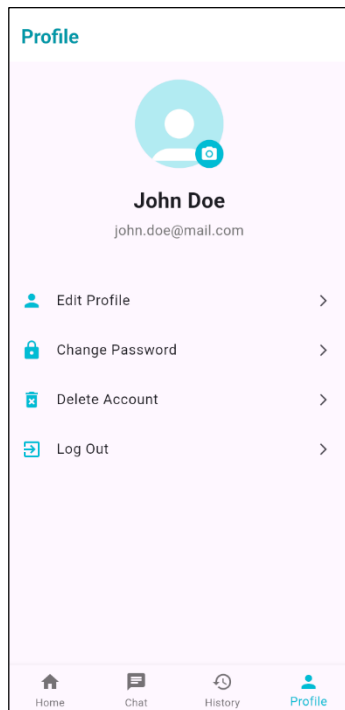


Figure 14

Mobile profile management



A standout feature of the mobile app is the psychologist selection interface, which presents users with a curated list of available mental health professionals. Each psychologist's profile includes their specialization, experience, and consultation fees, allowing patients to make informed decisions about their care. The app also incorporates a user-friendly chat system, mirroring the web version's functionality but optimized for mobile devices. This ensures that patients can engage in consultations comfortably from their smartphones or tablets.

Real-time chat for psychological consultation on online platforms offers several benefits and challenges that impact the comfort and effectiveness of communication. One significant advantage is providing immediate support, crucial during crises, as demonstrated during the Covid-19 pandemic when virtual therapy helped alleviate mental health challenges and maximize psychological well-being (Java et al., 2021). Additionally, real-time chat can reach a broader audience, including those uncomfortable with face-to-face interactions, thus promoting mental illness prevention (Matsunaga et al., 2020). However, there are challenges, such as technological barriers and concerns about the effectiveness of online counselling compared to traditional methods. Some patients may resist online consultations, preferring in-person interactions due to perceived effectiveness and personal comfort (Almathami et al., 2020). Despite these challenges, the anonymity and convenience of online platforms can make clients feel more secure in sharing sensitive information, potentially leading to more open and honest communication (Matsunaga et al., 2020). While real-time chat platforms for psychological consultation offer significant benefits, they also present challenges that must be addressed to enhance their effectiveness and user acceptance.

The web and mobile versions prioritize data security and user privacy, implementing robust encryption and adhering to healthcare data protection standards. The consistent design language across platforms ensures a cohesive user experience for professionals and patients. By offering features tailored to each role, the application is a powerful tool for facilitating accessible, efficient, and effective mental health consultations.

4.3. Usability Testing Results

To evaluate the effectiveness and user-friendliness of the mental health consultation application prototype, comprehensive usability testing was conducted. Ten participants, consisting of individuals familiar with mobile applications and mental health services, were

recruited to interact with the application and provide feedback on various aspects of its functionality and design. The testing focused on key parameters that are crucial for the success of a mental health application, including loading speed, UI responsiveness, navigation, stability, and ease of use. Participants were given a series of tasks to complete within the application prototype, simulating potential real-world usage scenarios such as navigating through a consultation booking process, exploring the chat interface, and accessing mental health resources. Throughout the testing process, participants were encouraged to think aloud, sharing their thoughts and impressions as they navigated the application. This approach provided valuable qualitative insights to complement the quantitative data collected. The testing was conducted in a controlled environment to ensure consistency across all participants. After completing the tasks, participants filled out a detailed questionnaire to rate their experience across the various parameters. The results of this testing provide a comprehensive overview of the application prototype's usability and highlight areas of strength as well as potential improvements for future development.

Table 2*Usability testing results*

Description/Evaluation Parameters	Score					SD	Mean	Remarks
	5	4	3	2	1			
A. The application loads quickly and efficiently	4	4	2	0	0	0.70	4.20	A
B. The UI responsiveness is excellent and fast	6	4	0	0	0	0.48	4.60	HA
C. Smooth navigation between pages and menus	4	5	1	0	0	0.63	4.30	A
D. Application stability without crashes or lag	5	3	2	0	0	0.77	4.30	A
E. Ease of use of application features	4	5	1	0	0	0.63	4.30	A
OVERALL							4.34	A

Legend: Highly Acceptable (HA) - (5.00 - 4.51); Acceptable (A) - (4.50 - 3.51); Moderately Acceptable (MA) - (3.50 - 2.51); Fairly Acceptable (FA) - (2.50 - 1.51); Not Acceptable (NA) - (1.50 - 1.00)

The usability testing results, as presented in table 1, provide valuable insights into the application's performance and user experience. The application received a mean score of 4.34 out of 5, which falls within the "acceptable" range according to our evaluation criteria. This indicates that the application meets user expectations and provides a satisfactory experience.

Breaking down the results by specific parameters:

- a. **Application loading speed:** With a mean score of 4.20, users found the application to load quickly and efficiently. This is crucial for ensuring that users can access mental health support without frustrating delays.
- b. **UI responsiveness:** This parameter received the highest score of 4.60, falling into the "Highly Acceptable" category. The excellent responsiveness of the user interface contributes significantly to a smooth and engaging user experience.
- c. **Navigation:** Smooth navigation between pages and menus scored 4.30, indicating that users quickly moved through different application sections. This is particularly important for a mental health app where ease of use can impact user engagement and treatment adherence.
- d. **Application stability:** With a score of 4.30, the application demonstrated good stability without crashes or lag. This reliability is essential for maintaining user trust and ensuring uninterrupted access to mental health services.
- e. **Ease of use of features:** The application's features also scored 4.30, suggesting that users found the various functionalities intuitive and straightforward. This is critical for ensuring that users can effectively utilize all aspects of the application without unnecessary confusion or frustration.

Each parameter's standard deviation (SD) ranged from 0.48 to 0.77, indicating a relatively consistent evaluation across participants. The lowest SD of 0.48 for UI responsiveness suggests strong agreement among users regarding the excellent performance in this area. These results demonstrate that the application has successfully met its usability goals, providing a user-friendly interface that facilitates easy access to mental health services. The high UI responsiveness and navigation scores are particularly encouraging, as they contribute significantly to user satisfaction and engagement. However, there is room for improvement, particularly in areas like application loading speed and stability, where slight enhancements could further elevate the user experience. These insights will be valuable in guiding future development efforts, ensuring that the application continues to meet and exceed user expectations in providing accessible and effective mental health support.

4.4. Potential Impact and Effectiveness

The developed mental health application has the potential to significantly impact mental health management, mainly due to its critical features designed to address user needs. Based on the features provided, the application shows promise in enhancing accessibility, privacy, and effectiveness of mental health support. The live chat feature with psychologists offers real-time support, significantly reducing barriers to accessing professional help, such as time constraints or geographical limitations. This flexibility provides an effective alternative for users who may feel uncomfortable with in-person therapy, ensuring they can still access mental health support more conveniently and privately. The prioritization of data privacy and security builds trust with users, encouraging them to engage more openly during consultations and creating a safe environment where users can discuss personal issues without fear of judgment or data breaches.

Including self-help resources empowers users to manage their mental health actively, supporting continuous self-improvement and mental well-being outside professional consultations. The follow-up support feature, providing messages or check-ins after live chat sessions, enhances user engagement and satisfaction by showing commitment to their long-term mental health journey. By offering culturally sensitive support, the app ensures that users from diverse backgrounds feel understood and respected, potentially increasing its effectiveness among different populations. The ability to schedule recurring sessions with the same psychologist fosters a sense of continuity in care, which is beneficial for long-term mental health management. Multiple chat options allow users to choose the communication format that best suits their needs, making the app more user-friendly and inclusive.

According to Alqahtani and Orji (2020), a study of 106 mental health apps and an analysis of over 13,000 user reviews emphasizes the critical role of understanding user opinions in designing practical mental health applications. The findings highlight vital areas developers should prioritize, such as usability, rich content, personalization, and the need for security measures to build user trust. Regular updates, new features, and high-quality customer service are essential to reduce attrition and increase user engagement. By incorporating these features and adhering to the insights from user studies, the mental health application has the potential to significantly impact users' mental well-being positively. It offers a comprehensive, accessible, and user-centred approach to mental health management, addressing many barriers and challenges faced in traditional mental health care delivery.

5. Conclusion

This research has successfully designed and developed an interactive mental health consultation application that addresses the growing need for accessible and practical mental health support. By incorporating features such as live chat with psychologists, self-help resources, and culturally sensitive support, the application offers a comprehensive solution to overcome barriers in traditional mental health care. The usability testing results and potential impact analysis suggest that the application can significantly improve access to mental health services and enhance user engagement in their mental well-being journey. As mental health continues to be a critical global concern, this application represents a promising step towards leveraging technology to provide timely, personalized, and effective mental health support to a wide range of users.

Based on the successful design and development of the interactive mental health consultation application, it is recommended that critical features like quick response time, secure data privacy measures, self-help resources, and culturally sensitive support be prioritized to address user needs effectively. The application should also provide real-time support options, such as live chat and video consultations, and include follow-up messaging to foster continuous engagement. To further improve user experience, incorporating flexible communication modes and empathetic, personalized support by trained professionals will enhance users' comfort and trust, making mental health care more accessible and responsive.

To further enhance the impact of this research, future work should explore the long-term effects of the application on user well-being and mental health outcomes. Additionally, integrating artificial intelligence techniques to provide more personalized and adaptive support could significantly improve the application's ability to cater to individual user needs. Finally, conducting larger-scale evaluations of the application's effectiveness and user satisfaction would provide valuable insights to refine the design and implementation for widespread adoption.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was not supported by any funding.

ORCID

Muhammad Rizky – <https://orcid.org/0009-0008-3402-2933>

Ikrimach – <https://orcid.org/0000-0003-2096-052X>

References

- Ali, W., & Arsalan, H. (2024). *Ensuring data security and privacy: strategies for targeted data discovery, data management systems, and private data access in educational settings*. <https://doi.org/10.13140/RG.2.2.13551.24483>
- Almathami, H. K. Y., Win, K. T., & Vlahu-Gjorgievska, E. (2020). Barriers and facilitators that influence telemedicine-based, real-time, online consultation at patients' homes: Systematic literature review. *Journal of Medical Internet Research*, 22(2), e16407. <https://doi.org/10.2196/16407>
- Alqahtani, F., & Orji, R. (2020). Insights from user reviews to improve mental health apps. *Health Informatics Journal*, 26(3), 2042–2066. <https://doi.org/10.1177/1460458219896492>
- Alsaqqa, S., Sawalha, S., & Abdel-Nabi, H. (2020). Agile software development: Methodologies and trends. *International Journal of Interactive Mobile Technologies (IJIM)*, 14(11), 246. <https://doi.org/10.3991/ijim.v14i11.13269>
- Appleton, R., Barnett, P., Vera San Juan, N., Tuudah, E., Lyons, N., Parker, J., Roxburgh, E., Spyridonidis, S., Tamworth, M., Worden, M., Yilmaz, M., Sevdalis, N., Lloyd-Evans, B., Needle, J. J., & Johnson, S. (2023). Implementation strategies for telemental health: a systematic review. *BMC Health Services Research*, 23(1), 78. <https://doi.org/10.1186/s12913-022-08993-1>
- Campion, J., Javed, A., Lund, C., Sartorius, N., Saxena, S., Marmot, M., Allan, J., & Udomratn, P. (2022). Public mental health: required actions to address implementation failure in the context of COVID-19. *The Lancet Psychiatry*, 9(2), 169–182. [https://doi.org/10.1016/S2215-0366\(21\)00199-1](https://doi.org/10.1016/S2215-0366(21)00199-1)

- Damayanti, R., Abdulhak, I., Hatimah, I., & Ardiwinata, J. S. (2020). Community-based mental health education in empowering people with mental disorders in the community. *International Journal of Psychosocial Rehabilitation*, 14757192, 1346–1354. <https://doi.org/10.37200/IJPR/V24I3/PR200884>
- Demirel, S. T., & Das, R. (2018). Software requirement analysis: Research challenges and technical approaches. *2018 6th International Symposium on Digital Forensic and Security (ISDFS)*, 1–6. <https://doi.org/10.1109/ISDFS.2018.8355322>
- Gan, D. Z. Q., McGillivray, L., Larsen, M. E., Christensen, H., & Torok, M. (2022). Technology-supported strategies for promoting user engagement with digital mental health interventions: A systematic review. *Digital Health*, 8, 205520762210982. <https://doi.org/10.1177/20552076221098268>
- Gbollie, E. F., Bantjes, J., Jarvis, L., Swandevelder, S., du Plessis, J., Shadwell, R., Davids, C., Gerber, R., Holland, N., & Hunt, X. (2023). Intention to use digital mental health solutions: A cross-sectional survey of university students' attitudes and perceptions toward online therapy, mental health apps, and chatbots. *Digital Health*, 9. <https://doi.org/10.1177/20552076231216559>
- Ge, X., Chappell, P., Ledger, J., Bakhai, M., & Clarke, G. M. (2024). The use of online consultation systems and patient experience of primary care: Cross-sectional analysis using the general practice patient survey. *Journal of Medical Internet Research*, 26, e51272. <https://doi.org/10.2196/51272>
- Geraldina, A. M., Suen, M.-W., & Suanrueang, P. (2023). Online mental health services during COVID-19 pandemic in Indonesia: Challenges from psychologist perspective. *Plos One*, 18(6), e0285490. <https://doi.org/10.1371/journal.pone.0285490>
- Graf-Vlachy, L., Sun, S., & Zhang, S. X. (2020). Predictors of managers' mental health during the COVID-19 pandemic. *European Journal of Psychotraumatology*, 11(1). <https://doi.org/10.1080/20008198.2020.1834195>
- Gunawan, J., Aunguroch, Y., & Marzilli, C. (2020). 'New normal' in Covid-19 Era: A nursing perspective from Thailand. *Journal of the American Medical Directors Association*, 21(10), 1514–1515. <https://doi.org/10.1016/j.jamda.2020.07.021>
- Haleem, A., Javaid, M., Singh, R. P., & Suman, R. (2021). Telemedicine for healthcare: Capabilities, features, barriers, and applications. *Sensors International*, 2, 100117. <https://doi.org/10.1016/j.sintl.2021.100117>

- Haun, M. W., Tönnies, J., Hartmann, M., Wildenauer, A., Wensing, M., Szecsenyi, J., Feißt, M., Pohl, M., Vomhof, M., Icks, A., & Friederich, H.-C. (2024). Model of integrated mental health video consultations for people with depression or anxiety in primary care (PROVIDE-C): assessor masked, multicentre, randomised controlled trial. *BMJ*, e079921. <https://doi.org/10.1136/bmj-2024-079921>
- Hentati, A., Forsell, E., Ljótsson, B., Kaldo, V., Lindfors, N., & Kraepelien, M. (2021). The effect of user interface on treatment engagement in a self-guided digital problem-solving intervention: A randomized controlled trial. *Internet Interventions*, 26, 100448. <https://doi.org/10.1016/j.invent.2021.100448>
- Ishii, K., Lyons, M. M., & Carr, S. A. (2019). Revisiting media richness theory for today and future. *Human Behavior and Emerging Technologies*, 1(2), 124–131. <https://doi.org/10.1002/hbe2.138>
- Java, S., Mohammed, H., & Bhardwaj, A. B. (2021). Psychological analysis of online counselling platforms offering mental health support. *2021 12th International Conference on Computing Communication and Networking Technologies (ICCCNT)*, 1–7. <https://doi.org/10.1109/ICCCNT51525.2021.9579871>
- Jones, T., Baxter, M., & Khanduja, V. (2013). A quick guide to survey research. *The Annals of the Royal College of Surgeons of England*, 95(1), 5–7. <https://doi.org/10.1308/003588413X13511609956372>
- Joshi, A., Kale, S., Chandel, S., & Pal, D. (2015). Likert scale: Explored and explained. *British Journal of Applied Science & Technology*, 7(4), 396–403. <https://doi.org/10.9734/BJAST/2015/14975>
- Koh, J., Tng, G. Y. Q., & Hartanto, A. (2022). Potential and pitfalls of mobile mental health apps in traditional treatment: An umbrella review. *Journal of Personalized Medicine*, 12(9), 1376. <https://doi.org/10.3390/jpm12091376>
- Kusmaryono, I., Wijayanti, D., & Maharani, H. R. (2022). Number of response options, reliability, validity, and potential bias in the use of the Likert scale education and social science research: A Literature Review. *International Journal of Educational Methodology*, 8(4), 625–637. <https://doi.org/10.12973/ijem.8.4.625>
- Kwame, A., & Petrucka, P. M. (2020). Communication in nurse-patient interaction in healthcare settings in sub-Saharan Africa: A scoping review. *International Journal of Africa Nursing Sciences*, 12, 100198. <https://doi.org/10.1016/j.ijans.2020.100198>

- Lai, T., Shi, Y., Du, Z., Wu, J., Fu, K., Dou, Y., & Wang, Z. (2023). Supporting the demand on mental health services with AI-based conversational large language models (LLMs). *BioMedInformatics*, 4(1), 8–33. <https://doi.org/10.3390/biomedinformatics4010002>
- Luft, J. A., Jeong, S., Idsardi, R., & Gardner, G. (2022). Literature reviews, theoretical frameworks, and conceptual frameworks: An introduction for new biology education researchers. *CBE—Life Sciences Education*, 21(3). <https://doi.org/10.1187/cbe.21-05-0134>
- Marei, A. H. (2021). Concept of health management. *International Journal of Scientific and Research Publications (IJSRP)*, 11(2), 195–198. <https://doi.org/10.29322/IJSRP.11.02.2021.p11022>
- Matsunaga, H., Mukai, K., & Yamanishi, K. (2020). Acute impact of COVID-19 pandemic on phenomenological features in fully or partially remitted patients with obsessive–compulsive disorder. *Psychiatry and Clinical Neurosciences*, 74(10), 565–566. <https://doi.org/10.1111/pcn.13119>
- Mosler, F., Packer, K., Jerome, L., & Bird, V. (2023). Structured communication methods for mental health consultations in primary care: a scoping review. *BMC Primary Care*, 24(1), 175. <https://doi.org/10.1186/s12875-023-02129-y>
- Moulaei, K., Sheikhtaheri, A., Fatehi, F., Shanbehzadeh, M., & Bahaadinbeigy, K. (2023). Patients’ perspectives and preferences toward telemedicine versus in-person visits: a mixed-methods study on 1226 patients. *BMC Medical Informatics and Decision Making*, 23(1), 261. <https://doi.org/10.1186/s12911-023-02348-4>
- Munira, L., Liamputtong, P., & Viwattanakulvanid, P. (2023). Barriers and facilitators to access mental health services among people with mental disorders in Indonesia: A qualitative study. *Belitung Nursing Journal*, 9(2), 110–117. <https://doi.org/10.33546/bnj.2521>
- Peffer, K., Tuunanen, T., Gengler, C. E., Rossi, M., Hui, W., Virtanen, V., & Bragge, J. (2020). Design science research process: A model for producing and presenting information systems research. *ArXiv Preprint ArXiv:2006.02763*. <https://doi.org/10.48550/arXiv.2006.02763>
- Pourfalatoun, S., & Miller, E. E. (2023). Effects of the COVID-19 pandemic on use and perception of shared e-scooters. *Transportation Research Interdisciplinary Perspectives*, 22, 100925. <https://doi.org/10.1016/j.trip.2023.100925>

- Ramón-Arbués, E., Gea-Caballero, V., Granada-López, J. M., Juárez-Vela, R., Pellicer-García, B., & Antón-Solanas, I. (2020). The prevalence of depression, anxiety and stress and their associated factors in college students. *International Journal of Environmental Research and Public Health*, 17(19), 7001. <https://doi.org/10.3390/ijerph17197001>
- Richardson, E., Aissat, D., Williams, G. A., & Fahy, N. (2020). Keeping what works: remote consultations during the COVID-19 pandemic. *Eurohealth*, 26(2), 73–76.
- Sorrentino, A., Sulla, F., Santamato, M., di Furia, M., Toto, G., & Monacis, L. (2023). Has the COVID-19 pandemic affected cyberbullying and cybervictimization prevalence among children and adolescents? A systematic review. *International Journal of Environmental Research and Public Health*, 20(10), 5825. <https://doi.org/10.3390/ijerph20105825>
- Wiegmann, P. M., Talmar, M., & de Nijs, S. B. (2023). Forging a sharper blade: A design science research approach for transition studies. *Environmental Innovation and Societal Transitions*, 48, 100760. <https://doi.org/10.1016/j.eist.2023.100760>
- Xiong, J., Lipsitz, O., Nasri, F., Lui, L. M. W., Gill, H., Phan, L., Chen-Li, D., Iacobucci, M., Ho, R., Majeed, A., & McIntyre, R. S. (2020). Impact of COVID-19 pandemic on mental health in the general population: A systematic review. *Journal of Affective Disorders*, 277, 55–64. <https://doi.org/10.1016/j.jad.2020.08.001>