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Development of a Mental Health Consultation Website Using the Waterfall Method (Case Study of Biro Psikologi Putra Tunggal)

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ABSTRACT

Mental health is an important issue that requires improved accessibility and efficiency in psychological services. Klinik Biro Psikologi Putra Tunggal, which serves various communities in Banyumas Regency, has a website as an information platform but does not yet support online consultation features. Therefore, this study aims to develop a web-based mental health consultation system to enhance the accessibility and effectiveness of psychological services. The system development follows the Waterfall method, consisting of analysis, design, implementation, testing, and maintenance stages, ensuring each phase is evaluated before progressing. The developed website includes user, service, and article management features for administrators; online and offline consultations by psychologists; as well as service booking and communication via chat rooms for patients. The system was tested using Blackbox Testing with descriptive analysis, yielding a feasibility score of 100%, Thus, the system is considered to be functioning properly and ready for deployment. The System Usability Scale (SUS) test showed that the new website scored 77.16, higher than the previous version, which only reached 69.5. With more comprehensive features, this website is deemed feasible and effective in improving the accessibility and efficiency of mental health services.

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1. INTRODUCTION

Mental health is a crucial aspect of human life that significantly impacts quality of life and productivity. However, compared to physical health, mental health is often overlooked [1]. The World Federation for Mental Health states that understanding mental health should be expanded from an individual approach to a broader societal perspective [2]. The World Health Organization (WHO) defines health as physical, mental, and social well-being rather than merely the absence of disease, making mental health an essential component that cannot be ignored [3].

In Indonesia, the prevalence of mental disorders continues to rise. The 2018 Basic Health Research (Riskesdas) reported that over 6% of the population experiences emotional mental disorders [4]. Meanwhile, the 2021 Indonesia-National Adolescent Mental Health Survey (I-NAMHS) found that 34.9% of adolescents aged 10–17 exhibit symptoms of mental disorders [5]. Unfortunately, access to mental health services remains limited due to stigma, a shortage of professionals, and geographical

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constraints [6]. Therefore, leveraging digital technology is a viable solution to improve accessibility to mental health services.

Biro Psikologi Putra Tunggal Clinic in Banyumas Regency currently relies on face-to-face consultations despite having a website that only serves as an informational platform. Interviews with the clinic owner and patients revealed that time and distance limitations are the primary barriers to accessing services. Out of 15 interviewed patients, 13 reported difficulties in receiving in-person consultations.

To address these challenges, developing a web-based consultation system is necessary to provide more flexible services and reach more patients. Digital transformation in mental health services offers various benefits, such as improved accessibility, flexible scheduling, and increased service efficiency [7]. One approach to developing an online consultation system is the Waterfall method, which enables systematic development through stages of analysis, design, implementation, testing, and maintenance. This structured approach ensures a well-defined system architecture while minimizing errors during development [8].

Previous studies on mental health consultation through websites have shown that digital technology can effectively enhance the accessibility of mental health services [9]. Furthermore, the results of other research indicate that the developed applications are successful in raising public awareness about the importance of mental health and enabling users to easily access help anytime and anywhere [10]. Both studies emphasize the importance of utilizing technology to broaden the reach of mental health services and overcome the access challenges often faced by many individuals.

This study focuses on developing a web-based mental health consultation system for Biro Psikologi Putra Tunggal using the Waterfall method. This approach was chosen to facilitate structured and systematic system development through sequential stages. The resulting system allows patients to consult online, enhancing service accessibility and supporting digital innovation in mental health care.

2. RESEARCH METHOD

This research involves several stages that must be undertaken. The research flowchart below illustrates the research process in the preparation of this report, as shown in Figure 2.1.

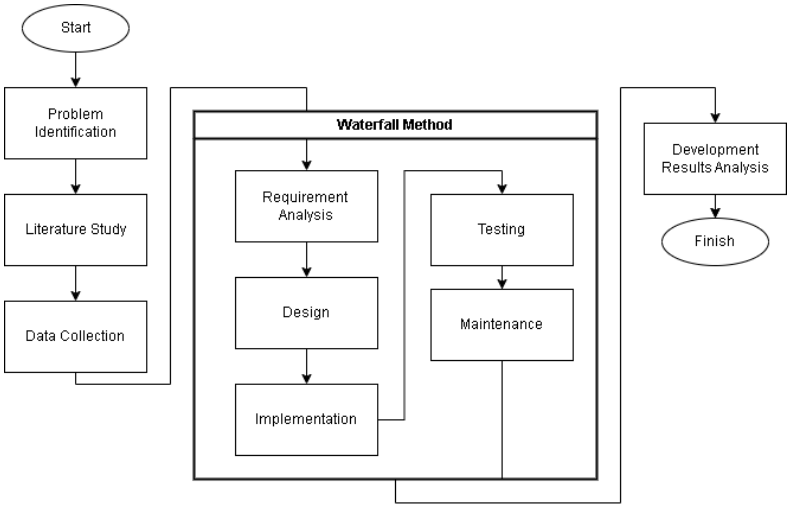

Figure 1. Research flowchart

2.1 Problem Identification

This stage is the problem identification phase, aimed at recognizing obstacles in the consultation services at Biro Psikologi Putra Tunggal Clinic. This process involves an in-depth analysis of existing issues to ensure that the proposed solutions effectively enhance the clinic's consultation services.

2.2 Literature Study

This stage involves gathering theoretical foundations and references related to the design of information systems from various sources, including books and previous journals. The purpose of this literature study is to enhance the understanding of the concepts and theories required for this research.

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2.3 Data Collection

This study employs data collection techniques, including interviews with the clinic owner, psychologists, and patients at Biro Psikologi Putra Tunggal Clinic, as well as usability testing results from the previous website using the System Usability Scale (SUS) method.

2.4 Requirements Analysis

Requirements analysis is conducted to identify and evaluate the existing issues at Biro Psikologi Putra Tunggal Clinic. This process includes determining user requirements and system requirements, covering both functional and non-functional aspects.

2.5 Design

The design phase aims to create a website according to the findings from the requirements analysis. The elements designed include Use Case Diagrams, Activity Diagrams, Sequence Diagrams, Class Diagrams, and basic User Interface (UI) designs to ensure user functionality is met.

2.6 Implementation

The implementation phase, the application is coded using Next.js and PostgreSQL. This process involves writing the program code to develop the mental health consultation website for Biro Psikologi Putra Tunggal Clinic, based on the previous design results.

2.7 Testing

The testing phase is carried out after implementation using Blackbox Testing to test functionality and System Usability Scale (SUS) to assess usability. The results of these tests are then analyzed to determine the feasibility of the website.

2.8 Maintenance

The maintenance phase is the final step in the Waterfall method. Maintenance is carried out to prevent errors and adapt the system to changes and feature additions over time.

2.9 Development Results Analysis

This stage is intended to identify the results of the development by comparing the SUS score of the previous website with the newly developed one.

3. RESULTS AND DISCUSSION

3.1 Data Collection

In the data collection phase, the researcher used data from interviews with clinic staff and patients, as well as the results of the System Usability Scale (SUS) method to evaluate the usability of the previous website. The data collection results are as follows:

a. Interviews and Observations

The interviews and observations at Biro Psikologi Putra Tunggal indicated that consultations are still conducted conventionally, which limits patient access due to time and distance constraints. Furthermore, the available facilities do not support online consultations, highlighting the need for a digital solution to enhance service reach and efficiency.

b. Usability Data from the Old Website

The System Usability Scale (SUS) testing on the old website was conducted to evaluate ease of use and user experience in accessing mental health consultation services at Biro Psikologi Putra Tunggal Clinic. The testing involved 30 respondents who filled out a questionnaire via Google Form. The total SUS score obtained was 2.085 from 30 respondents. The average SUS score was calculated using the following formula:

$$Average\ SUS\ Score: \frac{2085}{30} = 69{,}5$$

Thus, the average SUS score for the old website was 69.5. This score serves as baseline data before further development is carried out.

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3.2 Requirements Analysis

The requirements analysis phase includes several important elements, such as user requirements and functional requirements, all of which are part of the problem identification and investigation process.

a. User Requirement

Here are some user requirements based on the provided background:

Table 1. User requierment

Actor	Requirements
Patient	1. Patients must be able to create an account and easily access consultation services. 2. Patients want to easily choose consultation schedules with available psychologists. 3. Patients expect a safe, comfortable, and private consultation experience. 4. Patients should have access to articles related to mental health.
Psychologist	1. Psychologists must be able to monitor offline consultation schedules. 2. Psychologists should be able to conduct online consultations with patients easily. 3. Psychologists should be able to access consultation history, both online and offline.
Admin	1. Admin must have access to manage user data, including patients and psychologists. 2. dmin can manage website articles. 3. Admin can view all user activities (patients and psychologists). 4. Admin dapat melihat kegiatan layanan dari semua pengguna (pasien dan psikolog).

Table 1 presents a detailed overview of the system requirements from the standpoint of users or stakeholders who will engage with the system. Each user group is granted specific access rights and functionalities based on their respective roles within the system.

b. System Requirement

Below are the system requirements based on the provided background:

Table 1. System requierement

System	Requirement
Functional	1. Authentication and Authorization 2. Database Management 3. Online Chat 4. Scheduling 5. User Interface 6. Education and Resources
Non-Functional	1. Security 2. Maintainability 3. Reliability 4. Scalability 5. Performance

Table 2 outlines the technical specifications that must be fulfilled to develop a system aligned with user requirements, ensuring optimal system performance and functionality. These requirements are categorized into functional and non-functional aspects to provide a clear structure for implementation. Functional requirements define the core features that the system must support, while non-functional requirements ensure the system's quality attributes, such as security, scalability, and performance, are maintained throughout its operation.

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3.3 Design

The website design phase for mental health consultation at Klinik Biro Psikologi Putra Tunggal includes the creation of UML diagrams, such as Use Case and Activity Diagrams, and wireframes. These designs represent system functionality and the website's visual structure.

a. UML

In this study, UML is used to illustrate user interactions, processes, and system structure in the design and implementation of the mental health consultation website, with Use Case and Activity diagrams depicting workflows and system behavior in a clear and systematic manner.

1. Use Case

The Use Case Diagram illustrates the interactions among three primary actors: patients, psychologists, and administrators. It provides a comprehensive overview of the system's functional scope by depicting the various actions that each actor can perform within the website. As shown in Figure 2 , the diagram presents the available features and accessible menus for each actor, serving as a foundational representation of system behavior and user roles.

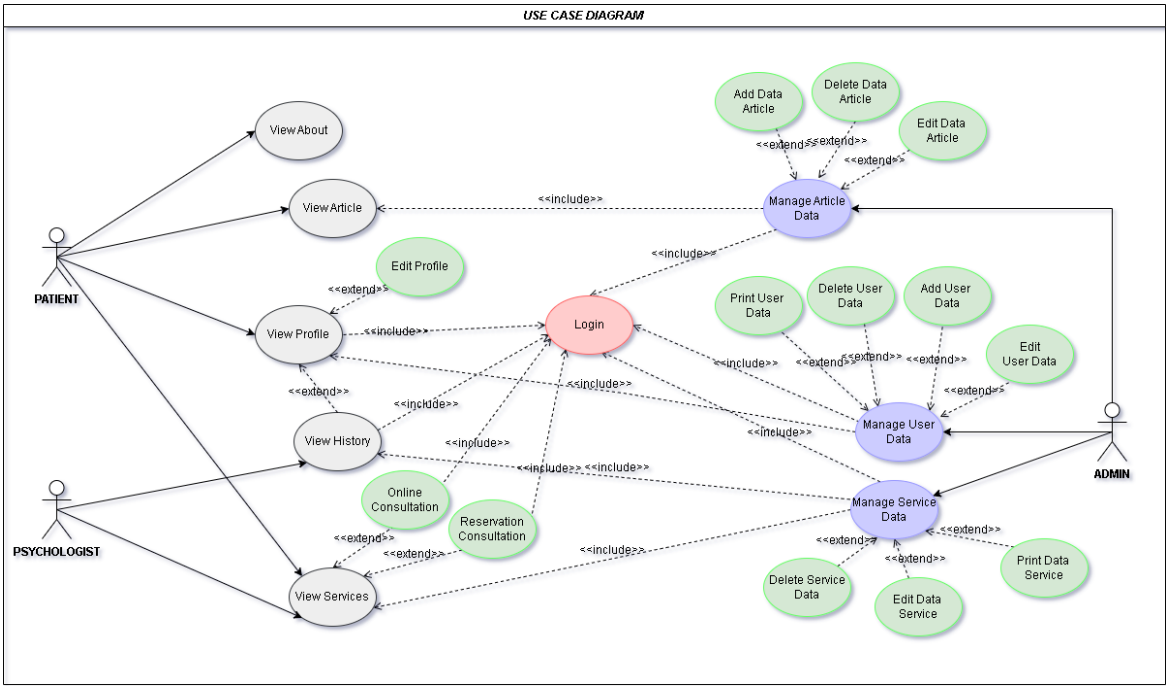

Figure 2. Use case diagram

2. Activity Diagram

This diagram illustrates the interactions between the three primary actors: patients, psychologists, and administrators. Each actor holds a vital role in ensuring the system operates effectively and efficiently.

a) Patient Activity

The following figure illustrates the activity diagram of a patient when accessing the service page and initiating a consultation service, either online or offline.

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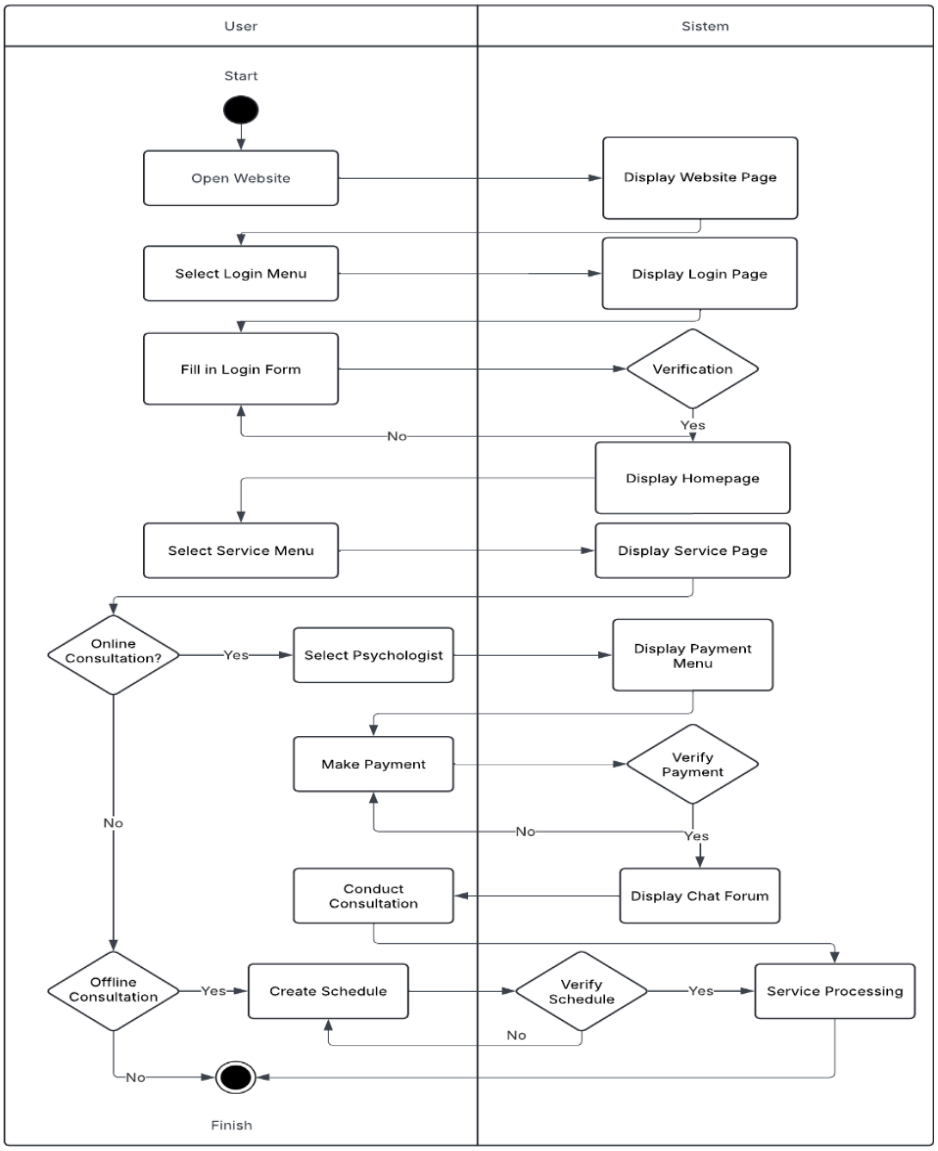

Figure 3. Activity diagram of Patient Service Page

Figure 3 illustrates the patient's activity flow in accessing consultation services, either online or offline. The process begins when the user opens the website and logs in through the login menu. After successful verification, the user navigates to the service menu to choose between online or offline consultation. For online consultation, the user selects a psychologist, makes a payment, and upon verification, accesses the chat forum for consultation. For offline consultation, the user creates a schedule, which the system verifies before processing the service.

b) Pyschologist Activity

The following is a diagram of the activities of psychologists and admins when they want to manage the service page.

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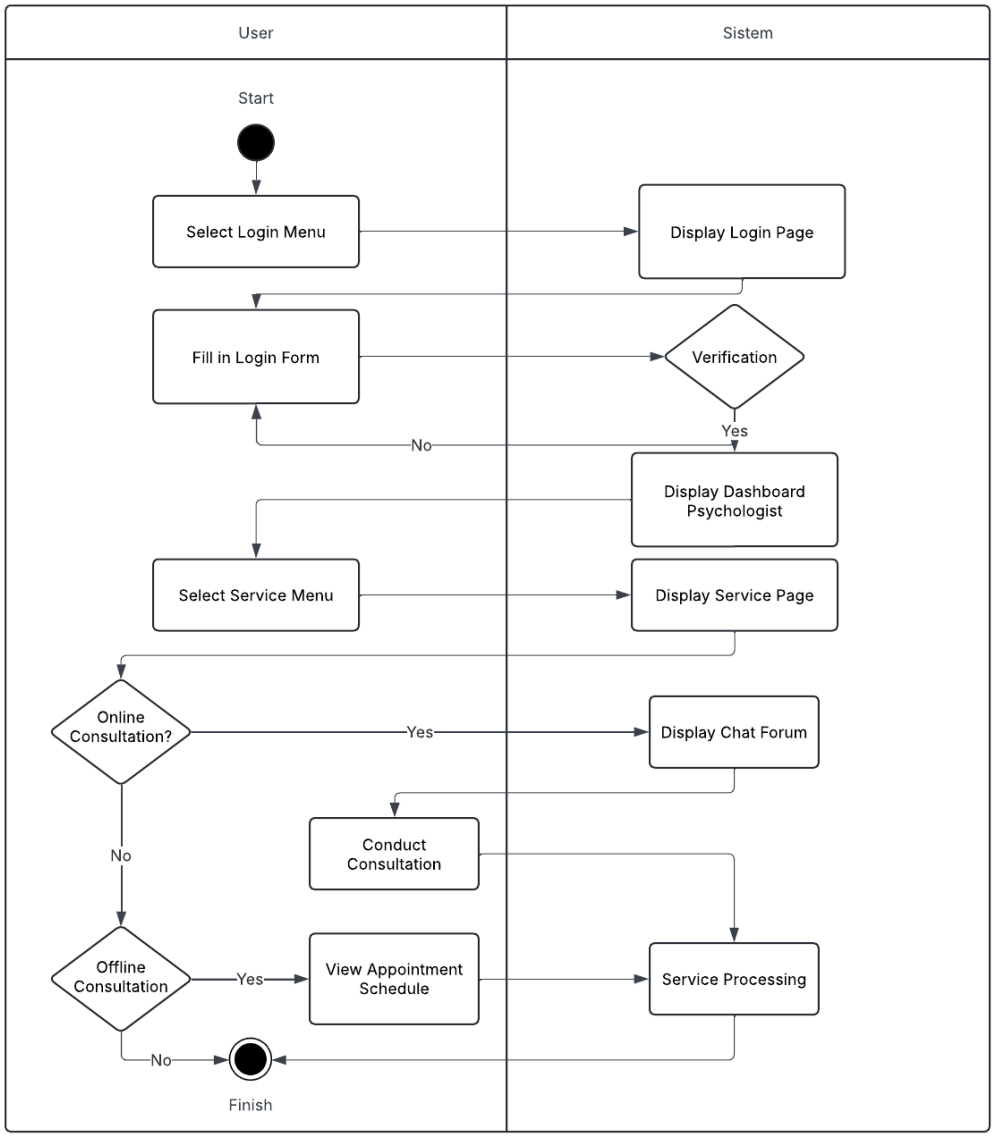

Figure 4. Activity diagram of Psychologist and Service Page

Figure 4 illustrates the flow of Psychologist and system activities in managing consultation services. The process begins with the user logging into the system and selecting the service menu. Users can choose between online or offline consultation services. If online consultation is selected, the system will display a chat forum to conduct the consultation. If offline consultation is chosen, users can view the appointment schedule, and the system will process the service accordingly. This activity flow supports the smooth operation and accessibility of psychological services within the system.

c) Administrator Activity

The following is a diagram of the activities of psychologists and admins when they want to manage the service page.

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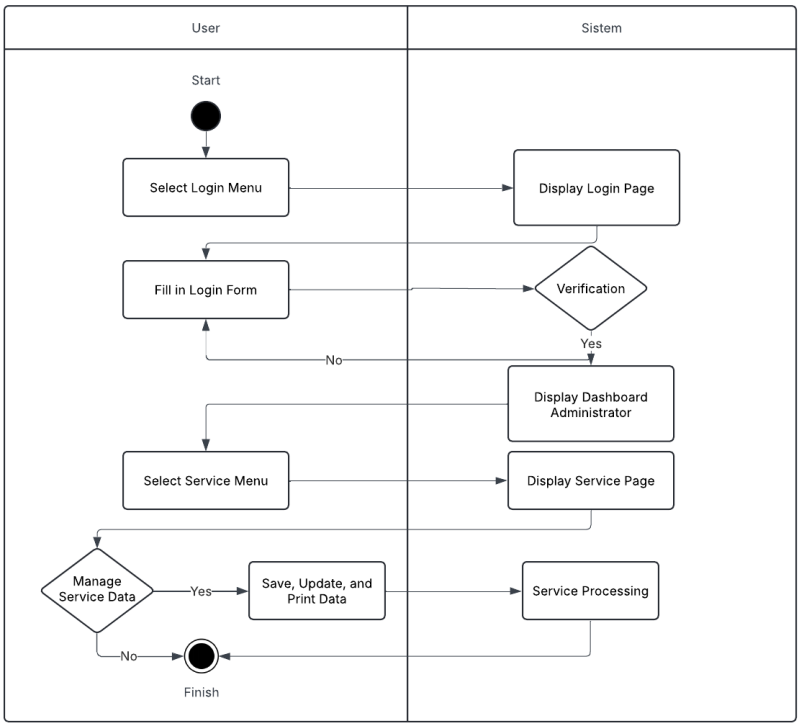

Figure 5. Activity diagram of Admin Managing Data

Figure 5 illustrates the administrator's workflow in managing service data within the system. The process begins when the administrator selects the login menu and fills in the login form. Upon successful verification, the system displays the administrator dashboard, providing access to various service-related features. The administrator then navigates to the service menu to manage service data. If data management is required, the administrator can perform actions such as saving, updating, and printing service data. These activities are processed by the system to ensure data accuracy and service efficiency. This workflow enables the administrator to maintain and control service information effectively, supporting the overall functionality and performance of the system.

b. Wireframe

Wireframes were created based on use case and activity diagrams. The user-friendly UI design ensures an effective interaction between users. The wireframes for each menu are presented below:

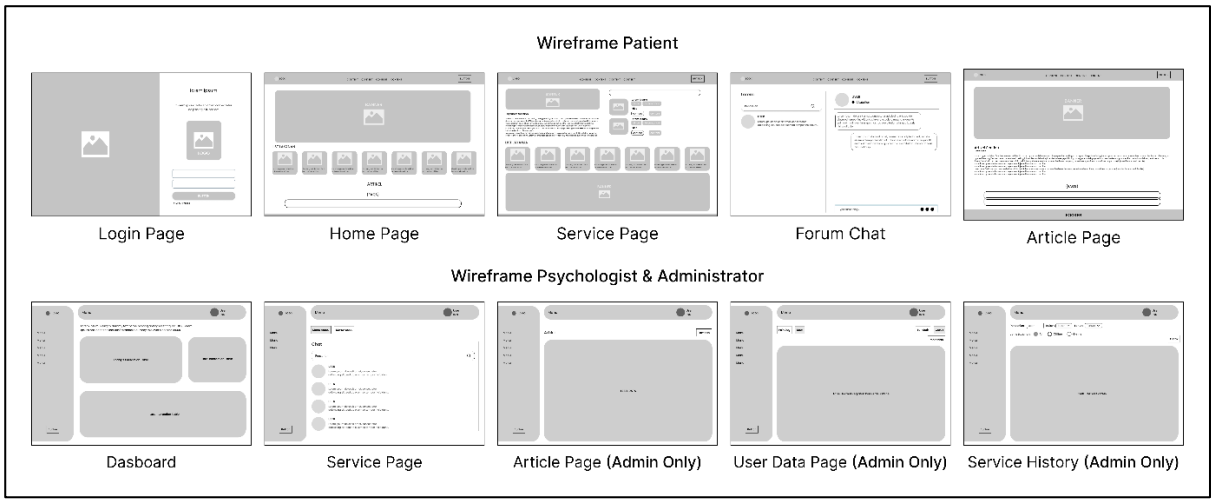

Figure 6. Wireframing

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Figure 6 illustrates the wireframes designed for both patients and administrators/psychologists, covering key pages such as login, home, services, forum chat, and data management. These wireframes serve as the foundation for the system's user interface, ensuring intuitive navigation and efficient interaction for all user roles.

3.4 Implementasi

The implementation phase resulted in the following developments:

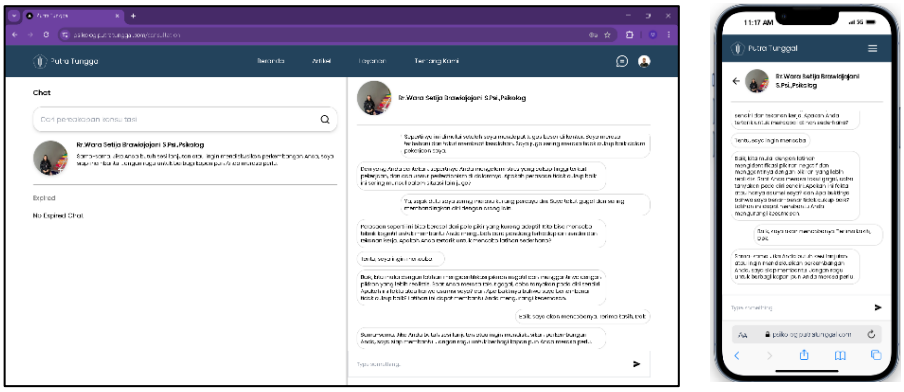

Figure 7. Online consultation menu for patients

Figure 7 shows the online consultation menu, which requires users to log in and complete payment before accessing consultation services. Patients can select a psychologist, make payments, and gain chat access for one hour with their chosen psychologist upon successful payment validation.

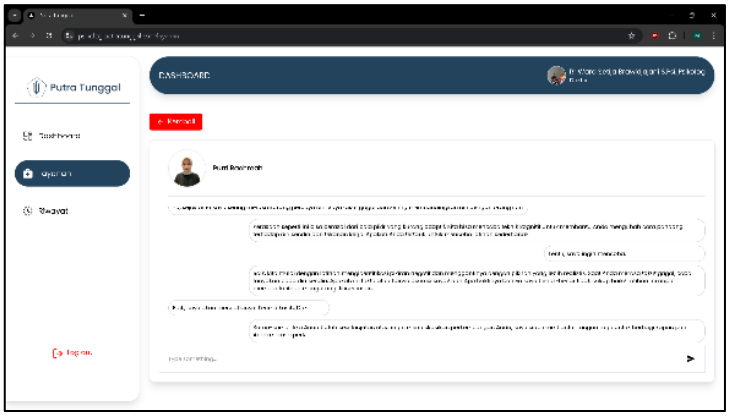

Figure 8. Consultation management menu for psychologist

Figure 8 shows the page where psychologists can conduct online consultations with patients who have completed payment and also view the schedule of offline consultations booked by patients.

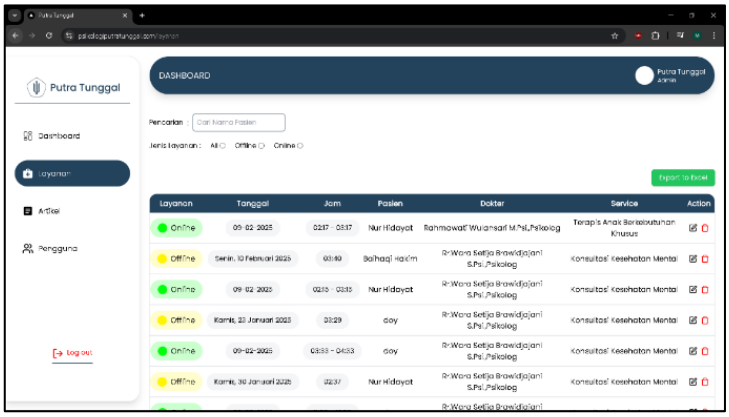

Figure 9. Service Management Menu for Administrators

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Figure 9 shows the admin page where administrators manage consultation services by editing, deleting, and generating reports, allowing efficient control and monitoring of service activities.

3.5 Testing

The website underwent two testing methodologies: Blackbox Testing for functionality and System Usability Scale (SUS) for usability evaluation:

a. Blackbox Testing

Table 3.3 presents the results of Blackbox testing conducted on five main pages of the system: Admin, Psychologist, Patient, Login, and Registration. All tests were successful with no failures, resulting in a total of 105 successful tests. These results indicate that the system operates reliably and stably according to its intended functions.

Table 3. Blackbox Testing Results

No	Test Scenario	Test Results	
		Successful Tests	Failed Tests
1	Admin Page	18	0
2	Psychologist Page	11	0
3	Patient Page	62	0
4	Login Page	6	0
5	Registration Page	8	0
Total Test Results		**105**	**0**

Success Rate Calculation:

$$Successful\ Tests : \frac{105}{105}\ x\ 100\% = 100\%$$

$$Failed\ Tests : \frac{0}{105}\ x\ 100\% = 0\%$$

Base on black box testing result, with a 100% success rate, the mental health consultation website at Klinik Biro Psikologi Putra Tunggal is highly functional and fully operational.

b. System Usability Scale (SUS)

This study employs the stratified sampling method by dividing respondents into two groups: clinic staff and the Banyumas community, with a total of 30 respondents. The distribution is based on population proportions to ensure more accurate and representative results. The test results indicate that the total System Usability Scale (SUS) score obtained is 2,315. The average SUS score is calculated using the following formula:

$$Average\ SUS\ score : \frac{2315}{30} = 77{,}16$$

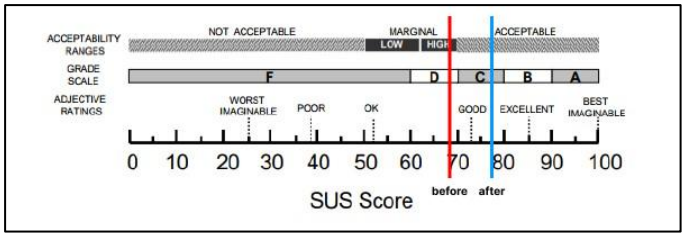

Figure 10. SUS testing results

Based on this calculation, the average SUS score of 77.16 falls within the **Acceptability Ranges** category as Acceptable. According to the **Grade Scale**, the system is classified as **Grade C**, while based on the **Adjective Rating**, it is categorized as **Good**. These results demonstrate that the website

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development has successfully improved the system's quality compared to the previous version, which had a SUS score of only 69.5.

4. CONCLUSION

The existing website primarily functions as an informational platform without online consultation features, limiting service flexibility and hindering clinical expansion, which still relies on face-to-face consultations. The development of a digital mental health consultation system through the Klinik Biro Psikologi Putra Tunggal website addresses these limitations by enhancing service accessibility and efficiency.

Developed using the Waterfall method, the new website goes beyond information dissemination by integrating an online consultation service, improving patient engagement and convenience. Blackbox Testing, conducted with 105 test scenarios, achieved a 100% success rate, Thus, the system is considered to be functioning properly and ready for deployment. Additionally, System Usability Scale (SUS) testing with 30 respondents showed an increase in the usability score from 69.5 to 77.16, indicating a significant improvement in user experience.

These results demonstrate that the digital transformation of the mental health consultation system successfully enhances patient access, optimizes consultation processes, and improves overall service quality at Klinik Biro Psikologi Putra Tunggal.

REFERENCES

[1] A. Rahmadhani, F. Fauziah, and A. Aningsih, "Sistem Pakar Deteksi Dini Kesehatan Mental Menggunakan Metode Dempster-Shafer," *Sisfotenika*, vol. 10, no. 1, p. 37, 2020, doi: 10.30700/jst.v10i1.747.

[2] Y. A. Rozali, N. W. Sitasari, and A. Lenggogeni, "Meningkatkan Kesehatan Mental Di Masa Pandemic," *J. Pengabdi. Masy. AbdiMas*, vol. 7, no. 2, 2021, doi: 10.47007/abd.v7i2.3958.

[3] D. Novianti, "Isu Kesehatan Mental (Mental Health) dan Peranan Pelayanan Konseling Pastoral Kristen," *J. Kadesi*, vol. 5, no. 1, pp. 137–162, 2023.

[4] S. Diah Puspita, "Kesehatan Mental Dan Penanganan Gangguannya Secara Islami Di Masa Kini," *J. Forum Kesehat. Media Publ. Kesehat. Ilm.* , vol. 12, pp. 2–3, 2022, [Online]. Available: http://e-journal.poltekkes-palangkaraya.ac.id/jfk/

[5] A. E. Wahdi, S. A. Wilopo, and H. E. Erskine, "122. The Prevalence of Adolescent Mental Disorders in Indonesia: An Analysis of Indonesia – National Mental Health Survey (I-NAMHS)," *J. Adolesc. Heal.*, vol. 72, no. 3, p. S70, 2023, doi: 10.1016/j.jadohealth.2022.11.143.

[6] R. A. Listiyandini, "Layanan kesehatan mental digital: Urgensi riset dan penerapannya di Indonesia," *J. Psikol. Ulayat*, vol. 10, no. 1, pp. 1–4, 2023, doi: 10.24854/jpu789.

[7] R. Arjadi, S. J. Kusumawardhani, N. Purnomo, and C. L. Bockting, "Benefits and challenges in implementing online mental health consultation in Indonesia: Survey in practitioners," *J. Psikol. Ulayat*, vol. 10, pp. 284–299, 2023, doi: 10.24854/jpu726.

[8] U. S. Senarath, "Waterfall methodology, prototyping and agile development," *Tech. Rep.*, no. June, pp. 1–16, 2021, doi: 10.13140/RG.2.2.17918.72001.

[9] B. R. Faturizky and R. Komalasari, "Sistem Informasi Layanan Konsultasi Kesehatan Mental Berbasis Website," *J. Teknol. Sist. Inf.*, vol. 5, no. 1, pp. 133–144, 2024, doi: 10.35957/jtsi.v5i1.7793.

[10] M. P. Aji and U. G. Aeman, "Rancang Bangun Website Kesehatan Mental Mindland," *J. Media Pratama*, vol. 17, no. 1, pp. 61–73, 2023.