Design of Information System for Pajjaiang Makassar Clinic Based on Web and Mobile

Muhammad Alwali¹⁾, Alvian Bastian²⁾, Asriyadi³⁾

^{1,2,3} Multimedia and Network Engineering Study Program, Department of Electrical Engineering, Ujung Pandang State Polytechnic asriyadi@poliupg.ac.id (Corresponding Author)³, muhammadalwali025@gmail.com¹, alvianbastian@poliupg.ac.id²



Abstract — The role of information technology is currently developed according to the current rapid development of the times. The most developed types of information technology are web-based and mobile devices. Web-based and mobile devices are used to facilitate daily activities along with technological advances. One of the important things for everyday life by utilizing technological advances is in the field of health services, especially services at health clinics. In this regard, a web-based and mobile information system was designed at the Pajjaiang Makassar clinic to facilitate service. Making this system uses the waterfall method which is often used in the development of information systems or software. This system consists of 4 actors, namely patients, admins, doctors, and pharmacists. Patients are connected to the mobile application, while admins, doctors, and pharmacists are connected on the web side. The patient registers for the examination, the admin manages the patient's data, the doctor conducts the examination, and the pharmacist manages the available drugs. Everything is interconnected using mysql database as the database and Application Programming Interface (API) to connect it. With this web-based and mobile information system is a form of digitalization process in the field of health services.

Keywords; Information System, Technology, Pajjaiang Clinic

I. Introduction

In everyday life, the role of technology cannot be separated from people's lives, and one of the technologies that play an important role today is the much-needed information technology. The role of information technology is developed according to the current rapid development of the times. The most developed types of information technology are web-based and mobile devices.

A clinic is a public service institution engaged in health services. Health clinics are classified as First Level Health Facilities (FKTP) which are the spearhead of health services in the community and have a function as the first contact of BPJS Health participants so that they have a major impact on improving the health status of the community. First Level Health Facilities (FKTP) are health facilities that provide non-specialized individual health services for the purposes of observation, diagnosis, care, treatment, and or other health services [1].

Currently, there are still many clinics that record daily operational activities manually in paper archives, such as patient registration, medical record data management, and so on. The archives of various clinic data become piled up, requiring more storage space and extra maintenance so that the paper records are not lost or easily damaged. The process of searching for patient data and medical records takes a long time, due to being in an increasing pile of archives [2].

Thus, based on this analysis, a web and mobile-based clinic information system was created in one of the First Level Health Facilities (FKTP) in Makassar city which can help overcome the above problems with the title "Design of Information System for Pajjaiang Makassar Clinic Based on Web and Mobile".

II. Literature Review

Related Research

Andrianto's research is related to a web-based health service information system at the health center. The purpose of making this health service information system is to help the performance of officers and doctors at the health center, such as searching for patient data, adding medical records, and making reports. System development with the objectives described, using the prototype development method with the stages of gathering requirements, building prototyping, evaluating prototyping, coding the system, testing the system, evaluating the system, and using the system [3]. In this web-based research, it only makes it easier from one side, namely services at the government clinic, while for patients who want to seek treatment there is no online registration feature or access to treatment history so that prospective patients must still come to the government clinic to register themselves.

Another research conducted by Hidayatullah is the design of an android information system. The purpose of this study is to facilitate the author to design and produce the information system needed by the clinic. So that it can help the clinic get an effective and useful system [4]. The system that has been built can only be accessed by clinic employees, and there is no queuing system for patients who want to seek treatment and only use one android-based device.

Putra with research on building web and mobilebased health clinic information system applications. in this study, the system in health clinics still runs in a conventional way, such as manual patient registration with patients coming to the clinic to register and waiting until they get a call according to their queue number or recording the results of patient diagnoses by therapists who still use paper [5]. However, in this study the patient's treatment history cannot be printed, and the health clinic referred to in this study is not a health clinic with an examination by a doctor but a therapist.

Information System

The system is a network of interconnected procedures, gathered together to carry out an activity or to complete a specific goal, while information is data that has been processed into a form that is more useful for those who receive it[6].

First Level Health Facilities (FKTP)

First Level Health Facilities (FKTP) or often also called Level I Health Facilities are health services that become the main gate to serve people who are participants of the Social Security Administration (BPJS) and nonparticipants (General). There are several types of First Level Health Facilities, including government clinics, private clinics, government clinic, and general practitioners.

Web

The web is one of the many services on the internet. This service is most widely used on the internet to convey information because it supports multimedia. This means that information is not only conveyed through text, but also images, videos and sounds [7].

Mobile

Mobile is an adjective that means able to move or can be moved freely and easily. However, mobile can also mean an object that is high-tech and can move without using wires. Examples include smartphones, PDAs, and tablets. Mobile can also mean a motorized vehicle that can move. Mobile is free like water and can flow anywhere. Mobile can change and change easily [8].

III. Research Methodology

A. Place and Time of Research

The place of this research was conducted at the Pajjaiang Clinic which is located at Jl. Pajjaiang, Paccerakkang, Kec. Biringkanaya, Makassar City, South Sulawesi, the author analyzes the needs needed to build the application.

B. Waterfall Method

The waterfall model is one of the SDLC models that is often used in the development of information systems or software. This model uses a systematic and sequential approach. The stages in this model start from the planning stage to the maintenance stage and are carried out in stages. Developers need to know more about how the system development process if using the waterfall model and also the characteristics of the waterfall model [9].

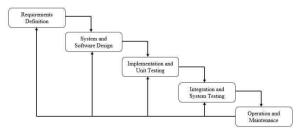


Figure 1. Stages of the waterfall method

C. System General Description

This information system is designed web-based and mobile android with Java, Kotlin and PHP programming languages and Mysql as the database. This system was created for the Pajjaiang Makassar clinic as a First Level Health Facility (FKTP) which requires this system in order to facilitate the clinic and prospective patients.

Prospective patients who want to seek treatment at the clinic can register online by choosing a date, schedule and polyclinic via a smartphone. Then after the prospective patient registers and gets a queue number, it will appear on the web dashboard on the admin side of the patient's registration clinic. Patient registration data reaches the admin thanks to Mysql which acts as a backend service. After that the clinic admin directs the patient to the intended polyclinic room to meet with the doctor for examination. After the patient is examined by a doctor, the doctor will fill in complaints, diagnoses and actions taken to the patient online which is called a medical record, and the doctor will also prescribe medicine to the patient. For drug prescriptions, patients can redeem drugs that have been prescribed by the doctor at the pharmacy. Later the medical record and drug prescription can be seen by the patient sent to the patient's registration account via smartphone.

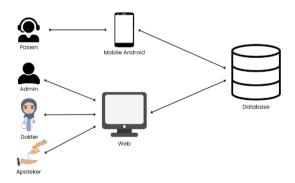


Figure 2. System Workflow

D. Activity Diagram

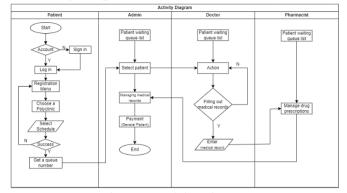


Figure 3. Activity Diagram

The figure above shows the Activity Diagram of this system that will be designed later. If the patient who wants treatment does not have an account, then the patient is required to sign in first, but if the patient already has an account then the patient can immediately log in. After logging in the patient will be directed to the main page, namely the registration menu, then the patient can choose the polyclinic to be addressed and then choose the examination schedule, namely day, date, month, and session, then after the patient has successfully registered, the patient will get a queue number. Patient data that has registered will appear to the admin, then the patient data will be checked by the clinic admin, if it is correct then the patient will be directed to meet with the doctor at the polyclinic to carry out the examination. After the examination, the doctor will fill in the patient's medical record online and then input it into the system. The medical record will reach the admin and will also be entered into the patient's account.

IV. Results and Discussion

View

Mobile Application Interface Display

	÷
PAJJAIANG	
	Klinik Pajjalang
Email	Poli Umum
	Nomor Antrian
Password	_
A	3
LOG IN	
	Pada tanggal :
	25-09-2023
Belum memiliki akun? SIGN IN	Pagi (08.00) - dr. Indah Lestari SM, S.Ked.
	Sisa Antrian : 1

Figure 4. Initial view of the mobile application

	REGISTRASI
7	AJJAIANG
	NAMA
	ALAMAT
	JENIS KELAMIN
	LAKI
0	LAKI
) LAKI	-LAKI MPUAN
0	laki Mpuan TEMPAT LAHIR

Figure 5. Mobile application registration view



Figure 6. Patient registration view

Ρ	agi (08.00) - dr. Indah Lestari SM, S.Ked.
	Sisa Antrian : 1

Figure 7. Patient queue view

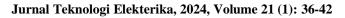
← Nomor Antrian Saya	
Poli Umum	
03-08-2023	
Jadwal : Pagi (08.00)	
Nomor Antrian : 1	
Poli Gigi	
03-08-2023	
Jadwal : Sore (16.00)	
Nomor Antrian : 3	
Poli Umum	
28-07-2023	
Jadwal : Pagi (08.00)	
Nomor Antrian : 3	
Poli Gigi	
25-07-2023	
Jadwal : Pagi (08.00)	
Nomor Antrian : 1	
Poli Umum	
24-07-2023	
Jadwal : Pagi (08.00)	
Nomor Antrian : 1	

Figure 8. Patient Treatment History Display

• Web Interface Display

Sigtem Informasi Klinik Pajjaiang Sign in to continue	
admin⊜gmail.com	
SIGN IN	

Figure 9. Login page view



Antrian Antria

Figure 10. Queue page view

E Hürsk Pağatarış	Antrian									1
	Antrian									
Antrian	List Antr									
St Passer	08-08-3		sid	08-09-2023	Politimum		· Dwellas		1000	
	Stov 10	w process						barth		
	No	lastel	No.Actrian	Biodata	Jervis Pasien	Poléšnik	Return Media	Resep Obst		
		(8-09-2023 Page (08.00)		Linderreitheit Grossperiesse Corpaterier	Unun	Pallunae	Terrent	Tartak		
	ÿ.	08-08-2023 Pagi 008.001	1	Lineuroper frecere Concervations Concervations	Langers	Par Unum	Tarrente	Terest		
	Drawing he	2 of 2 ereras (10e	ned hori Tüstələrini	=0					Prinkbull 1	Nex!

Figure 11. Inspection page view

Tambah Rekam	Medis	×
Anamnesis*		
Diagnosa*		
Tindakan*		
File (File Maks 5	MB)	
Plih File	Tidak ada file yang dipilih	
Rujuk*		
Tidak		~
Biaya*		

Figure 12. View of the add patient medical record page

Nama		: Muhammad Alwali	Umur	: 22
	irtu BPJS/NIK	: 7308032011000005	Telp	: 081258103737
Alamo	st.	: BTP Blok M		
No	Tanggal	Anamnesis	Diagnosa	Tindakan
1	23-07-2023	Sakit gigi 2 hari	Gigi Berlabang	Tambal saluran akar gigi
2	23-07-2023	Pusing	Migran	Pemberian infus Vitamin
3	24-07-2023	Sakit gigi saat malam hari	Gigi berlubang	Perawatan Saluran Akar
4	01-08-2023	sakit kepala pada malam hari	migran dan pusing	pemberian vitamin dan obat
5	03-08-2023	Ambeyen	Ambeyen dalam	Pemberian obat ambeven dan vitamin
		1		

Figure 13. Medical record print view

E Kink Pajalang	Obat Menter / Obet						0
Watter Obst	Landbar						
H Clear Stater							
		· anties				Search	
	100	Nama) Harga	City Twooda	Disat	Dupdate	
		Broadiates 20 mg	Pp-6.508	20	L Apotosium O cu- cer 2023 18-60	Lipsteker Ø14-08-202018-55	Usan Pagua
		Ampilin	Pp-5.008	25	1 Approxime 0 OF 08 2022 20 30	Lipptekar Ø15108-00201215	User Hight
		Arriseliper S	Pp-9-202	211	L lipstatur O 20-07-0020 21-00	Linterstatute ©25-01-2025/20.54	Ulum Pagear
		Antonias	Pp12.008	30	L Approxime 0 25-07-0023 21:25	Linpotekar Ø15-08-002510.51	User Higher
	•	del planar	Pp/6.008		1 Apostudium 0 220-07-0020 22 All	Lipsteiler Ø27-07-0020108-12	Ulan Pagaa

Figure 14. Display of medicine master page

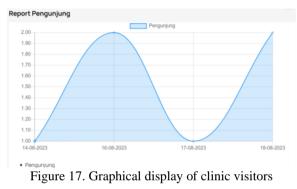
e- ISSN 2656-0143



Figure 15. Display of outgoing medicine page

🗏 Klinik Pajjalang	Report Pengunjung Report Pengunjung	0
B: Report Pengurgung	List Report Pergenang Segundar Sel Tengenang Report Pengenang Lists Desilverpropring Lists	
	Kink Puguang - Soten Internet Kink Puguang	opyright © 2023. All rights reserved.

Figure 16. View of the clinic visitor report page



Database View

🕀 📝 antrian
🕂 📝 groups
Iogin_attempts
🕀 📝 menu
🛨 📝 menu_access
🖶 🥂 m_obat
🕀 📝 obat_keluar
🕂 📝 pasien
🕂 📝 poliklinik
🕂 🥂 rekam_medis
🕂 📝 resep_obat
+ V users
🛨 🥢 users_groups
 m_obat obat_keluar pasien poliklinik rekam_medis resep_obat v users

	Tabel	Tind	akan						Baris		Jenis	Penyortiran	Ukuran	Bet	an
	antrian	*	🔄 Jelajahi	K Struktur	R Cari	👫 Tambahkan	🚆 Kosongkan	😂 Hapus		21	InnoDB	utf8mb4_general_cl	32.0	(8	
	groups	索	🔄 Jelajahi	K Struktur	🔹 Cari	🛃 Tambahkan	🚆 Kosongkan	😂 Hapus		4	InnoDB	utf8_general_ci	16.0	6	
0	login_attempts	*	📰 Jelajahi	K Struktur	R Carl	👫 Tambahkan	层 Kosongkan	Hapus		0	InnoDB	utf8_general_ci	16.0	(8	
	menu	*	📑 Jelajahi	K Struktur	R Cari	👫 Tambahkan	🖶 Kosongkan	😂 Hapus		5	InnoDB	latin1_swedish_ci	16.0	B	
0	menu_access	*	📑 Jelajahi	🖌 Struktur	R Carl	👫 Tambahkan	层 Kosongkan	😂 Hapus		9	InnoDB	utf8mb4_general_ci	48.0	(B	
	m_obat	sk.	🔄 Jelajahi	K Struktur	R Cari	14 Tambahkan	E Kosongkan	Hapus		8	InnoDB	utf8mb4_general_ci	32.0	8	
	obat_keluar	*	🗾 Jelajahi	K Struktur	le Cari	👫 Tambahkan	🚍 Kosongkan	😂 Hapus		4	InnoDB	utf8mb4_general_ci	16.0	(B	
0	pasien	索	🔄 Jelajahi	K Struktur	R Carl	🛃 Tambahkan	🚍 Kosongkan	🖨 Hapus		. 9	InnoDB	utf8mb4_general_ci	16.0	6	
	poliklinik	*	🗾 Jelajahi	M Struktur	Reg Carl	📲 i Tambahkan	🚔 Kosongkan	Hapus		3	InnoDB	utf8mb4_general_ci	16.0	(B	
	rekam_medis	*	📑 Jelajahi	Je Struktur	🤹 Carl	≣ é Tambahkan	🚍 Kosongkan	😂 Hapus		14	InnoDB	utt8mb4_general_ci	64.0	8	
	resep_obat	*	📷 Jelajahi	M Struktur	R Cari	👫 Tambahkan	🚆 Kosongkan	😂 Hapus		17	InnoDB	utf8mb4_general_ci	80.0	(B	
0	users	索	🔁 Jelajahi	K Struktur	🔹 Carl	🛃 Tambahkan	Hosongkan	👌 Hapus		13	InnoDB	utf8_general_ci	96.0	8	
0	users_groups	*	📑 Jelajahi	K Struktur	R Carl	3 Tambahkan	E Kosongkan	😂 Hapus		13	InnoDB	utf8_general_ci	64.0	(B	
	13 tabel	Jum	lah							120	InnoDB	utf8mb4_unicode_ci	512.0	(B 6	0 B

Figure 18. System database design

Blackbox Testing Results

From the results of system testing that has been carried out using blackbox testing, the results of testing both from the mobile and web application side (admin, doctor, and pharmacist) run well and as expected. Testing is done by doing each test scenario by following the test case. From this test, users or patients can only access the system through the mobile application, while admins, doctors, and pharmacists can access the system via the web. Every mobile user who is a prospective patient is required to create an account first in order to register. Admins have access to the web as a whole except for the part of filling in medical records and drug prescriptions, because it can only be filled in by doctors. Doctors and pharmacists have access according to their respective professional work fields.

Analysis of System Usage Results at the Clinic

From the results of using the system at the pajjaiang clinic, it received a positive response from the clinic. From the results of using the system, interviews were conducted to determine the level of satisfaction of the clinic with the system that had been created. The system that has been created is in accordance with the system and service flow that runs at the clinic, namely offline and still using paper records, and a digitization process is carried out to facilitate service. In the appearance of the system that has been made, the clinic responds that it is quite interesting and easy to understand each content and part of the system, and for further use it is necessary to conduct some kind of training or training for employees so that this system is truly understood. The clinic also said that the system that has been made can be very helpful in providing services because it is similar to services in large clinics or hospitals, with the hope that it can facilitate health services.

V. Conclusion

From the results of system design and testing, it can be concluded that:

- 1. All views, menus, access, buttons and processes can run correctly and according to their functions.
- 2. In designing this system using mysql database as the database and in accordance with the initial design, and using Application Programming Interface (API) to connect web and mobile applications so that an information system for the Makassar pajjaiang clinic is formed.
- 3. This information system supports and facilitates community services in the health sector and digitizes the service process at the Makassar pajjaiang clinic.

Acknowledgement

Large research projects generally do not involve just one person. The lecturers and colleagues who contributed significantly to the implementation of the research activities all need to be acknowledged and thanked.

References

- [1] M. Mujiati and Y. Yuniar, "Ketersediaan Sumber Daya Manusia Kesehatan pada Fasilitas Kesehatan Tingkat Pertama dalam Era Jaminan Kesehatan Nasional di Delapan Kabupaten-Kota di Indonesia," *Media Penelit. dan Pengemb. Kesehat.*, vol. 26, no. 4, pp. 201–210, 2017, doi: 10.22435/mpk.v26i4.4827.201-210.
- [2] D. Ferdiansyah, "Penerapan Konsep Model View Controller Pada Rancang Bangun Sistem Informasi Klinik Kesehatan Berbasis Web," J. Kaji. Ilm., vol. 18, no. 2, p. 195, 2018, doi: 10.31599/jki.v18i2.289.
- [3] Andrianto. P, "Sistem Informasi Pelayanan Kesehatan Berbasis Web di Puskesmas," Prosiding Seminar Nasional Komputer Dan Informatika (SENASKI), 978–602, 2017.
- R. Pakaya and R. Syarief Hidayatullah, "JISAMAR (Journal of Information System, Applied, Management, Accounting and Researh) PERANCANGAN SISTEM INFORMASI KLINIK PRATAMA YAKRIJA DI BANGKA JAKARTA SELATAN BERBASIS ANDROID," vol. 4, no. 4, pp. 2598–8700, 2020, [Online]. Available: http://journal.stmikjayakarta.ac.id/index.php/jisamarTelp.+6 2-21-3905050
- [5] H. D. Putra, M. I. Syarif, and A. Asriyadi, "Rancang Bangun Aplikasi Sistem Informasi Klinik Kesehatan Berbasis Web dan Mobile," *Semin. Nas. Tek. Elektro dan Inform.*, pp. 128– 135, 2020.
- [6] H. T. SIHOTANG, "Sistem Informasi Pengagendaan Surat Berbasis Web Pada Pengadilan Tinggi Medan," vol. 3, no. 1, pp. 6–9, 2019, doi: 10.31227/osf.io/bhj5q.
- [7] G. Y. Swara and Y. Pebriadi, "Rekayasa Perangkat Lunak Berbasis Web," J. TEKNOIF, vol. 4, no. 2, pp. 27–39, 2016.

- Y. Effendi, "Rancangan Aplikasi Game Edukasi Berbasis Mobile Menggunakan App Inventor," J. Intra-Tech, vol. 2, [8] no. 1, pp. 39–48, 2018. A. Wahid Abdul, "Analisis Metode Waterfall Untuk
- [9]

Pengembangan Sistem Informasi," J. Ilmu-ilmu Inform. dan Manaj. STMIK, no. November, pp. 1–5, 2020.