ANDROID-BASED DISTRICT E-GOVERNMENT APPLICATION MODEL UI/UX PROTOTYPE USING DESIGN THINKING METHOD

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ABSTRACT- The positive impact of rapid technological developments is widely felt in various aspects of human life. One example is improving the quality of public services at sub-district offices through appropriate technology. E-Government is a new development to enhance information and communication technology-based public services. This aims to make public services more transparent, accountable, effective, and efficient. The E- Government application in this sub-district office requires a UI/UX design prototype model to help ease users accessing the application. This study aims to design a UI/UX design prototype model in the sub-district office using design thinking. Researchers will analyze the problems sub-districts face in providing e-government services to the community and develop a prototyping model of e-government applications that can solve the problem. The design thinking method will be used to create the prototype model. The Design Thinking method is an innovation- based software product design method based on finding solutions to specific problems after successfully finding and understanding the issues found. The results of this report will later display a prototype in the form of an e- government website design that has been made. The Design Thinking method is an innovation-based software product design method based on finding solutions to specific problems after successfully finding and understanding the issues found. The results of this report will later display a prototype in the form of an e- government website design that has been made. The Design Thinking method is an innovation-based software product design method based on finding solutions to specific problems, after successfully finding and understanding the issues found. The results of this report will later display a prototype in the form of an e- government website design that has been made.

Keywords: E-Governance, UI/UX, Design Thinking

INTRODUCTION

In the government sector, changes in the strategic environment and technological advances encourage government employees to be prepared to face the new paradigm by improving bureaucratic performance and service quality.

Improving public services in sub-districts through technology has become a significant effort in improving the quality and accessibility of services for the community. By adopting technologies such as online services, integrated information systems, and mobile applications, sub-district governments can provide services that are more efficient, responsive, and easily accessible to citizens. Technology enables real-time service performance monitoring and facilitates active community participation in service evaluation and improvement.

The public service system in the sub-district, especially Musi Banyuasin Regency, is still classified as manual, where people who wish to apply for a letter must first come to the office, then meet with the sub-district employee to interview the need for notes after conducting the interview the sub-district employee provides the requirements for the documents to the community. That must be collected back to the sub-district employee, after which the employee makes the letters the community needs. It is considered that public services in the sub-district to improve the quality and accessibility of services for the community that are more efficient,

responsive, and easily accessible to residents cannot be provided. E-Government is the latest innovation in efforts to improve public services that rely on the use of information and communication technology. This aims to make public services more transparent, accountable, effective, and efficient [1].

E-government in this sub-district is one of the e- government models that can directly provide public services to the community. Communities can get enough benefits from home without spending a long time. This is more practical than conventional systems that require face-to-face meetings between the community and sub-district officials and aim to achieve reasonable governance goals. The impact of e-government is a change from manual services to electronic services, where government agencies that previously used paper documents have now switchedto electronic-based service systems [2].

Making e-government must pay attention to design as a form of user satisfaction and experience in accessing an application. This relates to how an application provides convenience for users using it. An application that is difficult to understand willcertainly not attract users and will not work correctly.Therefore, it is necessary to think carefully about making digital-based applications, especially in terms of appearance and UI/UX.*user interface* and user experience are essential components in building a website that can make it easier for users to do a job and increase the effectiveness of the information displayed for users.

Conversely, suppose the user interface and user experience could be better designed or take the user into account. In that case, it causes the existing system or product not to work correctly, and users feel uncomfortable accessing information [3]. Because of these problems, the research designed a UI/UX design using the design thinking method to make it easy to use and provide a better user experience in using the application.

Previous research entitled "Application DesignLet's Take Action With the Design Thinking Method"conducted by [4] States that in the process of making the Ayo Beraksi application, the design thinkingmethod is used to produce prototypes that can be adapted to user needs as the first step in creating a user interface and user experience. The use of the design thinking method is considered very helpful inthis process so that the Ayo BerAction application can be present to make it easier for the public to reportcriminal acts of corruption.

"Design UI/UX Design in the PANTAU Application using the Design Thinking Approach" with the researcher [5] The method used in designing the user interface and user experience of this application is Design Thinking, which consists of 5 stages, namely empathize, define, ideate, prototype, and test. The stages in the Design Thinking method are very flexible, so they don't have to be done sequentially or start from the initial stages of implementation or use.[6] Conducted a study entitled "UI/UX Design Using the Web-Based Design Thinking Method at Laportea Company" The results of his research stated that in designing, manufacturing, and testing UI/UX using the web- based Design Thinking method at Laportea Company, the results of usability testing show numbers by 91% and data analysis showed a value of 86.1%. Therefore, the methods and tests used were considered successful in creating product prototypes that fit the needs of potential Laportea Company online shop website users when shopping.

Previous research conducted by [7] with his research title "Implementation of Design Thinking for User Experience in the Use of Digital Applications" states that this Design Thinking approach places consumers as the center of attention in the designs produced so that the resulting structures can solve problems faced by users effectively and efficiently. Thus, Design Thinking becomes advantageous in designing user-oriented products or services.

Using the Design Thinking method will affect thedesign of an application's user interface and userexperience. The process that occurs in the Design Thinking method is used to find out problems and find out what the user needs so that they can be resolved in the form of UI/UX.[8].

This sub-district e-government application is expected to provide better public services and easy access for the community to interact with the government. In this case, the Android-based sub- district e-government application UI/UX design prototype model with the Design Thinking method is considered the right solution to meet the needs of better technology-based public services. In the problem above, the researcher proposed a "Prototype Model of UI/UX Design for Android-Based District E-Government Applications with the Design Thinking Method.

RESEARCH CONTENT

1. Research methods

The method used in this research is method *design thinking. Design thinking* is an approachmethod in the design process that offers solutions toovercome specific problems. This approach has a significant influence on the way decisions are madeso that they can generate new and innovative ideas[9]. The design thinking method has 5 stages: empathize, define, ideate, prototype, and testing.

Source: Sakshi Gupta, 2023
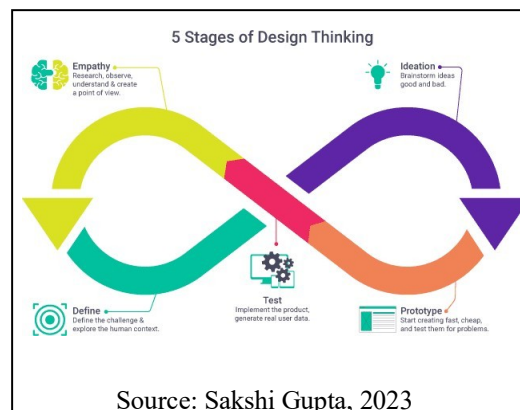
Picture 1. Stages of the design thinking method

Stage *Empathize*in design thinking focuses on understanding human thoughts, desires, and needs [10]. The Define stage in design thinking involves the process of analyzing and understanding various insights that have been obtained through empathy [11]. The Ideate Stage is the third stage in Design Thinking, where the focusis on generating as many usable ideas as possible. All statements that arise during this stage are collected and maintained to become a source of solutions for the problems identified at the Define stage [12]. At the ideat stage, the main focus is to generate ideas or ideas as a basis for making a design prototype to be made [13]. The prototype stage aims to identify the best solution for each problem identified during the previous three steps. At this stage, prototypes or models are developed that reflect the ideas generated previously [14]. The testing stage is a Design Thinking process in which solutions that have been made in the form of prototypes or models are tested directly with users or relevant stakeholders [15].

1.2 Results

UI/UX   APPIK   (DISTRICT   PUBLIC SERVICE APPLICATION) is presented to help people systematically get public services. Making UI/UX in the APPIK application uses the Design Thinking method. According to (Aulia Putri Prasetyo et al., 2022), Design Thinking is an innovative method used to design products or services that meet the needs and expectations

of users. This method focuses on a deep understandingof users, identifying problems, generating creative solutions, and testing through prototyping. With this approach, the design team can create solutions that are both relevant and useful to users.

2. Emphasize

The first stage is empathizing, which is used to understand the needs of sub-district employees and the community, such as public services, by conducting observations and interviews. Based on the observations and interviews conducted in a sub- district, there are several public services such as moving letters, death certificates, ID cards, family cards, birth certificates, business certificates, crowdpermits, and recommendation letters. They were done manually so that the community and sub-district officials want the public service process to be carried out quickly, transparently, and effectively. The following questions were asked by researchers to the community and sub-district officials.

- What do you think about manual publicservices?
- In your opinion, what are the shortcomings of unsystematic public services?
- In your opinion, how important is the design ofa public service application in a district?
- What are the following features or functions that must be present in a service application district public?
- If you later make a public service application, do you feel comfortable and make it easier to get public services in the district?
- What kind of interface design do users want in the Public Service application?

2.1 Define

After collecting data about the needs and problems of users in the empathy process, the definestage aims to identify the issues faced by users[4]. At this stage, the data that has been collected is usedto define the problem more clearly and understand the actual situation using the "how might we" approach.

*How might we*is a method used to explore as many ideas as possible solutions to a problem or challengefaced? This approach encourages teams to think creatively and ask the question "How could we...?"to come up with various possible solutions [7]. By using the How might we method, researchers can look at problems from various points of view and generate diverse ideas. This approach opens the door for innovative thinking and broadens the spectrum of solutions that can be considered [16]. The way the How Might We method works is by turning statements into questions [17]. This methodhelps in identifying the information needed from each solution to the problem and formulating steps for solving the solution to be built. Here is anexample of using how we might:

A. Manual public services are quite time- consuming, so services are less effective.
- *How*: How to make public services more effective?
- *Might*: Creating an application designthat functions to perform public services.

B. Requires an application design to make it easier to find public service information.
- *How*: How do you make an application design that can make it easier for users?
- *Might*: Create a user-friendly application design to make it easier for users to find information about public services in the district

C. Requires a user interface design on the APPIKapplication that provides complete features
- *How*: How to design complete features?
- *Might*: Create features according to the needs of public services.

3. Idea

At the Ideate stage, solutions are put forward involving evaluation and researcher creativity. In this study, these solutions are embodied in drawings using a low-design framework. An example of the resulting UI/UX design results is shown at the Ideate stage before making the final design layout.

Figure 2. Wireframes (Source: Ulva 2023)

4. Prototype

The prototype acts as the main guide and reference in the application simulation design process. In this stage, the developer uses the previously created prototype as a basis for designing and developing a suitable user interface.

a. Front page

The front page, which is also known as the home page or landing page, is the initial page that appears when a user accesses a website. This page is designed with the aim of giving users an overview of the content, purpose, and value offered by the website.
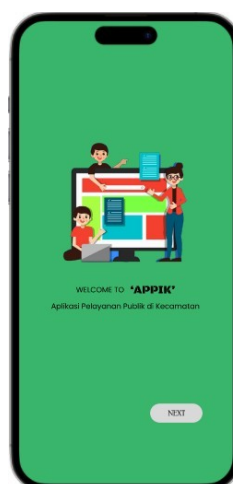
Figure 3 Application start page (Source : Ulva 2023)

b. Login page and account registration

This login page serves to verify the user'sidentity before granting user activity access. The account registration page is the address used to allow new users to create an account or register intothe system or application.

Login Registration

Figure 4 login and registration page (Source : Ulva 2023)

c. Home page

The home page is used to present an overviewof the content and purpose of the application. Whatkind of information is contained in this APPIK application? Apart from the description, the home page also displays the main features available in theapplication. Users will clearly know what features are provided, such as the ability to manage data, access to up-to-date information, interaction with other users, or other special features that can help users achieve their goals.

The aim of the home page is to provide users with a thorough understanding of what they can expect from the APPIK application. By presentingcomprehensive and clear information, the homepage helps users understand the value and benefitsoffered by the application so that they can make theright decision and get the most out of theapplication.
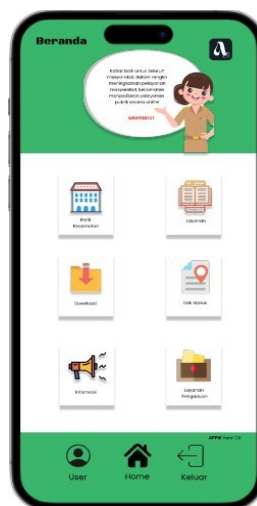
Figure 5 Home page (Source: Ulva 2023)

d. Profile Page
    This profile page contains sub-district information in the form of sub-district heads, the history of the sub-district, and content in the form of news about the sub-district

Figure 6 Profile page (Source: Ulva 2023)

e. Service Page
    This service page contains public services provided by the sub-district to the community, providing access to the community to access various public services provided by the sub-district.Through this page, people have the ability to make multiple types of letters or obtain other public services more quickly and efficiently.
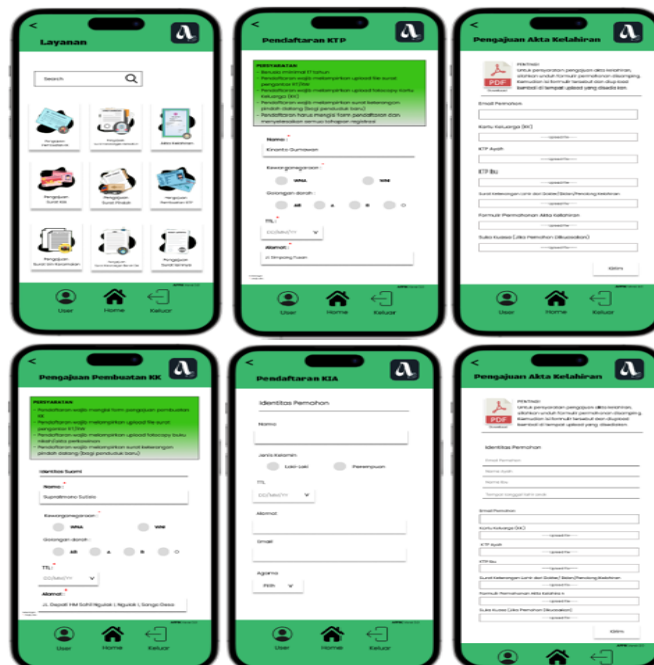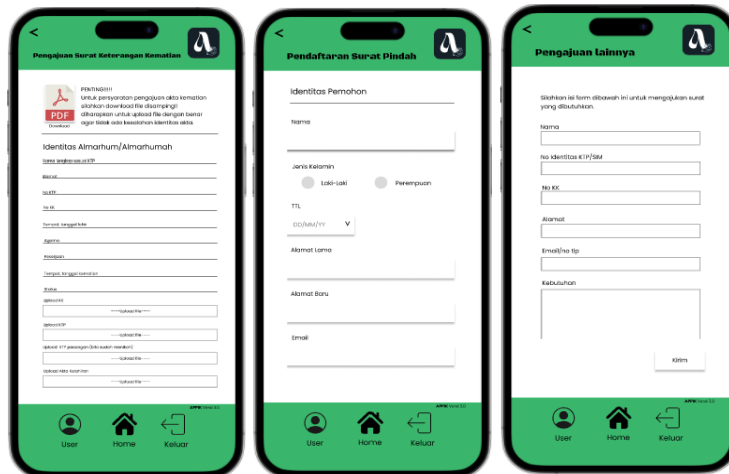
Figure 7 Public service page (Source: Ulva 2023)

f. Downloads page

The download page is used to download the letters that have been made.

Figure 8 Download page (Source: Ulva 2023)

g. Status Check Page

This status check page is used for users to see how far the submitted letter has been processed.
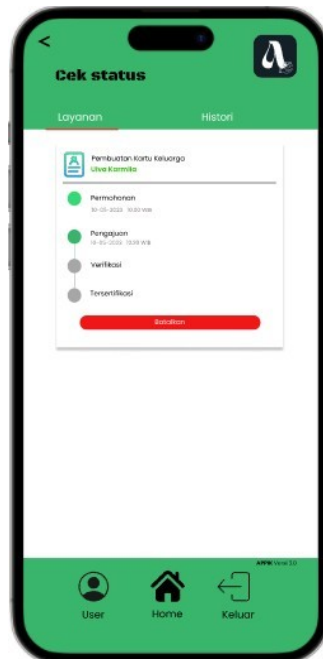
Figure 9 page status check (Source: Ulva 2023)

h. Information page
The information page in the sub-district functions as an information resource that contains various information related to the activities and services available in it. This page is designed to provide easy and complete access for residents andvisitors to the sub-district to find the information they need. On the sub-district information page, users can find various types of information related to activities and services in the area.

Figure 10 pages of information (Source: Ulva 2023)

5. Testing

The last stage is testing and improving the solution that is made. The solutions created must be tested and evaluated to ensure that the solutions created meet user needs and achieve the desired goals. The testing used in this research is usability testing. The test was carried out by distributing questionnaires to 30 respondents.

Table 1 Testing using Usability Testing

Scenario	Expectedresults	Results obtained
The user registers an account to log into the system	The account was created successfully and can be used to loginto the system	Succeed
The use enters the username and password according to the account previously created to log into the system.	The user successfully logs into the system using the username and password from the previously created account	Succeed
The user enters the username and password according to the account previously created to log into the system.	The user successfully logs into the system using the usernameand passwordfrom the previously created account.	Succeed
Users click Navigation buttons and menus in the application	The navigation buttons and menus in the system function properly	Succeed
The user fills out the form on the complaint report menu and sends the complaint report.	The user canfill in the form in the complaint report menu, and the completed complaint report can besent.	Succeed
The user fills out the form on the menus on the service page and uploads the required files, and Sends the desired letter submission data according to the selected service menu.	The forms inthe menus on the servicepage can be adequately filled, and the required filescan be uploaded, andsubmissions of letters following theselected service menucan be sent.	Succeed
The user records a photo in the KTP Submission menu by taking a selfie photo.	The photo recording feature in theKTP submission service menufunctions properly andmanages to take a photo of the user.	Succeed
The user makes a video recording in the KTP application menu by recording the user	The video recording feature in the KTP submission service menu functions properly and manages to record user videos	Succeed

Table 2. First Scenario Testing Results

	Respondent	Result
Scenario 1	Respondent 1	✓
	Respondent 2	✓
	Respondent 3	✓
	Respondent 4	✗
	Respondent 5	✗
	Respondent 6	✓
	Respondent 7	✓
	Respondent 8	✗
	Respondent 9	✓
	Respondent 10	✓
	Respondent 11	✓
	Respondent 12	✓
	Respondent 13	✗
	Respondent 14	✓
	Respondent 15	✓
	Respondent 16	✓
	Respondent 17	✓
	Respondent 18	✗
	Respondent 19	✓
	Respondents 20	✓
	Respondent 21	✓
	Respondent 22	✗
	Respondent 23	✓
	Respondent 24	✗
	Respondents 25	✓
	Respondent 26	✓
	Respondent 27	✓
	Respondent 28	✓
	Respondent 29	✓
	Respondents 30	✓

Table 2 displays the results of testing scenario 1 of 30 respondents. Obtained 23 respondents who succeeded in scenario 1 and 7 respondents who experienced failure,

Table 3 Results of the Second Scenario Test

	Respondent	Result
Scenario 2	Respondent 1	✓
	Respondent 2	✗
	Respondent 3	✓
	Respondent 4	✓
	Respondent 5	✓
	Respondent 6	✗
	Respondent 7	✓
	Respondent 8	✗
	Respondent 9	✓
	Respondent 10	✓
	Respondent 11	✓
	Respondent 12	✓
	Respondent 13	✓
	Respondent 14	✗
	Respondent 15	✗
	Respondent 16	✓
	Respondent 17	✓
	Respondent 18	✓
	Respondent 19	✓
	Respondents 20	✓
	Respondent 21	✗
	Respondent 22	✓
	Respondent 23	✓

	Respondent 24	✓
	Respondents 25	✓
	Respondent 26	✓
	Respondent 27	✓
	Respondent 28	✓
	Respondent 29	✓
	Respondents 30	✓

Table 3 displays the results of testing scenario 2 of 30 respondents with a description of 6 respondents who failed and 24 other respondents who succeeded.

Table 4. Results of the Third Scenario Test

	Respondent 1	✓
	Respondent 2	✓
	Respondent 3	✓
	Respondent 4	✓
	Respondent 5	✓
	Respondent 6	✓
	Respondent 7	✗
	Respondent 8	✓
	Respondent 9	✗
	Respondent 10	✓
	Respondent 11	✓
	Respondent 12	✓
	Respondent 13	✓
	Respondent 14	✓
	Respondent 15	✗
	Respondent 16	✓
Scenario 3	Respondent 17	✗
	Respondent 18	✓
	Respondent 19	✓
	Respondents 20	✗
	Respondent 21	✓
	Respondent 22	✓
	Respondent 23	✓
	Respondent 24	✓
	Respondents 25	✓
	Respondent 26	✓
	Respondent 27	✓
	Respondent 28	✓
	Respondent 29	✓
	Respondents 30	✓

Table 4 shows that testing scenario 3 out of 30 respondents displays the results, namely 25 respondents who succeeded and five respondents who failed.

Table 5 Results of the Fourth Scenario Test

	Respondent 1	✗
	Respondent 2	✗
	Respondent 3	✓
	Respondent 4	✗
	Respondent 5	✓
Scenario 4	Respondent 6	✓
	Respondent 7	✓
	Respondent 8	✓
	Respondent 9	✓
	Respondent 10	✓
	Respondent 11	✓

	Respondent 12	✓
	Respondent 13	✓
	Respondent 14	✗
	Respondent 15	✗
	Respondent 16	✓
	Respondent 17	✓
	Respondent 18	✓
	Respondent 19	✓
	Respondents 20	✓
	Respondent 21	✗
	Respondent 22	✓
	Respondent 23	✓
	Respondent 24	✓
	Respondents 25	✓
	Respondent 26	✓
	Respondent 27	✗
	Respondent 28	✓
	Respondent 29	✗
	Respondents 30	✗

Table 5 shows the results of testing scenario 4 outof 30 respondents, namely 9 respondents who failedand 21 who succeeded.

Table 6. Fifth Scenario Testing Results

	Respondent 1	✓
	Respondent 2	✓
	Respondent 3	✓
	Respondent 4	✓
	Respondent 5	✓
	Respondent 6	✗
	Respondent 7	✗
	Respondent 8	✗
	Respondent 9	✓
	Respondent 10	✗
	Respondent 11	✓
	Respondent 12	✓
	Respondent 13	✓
	Respondent 14	✓
	Respondent 15	✗
	Respondent 16	✓
Scenario 5	Respondent 17	✓
	Respondent 18	✓
	Respondent 19	✗
	Respondents 20	✓
	Respondent 21	✓
	Respondent 22	✓
	Respondent 23	✓
	Respondent 24	✓
	Respondents 25	✗
	Respondent 26	✗
	Respondent 27	✓
	Respondent 28	✓
	Respondent 29	✓
	Respondents 30	✓

Table 6 displays the results of testing scenario 5 out of 30 respondents, namely 22 respondents whowere successful and 8 who failed.

Table 7 Results of the Sixth Scenario Test

	Respondent 1	✓
	Respondent 2	✓
	Respondent 3	✓
	Respondent 4	✓
	Respondent 5	✓
	Respondent 6	✓
	Respondent 7	✓
	Respondent 8	✓
	Respondent 9	✓
	Respondent 10	✓
	Respondent 11	✓
	Respondent 12	✓
	Respondent 13	✓
	Respondent 14	✗
	Respondent 15	✓
	Respondent 16	✓
Scenario 6	Respondent 17	✗
	Respondent 18	✗
	Respondent 19	✗
	Respondents 20	✓
	Respondent 21	✓
	Respondent 22	✗
	Respondent 23	✗
	Respondent 24	✓
	Respondents 25	✓
	Respondent 26	✓
	Respondent 27	✓
	Respondent 28	✓
	Respondent 29	✓
	Respondents 30	✓

Table 7 shows the results of testing scenario 6 out of 30 respondents, namely 24 respondents who succeeded and 6 who failed.

Table 8 Results of the Seventh Scenario Test

	Respondent 1	✓
	Respondent 2	✓
	Respondent 3	✓
	Respondent 4	✗
	Respondent 5	✓
	Respondent 6	✓
	Respondent 7	✓
	Respondent 8	✗
	Respondent 9	✓
	Respondent 10	✓
	Respondent 11	✓
	Respondent 12	✓
	Respondent 13	✓
	Respondent 14	✓
Scenario 7	Respondent 15	✓
	Respondent 16	✓
	Respondent 17	✗
	Respondent 18	✗
	Respondent 19	✓
	Respondents 20	✓
	Respondent 21	✓
	Respondent 22	✓
	Respondent 23	✓
	Respondent 24	✓
	Respondents 25	✓
	Respondent 26	✓

Respondent 27		✓
Respondent 28		✓
Respondent 29		✓
Respondents 30		✓

Table 8 shows the results of testing scenario 7 outof 30 respondents, namely 26 respondents who succeeded and 4 who failed.

CONCLUSION

Applying the Design Thinking approach in designapplications can make it easier to develop user interface plans that suit user needs, such as making an application that aims to improve the process of public services in the sub-district. By applying the Design Thinking approach, researchers can find exemplary user interface design through a process ofexploration, gathering insights, and a deep understanding of user needs and expectations.

By applying *design Thinking*, planning, and implementation of public service, websites can be more responsive to user needs, thereby increasing the efficiency and quality of services provided. This approach allows the team to see problems from the user's perspective and create relevant and practical solutions.

CLOSING

By implementing the APPIK application, the community can get easier and faster access to sub- district public services. Information about variousbenefits, procedures, and requirements can be conveyed through the application, making it easier forthe public to obtain the services they need.

However, further research is needed to identify and address potential deficiencies or challenges that may arise in the implementation of the APPIK application. This research can dig deeper into user experience, application effectiveness, and aspects of system security that need attention.

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