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UI/UX Design Using the Design Thinking Method in the Development of a New Student Registration Information System Website at Raudhatul Athfal (RA) Qurrotul 'Uyun

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ABSTRACT

This research aims to design User Interface (UI) and User Experience (UX) for website-based student registration at Raudhatul Athfal (RA) Qurrotul 'Uyun using design thinking method. In the face of educational development and the need for technological innovation, the use of technology in school administration activities is crucial to improve efficiency. This research highlights the problems faced by Raudhatul Athfal Qurrotul 'Uyun, namely the use of manual forms and Google Forms in Registration, which have the potential to result in filling errors and difficult data management. The design thinking method is applied through the stages of empathize, define, ideate, prototype, and testing. Interviews were conducted with prospective student guardians, solution ideas were collected, and a UI design was created to illustrate user flow. The prototype was tested through usability testing with the system usability scale, involving 12 respondents. The results showed that the UI and UX design of web-based student registration using figma tools with the design thinking method can be done at Raudhatul Athfal (RA) Qurrotul 'Uyun.

Introduction

The development of the times and information technology is currently growing rapidly (Nordhaus, 2021). The use of information system technology is not only applied in large institutions, but also begins to be needed in academic processing such as in kindergartens. Currently, new student admissions at RA Qurratul 'Uyun already use Google Form services, but do not have a more structured web-based system. With the unavailability of the information system, there are several registration processes that are less effective. The use of Google Form only helps in collecting initial data so that it is prone to errors and inconsistencies. The administration process is also less complex and there is no centralized platform to communicate with student guardians (Cheong & Nyaupane, 2022).

This system is designed to make it easier for schools and prospective students to carry out their activities. The system will include features that support more efficient and organized data management and communication. The registration method using this website can be done

by prospective students online and anywhere, which later the data will be stored in the school database. The school can also publish the latest news or announcements through the system so that it can be accessed easily.

With the design of this information system, it is hoped that schools and students can more easily conduct student admissions and registration, and can increase effectiveness in communication.

In designing a website-based UI/UX system for new student admissions at Raudhatul Athfal (RA) Qurrotul 'Uyun, there are several objectives to be achieved. First, creating a user interface (UI) that is intuitive and easy to use to simplify the process of registering new students for prospective parents. Second, designing an efficient user experience (UX) that makes it easier for administrative staff to manage and verify registration data. In addition, this design process will follow the stages of the Design Thinking method (Aryansyah et al., 2023), which includes the steps of Empathize, Define, Ideate, Prototype, and Test, to ensure that the resulting solution truly meets the needs and expectations of users.

Several studies have explored the implementation of user interface (UI) and user experience (UX) design in educational systems. Widoseno et al. (2023) examined the development of a web-based UI/UX system for student admissions at SMK Taruna Karya 1 Karawang, emphasizing the need for structured digital registration platforms. Similarly, Irfandi and Heroza (2023) proposed a Design Thinking approach to enhance the efficiency of the registration system at Madrasah Ibtidaiyah, addressing usability and accessibility issues. Additionally, Agam et al. (2024) developed a mobile-based UI/UX application using the Design Thinking method, demonstrating its effectiveness in improving user engagement and interaction. While these studies provide valuable insights, there remains a gap in implementing a structured and centralized web-based registration system specifically tailored for kindergartens.

Unlike previous research that mainly focuses on higher educational levels, this study aims to design a web-based UI/UX system specifically for kindergarten student admissions. The novelty of this research lies in its adaptation of the Design Thinking methodology to address the unique challenges faced by RA Qurrotul 'Uyun, such as parental accessibility, intuitive navigation, and efficient data management. By incorporating usability testing and user-centered design principles, this research ensures that the system effectively meets the needs of both administrators and prospective student guardians.

This research aims to, develop an intuitive and user-friendly UI/UX design for the online student registration system at RA Qurrotul 'Uyun. Implement the Design Thinking approach to improve usability and accessibility in the registration process. Conduct usability testing to evaluate the effectiveness of the designed system based on user feedback. Provide a structured digital platform to streamline student registration, reduce manual errors, and enhance administrative efficiency.

Method

Design thinking is a method that can solve challenges experienced by users (Foster, 2021; Ilham et al., 2021). This method is very concerned about what users experience and feel, wants or needs, therefore problem solving is really focused on users.

Meanwhile, according to Fariyanto, et al, design thinking in its stages is an iterative process where it starts to understand users, counter assumptions and redefine problems to find solutions that may not be immediately apparent from the start. The Design Thinking method was chosen because it provides a structured, flexible, and user-centered approach. This ensures that the solution produced in the design of a website-based UI/UX for new student admissions at Raudhatul Athfal (RA) Qurrotul 'Uyun is not only effective and efficient but also intuitive, secure, and able to meet the needs of all stakeholders. This approach helps to create an innovative and impactful system, improve user experience, and maximize efficiency and security in the registration process.

The method used in the research is the design thinking method or design thinking, in the design thinking stage there are 5 stages, namely empathize, define, ideate, prototype, and test. Can be seen in Figure 1 below: (Nisa, 2024)

Figure 1. five stages of design thinking source

Results and Discussion

Empathize Stage

The empathize stage, the goal is to understand the user's needs and what the user says, does and how the user thinks and feels which aims to gather enough observations so that it can actually start empathizing with the user and their perspective (Kenny et al., 2021; Lallemand et al., 2022).

This stage involves a lot of user research, such as conducting surveys, interviews, and observation sessions, so as to get a clear picture of who the users are and the challenges they face.

Before entering this stage, interviews were conducted by distributing questionnaires to prospective student guardians and conducting data collection observations (Firmansyah, 2018). At this stage, the researcher tries to empathize with the user, in this case, the prospective student guardian. Researchers empathize with users to understand what they feel, think, do so that researchers also feel so that a clear picture of what problems and challenges they face can be given. This stage uses empathy maps and user personas as tools for empathizing.

Empathy map is a tool to empathize with users by visualizing user attitudes and behaviors. Empathy map is divided into 4 quadrants namely Says, Thinks, Does and Feel. Empathy map can capture and reflect one user or several users at once (Aggregated empathy map). Empathize (Gauvin, 2024).

Empathy maps can be obtained from qualitative inputs such as interviews, field studies and qualitative surveys or asking open-ended questions. Two empathy maps were created from the results of the questionnaire with prospective homeroom students, namely the empathy maps of Isnan Adam and Erika Emli. The following is an image of the empathy map that has been made.

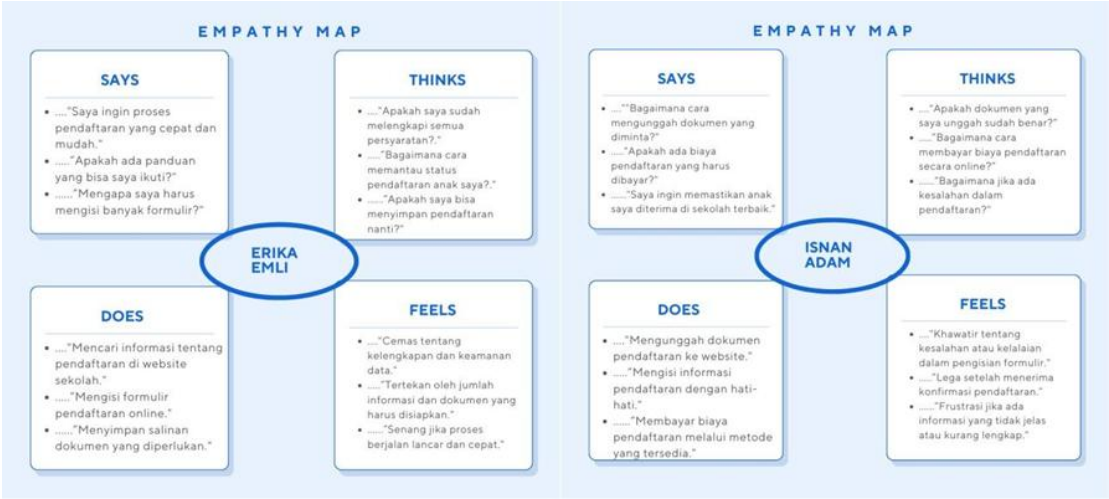

Figure 2. Empathy Map

Define Stage

This stage is the stage where problems and user needs are determined. This stage can also use the data obtained in the empathy stage to gain insight.

1. **User Persona**

   Furthermore, a user persona is created which contains the name of the persona, the persona's biography (education, occupation, background, age and so on), what expectations or goals the user wants, the problems faced by the user and a brief description of the persona. Researchers created 2 user personas. The user persona is 2 representatives of prospective student guardians. The following is a picture of the user persona that has been created.

Figure 3. User Persona Calon Wali Murid 1

Figure 4. User Persona Calon Wali Murid 2

2. **Pain Point**

Pain points identify the main problems of potential website users to minimize their difficulties. This process aims to increase user satisfaction by creating a website that meets their needs.

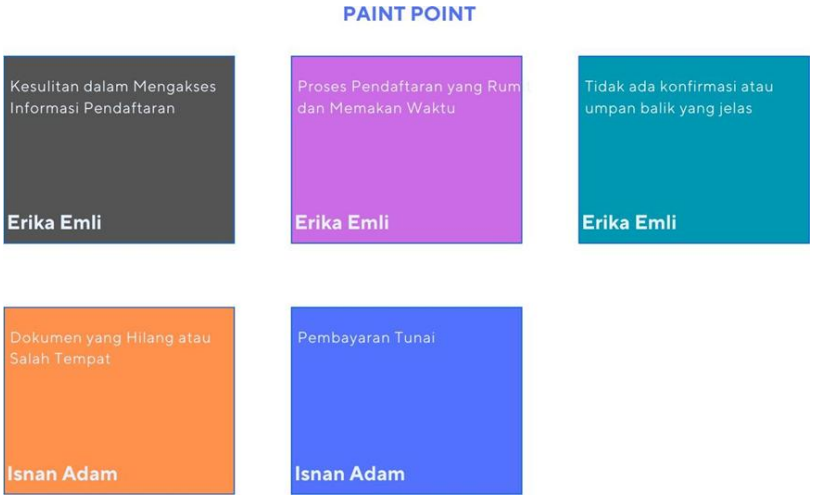

Figure 5. Poin Poin

3. **How Might We**

This step aims to formulate creative solutions by starting from the user's problem, then developing How Might We questions as ideation guides. This approach encourages the identification of innovative solutions.

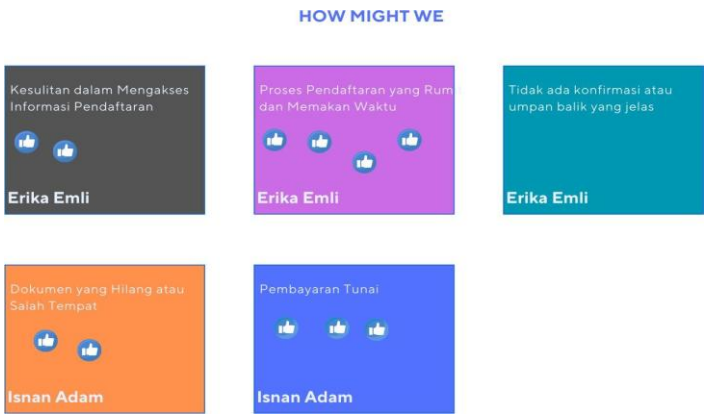

Figure 6. How Might We

Ideate Stage

The Ideate stage is the process of developing ideas or brainstorming to generate solutions to problems that have been identified in the previous stage. This process determines the main ideas that are most appropriate to meet user needs.

The main features designed as a solution include:

- **High priority, low effort**: Provide clear and structured information on the website.
- **High priority, high effort**:
    1. Create a simple and easy-to-fill registration form.
    2. Create a user dashboard to monitor registration status.
- **Low priority, low effort**: Provide payment options via transfer.
- **Low priority, high effort**: Create a digital document upload feature to facilitate document collection.

Prototype Stage

Prototype stage is the initial process of creating user interface (UI) and user experience (UX) to implement the ideas that have been collected. This prototype is designed using the Figma application and aims to identify errors early with the fail fast principle. The prototype display image can be seen in the following Figure.

Flow 1 : PPDB TK QURROTUL UYUN

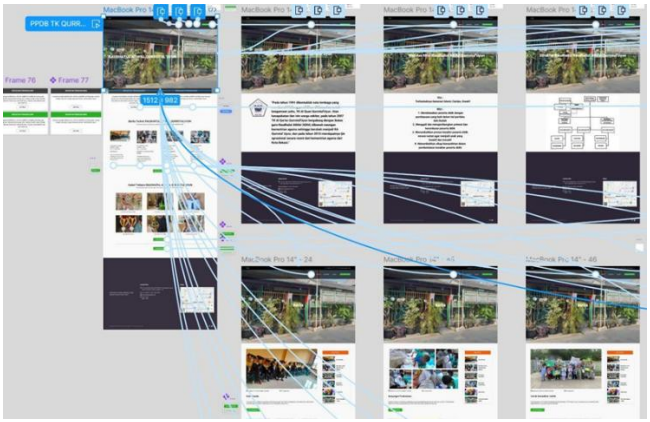

Figure 7. prototype flow 1 (1)

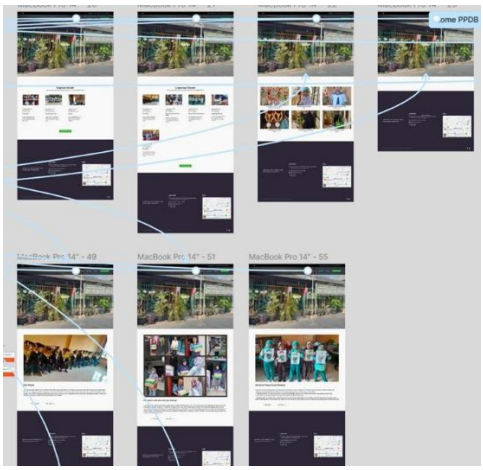

Figure 8. prototype flow 1 (2)

- Flow 2: Home PPDB

Figure 9. prototype flow 2

• Flow 3 & 4 : Daftar akun user dan login user

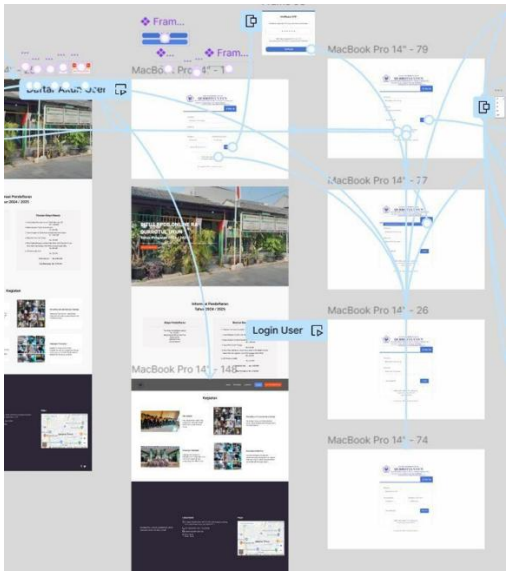

Figure10. prototype flow 3&4

• Flow 5: Login administrator

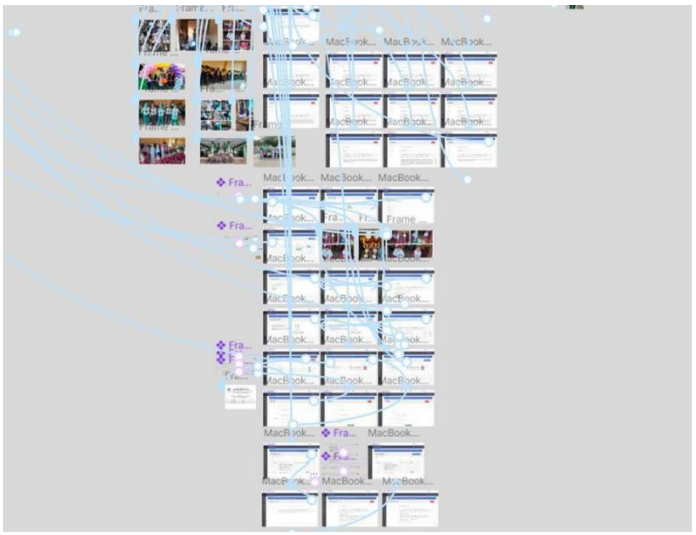

Figure 11. prototype flow 5

• Flow 6: Dashboard setelah mengisi form data formulir dan pembayaran

Figure 12. prototypr flow 6

Testing Stage

The final stage of this research is testing, which is the stage after all designs are made and then experiments are carried out to validate the solution of the design that has been made. The testing process is a trial on the prototype that has been made by experimenting with users.

Usability Testing is one category of methods in usability evaluation that is used to evaluate a product by testing it directly on users.

The first step taken in usability testing is to give a number of tasks that have been prepared beforehand to users when interacting with the system being tested (Firdaus & Zakiah, 2021). These tasks were given to 12 respondents who came from class 12.4A.05 students so that they no longer experienced difficulties when performing these tasks. According to Sastramihardja et al (2008) in (Rahadi, 2014) (Pratistha et al., 2023), these tasks are used as a means of interaction in usability measurement.

Table 1. Task means of interaction in usability measurement

NO	TASK / ASSIGNMENT
1.	Open the PPDB website and pay attention to the page that contains complete information about the school, schedule, and fees.
2.	Go to the PPDB-Online 2024 page.
3.	Click Register Now to create an account.

4.	Click Login, then enter your username and password to open the registrar dashboard
5.	Click Add Data button to fill in the registration form
6.	Input the exact data of the child who wants to register at RA Qurrotul 'Uyun.
7.	Select the payment menu then click Add Data
8.	Input account data and proof of transfer

Testing Process:

1. Respondents completed 10 tasks, such as opening the website, filling out forms, and making payments.
2. After the task is completed, respondents fill out a Likert Scale-based usability questionnaire (1-5) covering aspect:
    - System (interface, color, and navigation).
    - User (ease of reading and recognizing menus).
    - Interaction (information accessibility and security).

Table 2. Usability Testing Result

No.	Inquiry	Usability Aspect				
		SS	S	CS	TS	STS
System Aspect						
1	Is the website interface RA Qurratul Uyun PPDB website is easy to recognize?	41.7%	41.7%	16.7%	-	-
2	Is it easy to operate the PPDB website of RA Qurratul Uyun?	33.3%	41.7%	25%	-	-
3	Is the color display on the website RA Qurratul Uyun PPDBA website is comfortable to look at and not boring?	25%	58.3%	16.7%	-	-
User Aspect						
4	Is the menu display easy to recognize?	41.7%	41.7%	16.7%	-	-
5	Is it easy to find information on the PPDB website of RA Qurratul Uyun?	41.7%	41.7%	16.7%	-	-
6	Is it easy to read the existing text?	25%	58.3%	16.7%	-	-
7	Are the images and icon symbols easy to understand?	33.3%	33.3%	33.3%	-	-
Interaction Aspect						
8	Is the information offered easy to access?	41.7%	50%	8.3%	-	-
9	Are the functions offered in accordance with the purpose of the RA Qurratul Uyun PPDB website?	41.7%	41.7%	16.7%	-	-
10	Are the available payment transactions easy to access?	16.7%	58.3%	25%	-	-
11	Is the security of the RA Qurratul Uyun PPDB website guaranteed?	16.7%	50%	25%	8.3%	-
12	Is the menu and website display easy to remember?	33.3%	58.3%	8.3%	-	-

Table 3. rekap nilai Usability Testing

No	Inquiry	Value
	System Aspect	
1	Is the interface of RA Qurratul Uyun PPDB website easy to recognize?	4.25
2	Is it easy to operate the RA Qurratul Uyun PPDB website?	4.08
3	Is the color display on the PPDBA RA Qurratul Uyun website comfortable to look at and not boring?	4.08
	User Aspect	
4	Is the menu display easy to recognize?	4.25
5	Is it easy to find information on the RA Qurratul Uyun PPDB website?	4.25
6	Is it easy to read the existing text?	4.08
7	Are the images and icon symbols easy to understand?	3.92
	Interaction Aspect	
8	Is the information offered easy to access?	4.42
9	Are the functions offered in accordance with the purpose of the RA Qurratul Uyun PPDB website?	4.25
10	Is the security of RA Qurratul Uyun's PPDB website guaranteed?	4.25
11	Is the security of the RA Qurratul Uyun PPDB website guaranteed?	3.75
12	Is the menu and website display easy to remember?	4.25

Based on the average results of the questionnaire given to 12 respondents, the following is a detailed explanation of the five usability attributes:

1. Interface is Easy to Recognize (Average: 4.25)

The value of 4.25 shows that the majority of respondents feel that the interface (appearance) of the PPDB website of RA Qurratul Uyun is easy to recognize. This means: a.The website design is clear and intuitive.

b. Users can easily identify and understand the elements on the web page without feeling confused.

2. Easy to Operate (Average: 4.08)

With an average score of 4.08, this means that most respondents agree that this website is easy to use. This includes: a. Navigation is clear and easy to understand. b. There are no significant difficulties in accessing various features and services on the website.

3. Comfortable Color Display (Average: 4.08)

The value of 4.08 on the color display indicates that users feel comfortable with the color combination used. This means: a. The colors chosen do not make the eyes tired. b. The appearance of the web page is not boring and pleasant to look at for a long time.

4. Easy to Recognize Menu (Average: 4.25)

The average score of 4.25 indicates that the menu on the website is easy for respondents to recognize and use. This means: a. Users can quickly find the menus and options they need. b. The menu structure is logical and in line with user expectations.

5. Finding Information is Easy (Average: 4.25)

With an average score of 4.25, it can be concluded that the information sought by users is easy to find. This means: a. The placement of information on the website is appropriate and logical. b. Users do not need much effort to find the information they need.

6. Easy to Read Text (Average: 4.08)

The average score of 4.08 indicates that the text on the website is easy to read by users. This means: a. The size and type of font used are appropriate and comfortable for the eyes. b. The contrast between the text and the background is clear enough.

7. Images and Symbols are Easy to Understand (Average: 3.92)

With a score of 3.92, although still classified as good, this is the lowest scoring attribute. This means: a. Images and symbols are generally easy to understand, but there are some that may not be immediately obvious to some users. b. Some users may take longer to understand some of the symbols or icons used.

8. Accessible Information (Average: 4.42)

The highest score in this aspect indicates that the information on the website is very easy to access by users. This means: a. The information structure on the website is very good. b. Users can find and access information quickly.

9. Functions Fit for Purpose (Average: 4.25)

A score of 4.25 indicates that the features and functions offered on the website are in accordance with the user's needs and objectives. This means: a. The functions provided are relevant to what users expect. b. There are no useless or confusing features.

10. Easy Payment Transactions (Average: 4.25)

A score of 4.25 indicates that the payment transaction process on the website is considered easy by most users. This means: a. The payment process is clear and straightforward. b. The instructions for making payments are easy to follow.

11. Website Security (Average: 3.75)

The value of 3.75 shows that most respondents feel that the security of the PPDB website of RA Qurratul Uyun is quite guaranteed, but there are some who feel less confident. This means: a. Security is good enough, but there is still room for improvement so that all users feel completely safe. b. Some users may need more information regarding the security measures implemented.

12. Easy to Remember Menu and Display (Average: 4.25)

A score of 4.25 indicates that the majority of respondents feel that the menu and appearance of the website are easy to remember. This means: a. The website design helps users remember the menu layout and functions. b. A consistent and intuitive look helps users to return to the website without feeling confused.

Main Results:

- The average *usability* for each aspect ranged from 3.92 - 4.42, showing positive results with most users finding it easy to use the system.
- Highest aspect: Ease of information access (4.42).
- Lowest aspect: Understanding of images and symbols (3.92).

Recommendation:

- Improve system security to increase user trust.

- Optimize images and symbols to make them more intuitive for all users.

This process ensures the prototype meets user needs before further implementation.

Conclusion

Based on the results of the writing and research that has been carried out, the following conclusions can be obtained: The prototype that was built can run well and is as needed. Student Admission*Website* at Raudhatul Athfal Qurrotul 'Uyun can be run in a browser and in accordance with the prototype. From the results of testing the *website*, the *website* is in accordance with the needs.

The suggestions that want to be conveyed in order to make this website better and for further development are as follows: Conduct regular usage testing to get feedback from users and find out which parts need to be improved. Use a more sophisticated notification system, such as notification via email, so that prospective student guardians do not miss important information. Hold training sessions and introductions for prospective guardians so that they are more familiar with the online registration system, thus reducing confusion and making more people want to use the system.

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