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UI/UX Prototyping for Mobile Legends Quick Application through The Design Thinking Method (Case Study: Mobile Legends E-Sport)

M. Ikmal Fathona Hasibuan, Dadang Setiawan, & Dana Sulistyo Kusumo

Faculty of Informatics, Telkom University, Bandung, Indonesia

Abstract

Designing user interface prototyping and user experience aims to manage access to information easily for the e-sport game of Mobile Legends users. The application prototype contains match schedules, players, e-sport teams, match highlights, match analysis, and others. The reason is that when the users want to get such information, they must find it from various media without any data being immediately available. It is the appropriate way to develop a Mobile Legends Quick prototype application. The prototyping process in creating mobile applications uses the stages in design thinking method stages of *Empathize, Define, Ideate, Prototype,* and *Test.* The scope of these goals preferably has a user-centered approach and user satisfaction to solve relevant problems and create new innovations. The results of the tests carried out on making prototype application have been tested using The System Usability Scale (SUS) and obtained a result of 85,35%, with the acceptable category and excellent grade from the SUS score acquisition.

Keywords: e-sport, mobile legends, user interface, user experience, design thinking

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1. Introduction

In recent years, the name e-sport has appeared in the world. E-sport means an abbreviation of Electronic Sport. The term of E-sports was first introduced by Stanford University at Stanford Artificial Intelligence Lab California on October 19, 1972, as a site providing the PDP-10. It is a computer device that was used at that time. The game played on is Spacewar with a tournament entitled " Intergalactic Spacewar Olympics" (Spacewar, n.d.). During this time, e-sports has become a promising industry because almost every country in the world has an e-sports team and an audience in cyberspace that continues to increase its popularity. E-sport team is the manager of amateur players or professional e-sports athletes consisting of Indonesian, foreign and amateur professional (Pengurus Besar Esport Indonesia, 2021). Global game development companies have started making various games, ranging from Battle Royale Games, Multiplayer Online Battle Arena (MOBA), First Person Shooter (FPS), Real Time Strategy (RTS), and so on. This is evidenced by holding e-sports game tournaments from regional, national, and international levels. One of the games with most fans in Indonesia is Mobile Legends (Gura & Gura, 2018; Lehtonen et al., 2022).

Mobile legends is a MOBA game released by the Moonton company from China which can be played on IOS and Android devices. This game has become very popular in Southeast Asia to the world and has a large ecosystem in Indonesia. The statistical data obtained from the Mobile Legends researchers mentioned that there are 43 million users in Southeast Asia, almost 50% of the total are from Indonesia (Sunarto, S. A., Wulandari, C., & Hartanto, 2019). This game has a big tournament, named Mobile Legends: Bang Bang Professional League (MPL) and M Series organized by Mobile Legends. Through this tournament, e-sports teams in Indonesia, as well as spectators and supporters for these teams, began to exist.

Each team has a different match schedule and also the final results are presented in the form of percentage on the official Instagram social media organizer of the tournament. When the tournament is held, the e-sport team will announce the players and line up of their team who are ready to compete in each match. The players who are removed or farewell as well as player transfers are uploaded on the official social media account of the Instagram e-sport team. When the match

* Corresponding author.
E-mail address: hasibuanikmaal@student.telkomuniversity.ac.id

will take place, the match organizer will display a live stream on YouTube social media and display the game or gameplay of each team. It aims to make the fans can watch it through online. After the match organizer issues the percentages and statistics of the game, the accumulation of gameplay will be visualized in the form of a diagram based on kills, deaths, assists, and player performance after the match takes place and the analysis of the tournament will explain the results of the analysis.

In explaining this point, the parties concerned will provide information about the results that will be displayed. As a result, when the people want to see this information, they have to open it on the Instagram platform and scroll several uploaded information. On YouTube, the specific analysis of the analysis appears at the end of the game. When viewing the statistics diagram, people must check the YouTube video track record without any live data. This is what causes the process of accessing applications to be inefficient or more difficult, requiring the people to open several application tasks one by one.

The research was conducted to create an application prototype that could access all of these problems just by opening one application without the help of other platforms. The purpose of this research is to make a mobile application prototyping called “Mobile Legends Quick” to view information from every e-sport activity, with handling in the form of creating applications that are easy to access. In designing the application, research will be carried out by creating a user interface and user experience through the design thinking method. The concept of this method is used to think practically but creatively in dealing the big problems (Faste, 1979). Focus on design thinking preferably a user-centered and human- centric approach to solving relevant problems and creating new innovations.

Based on the explanation of the background described, the formulation of the problem explains how to design the Mobile Legends Quick application through the design thinking method.

The limitations of the problem in this study include designed only for the manufacture of Mobile Legends Quick prototype applications and the data used only for fans/supporters of the Mobile Legends e-sport game.

Based on the formulation of the problem, it can be determined that the objectives of the research is to design the development of the Mobile Legends Quick prototype application through the design thinking method and find out the results of the usability test by calculating the system usability scale (SUS) of the Mobile Legends prototype e-sport application.

2. Research Methods

2.1. User Interfaces

The use of the interface is created with a series of graphics that are easily understood by the users about the system, conceptual and physical (Satzinger, J. W., Jackson, R. B., & Burd, 2019). User Interface (UI) refers to an interactive computer system that can communicate with users (Sauro, J., & Lewis, 2012). It is also defined as program output so that the screen will display input from its users (Myers, 1995). Several experts mentioned that the definition of a user interface is in the effectiveness of the display in the use of tools, appearance, and comfort of each graphic element to interact with the interface system.

2.2. User Experience

User experience has an analysis of the layers of user experience from a cognitive psychologist's point of view, by classifying user experience into visceral, behavioral, and reflective (Norman, 1999)In building experience, it is important to consider every possible user action and understand the user expectations in each process. It may sound like a complex task, but by addressing these challenges, one can assemble the elements and components to understand the problem (Garrett, 2011)better. User experience means interaction with an interface display through user experience. It also has the steps that are carried out to provide a sense of comfort and ease of use when interacting through the system.

2.3. Usability

There are several definitions that create system capabilities in meeting user needs by assessing learnability, efficiency, memorability, error, and satisfaction (World Leaders in Research-Based User Experience, n.d.). The level of product processing defines usability to achieve more effective, efficient, and satisfying goals within the scope of its users (International Organization for Standardization, 2010). Usability is related to the benefits that are obtained every time you interact with a computer easily according to the user's experience with a level of subjective satisfaction. Learnability aims measure flexibility with simple tasks when encountering a design. Meanwhile, efficiency measures the level of

time when studying a design, memorability about assigning knowledge within a specified period of time with the ability to remember the placement of a fixed menu, error evaluating every mistake made by the user, and satisfaction about measuring whether the response that consumers expect can be fulfilled.

2.4. Multi Platforms of Social Media

Generally, the user community utilizes the internet, especially on social media, to interact online, such as Instagram, YouTube, Facebook, TikTok, etc. One of them is an Instagram application which is used to share information and communication in the form of photos, pictures, and videos as image formation or branding (Safrianto Muhammad, Jumaiddin La Ode, 2018). Youtube livestream is used to create multiple live videos when the uploader has registered and is in charge of his channel on Youtube and the number of viewers will change over time (Karine Pires, 2022). The developments that have taken place in the e-sports market have been supported by the existence of an online live-streaming platform (Dan Cryan, 2014). In the current situation, social media is necessary for e-sport tournaments to display information and can be seen by e-sport fans.

2.5. E-sport Mobile Legends

Online games are a collection of machines that require a network connection to be played by many users (Adam & Rollings, 2007)Mobile Legends is a kind of MOBA game released by the Moonton company which is played online. In this game, the users must need ten players divided into two teams to battle. This game describes the situation during the war so that it is such being in a game to defeat opponents when getting a victory that aims to rank up in the game (Rani et al., 2020). Having high game enthusiasts made Moonton create an official tournament, many parties created their own e-sport team.

2.6. Design Thinking

Design thinking is an approach to experience filled with emotional, aesthetic, and every behavior that interacts with the values of social life (Hartson & Pyla, 2012). By applying a design methodology to humans, it is able to produce process innovations that are relatively small but have a very large impact (Brown, 2008). This method consists of several stages to achieve a result in the form of user information, which is created based on user needs, brainstorming, building a representation of each existing solution, and testing the results of the representation to get feedback. At the stages of the design thinking process, there are different versions, basically having the same principle, namely providing an overview of the stages of creating more innovative designs based on specific human needs problems and producing solutions that can be implemented. Design thinking also has several manufacturing experiments, such as sketching, prototyping, testing, and utilizing effective concepts and ideas. Several stages of design thinking from Stanford d.school can be seen as follows:

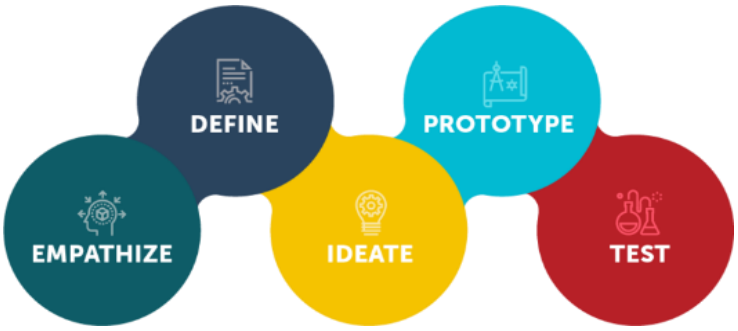

Figure 1. Design Thinking Phase

2.6.1. Empathize

The early stages of building applications using this method have an introduction to the user by finding out every problem, what is needed, and the desire of the user to find out about the complaints of the user. By distributing questionnaires and interviews through face-to-face meetings with observation objects, such as seeing how users are so excited about following developments in Mobile Legends games, and having to draw on their experiences to themselves, the developers can draw conclusions that are applied to the application.

2.6.2. Define

The define stage is the stage after finding the problem at the empathize stage. Finding the problem makes problem processing into one focus to get an understanding regarding the specific user and the design space for this problem from the designer's point of view. Then, continued by processing on the designer about what is suitable when added to the application design, such as icons and the function of each element.

2.6.3. Ideate

This stage is explained as the result of the idea about the process of empathizing and defining before Ideate becomes one of the stages of determining solutions and brainstorming ideas. This stage is an alternative way when doing designs to generate many varied ideas. The scope of these ideas includes capturing every step towards innovation, where the research results from this observation aims to obtain creative and innovative ideas. The solution involves the brainstorming process, and the outcomes of all ideas are then described in the form of mind map.

Now Wow How Matrix method is used so that these ideas can be divided into three quadrants (Siang & Dam, 2019), as follows :

a) Now: is implementing an idea without having to see it as new
b) Wow: innovatively implemented idea
c) How: is an idea that will be next implemented.

2.6.4. Prototype

The design of the system created is applied to the prototype. In the prototyping process, the people also have to go through the steps that were built before forming a display, including wireframes, mock-ups, and finally the application prototype. This process aims to quickly identify and rectify errors and rebuild quickly to determine goals or change shapes or patterns to the design. This stage represents the transformation into a concrete model from the previous stage to test, iterate, and validate ideas. The outcome is the creation of a user flow for application usage that can be interacted with, and the development of a prototype using the Figma application.

2.6.5. Test

The definition of a system usability scale is a questionnaire given to the users, which aims to get an assessment of perceived usefulness (Lewis, 2018). System usability scale (SUS) as much as 43% helps in the post-study questionnaire used in industry (Sauro & Lewis, 2009).

2.7. Prototypes

The prototype is a mock-up designed by the developer in the form of an application. This situation makes the user presented with information needs according to the user's expectation (Revell, 1991). In the prototyping process, it is made as quickly as possible to get feedback so that after seeing the errors that have occurred, the prototype system can be repaired quickly without worry and need a long time in the process.

2.8. User Flow

User Flow is the first step to the end carried out by the user on a task being done. User flow is designed for the needs of the user so that it makes the user comfortable in carrying out tasks (User flow, n.d.). In this case, user flow is used for how the user performs a task so that they can find out every step of completing the task.

3. Results

The implementation of the method in this problem requires design and accumulation of each data obtained, design thinking has a pattern to think analytically and empathize with something that is observed to give a solution, one of the stages that is owned is empathize with an approach to the user to generate an effective solution. Literature review is required as the reinforcement in relevant theories.

3.1. Design Thinking

Design Thinking is a method that can provide solutions to problem cases in various fields, the problem to be solved here is about how to build a Mobile Legends quick application that can meet the needs and desires of the users. Several of these steps are applied to this application, as follows.

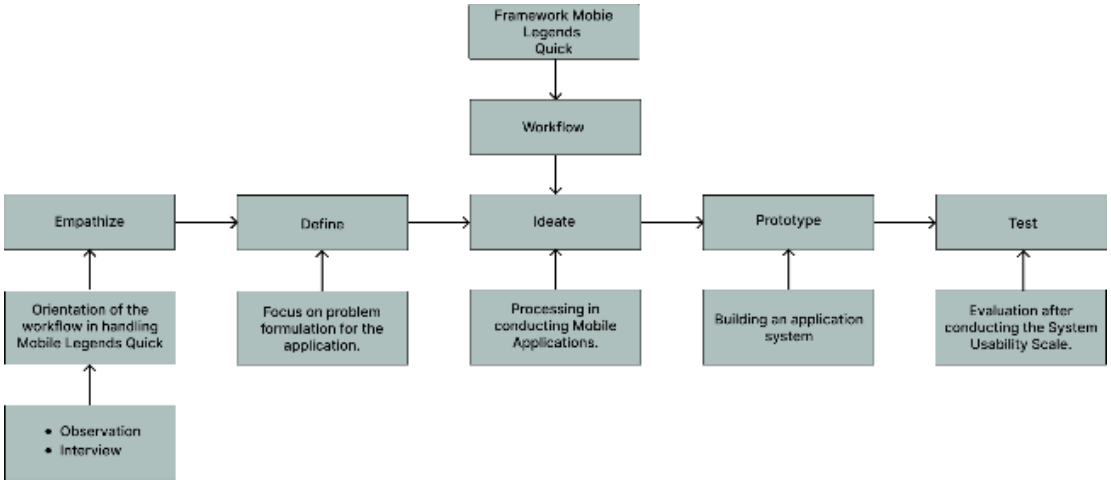

Figure 2. Diagram of Design Thinking for Mobile Application Development

3.2. Empathize

This includes observational studies by interviewing and distributing questionnaires to several sources, both directly and indirectly, who have been selected with those who are competent in the field of Mobile Legends *e-sport.* As a result, the main problem is obtained which is a reference for making application designs in this study. This observation was held to find out the process in *e-sport* games and was studied as a support for making the features used in the application. The questionnaire stage was carried out to obtain strong results for mobile applications that match the needs of Mobile Legends *e-sport.*

After that, it is followed by creating an empathy map to understand a picture of what is in the mind, motivations, and feelings of the person. There are six ways: hear, think and feel, see, say and do, pain, and gain. The results are seen in the Table 1.

Table 1. Empathy Map Table

No	Empathy maps	Description
1	Hear	Lack of management of the *e-sport* system Not efficient when obtaining information
2	Think and feel	The need for special media in handling Mobile Legends *e-sport* I want to get the live score feature in a running match I want a mobile application to view tournament information
3	See	Differences in platform handling the issues of Mobile Legends *e-sport* There are still incomplete platforms in delivering information
4	Say and do	The need for mobile applications to become a container in the problem Management with Mobile Legends game
5	Pain	I don't always have time to watch live at the venue I find it difficult to see the match highlights
6	Gain	The importance of creating a system in managing Mobile Legends *e-sport* Provide real and accurate data

3.3. Define

The results of the obtained data are then organized according to user qualifications by creating a user persona. The information listed when the user persona is created is an overview of the persona's photos, demographics, and persona biographies, persona's needs and desires, challenges faced by the persona experiences, and the persona's goals. The results of this information qualification have been made into consumer user personas as described in the following figure. After getting the problems that have been defined from observations and interviews, the technique of point of view is applied, as referenced in (User flow, n.d.)

a. Define the problem

Definition process has a point of view that has been referred to from the empathize section**.**

Table 2. Point of view of the problem definition of the respondents

Users	Need	Insights
First responder	*e-sport* information provider application media	a user wants accurate information data
Second respondent	ease of managing mobile applications with a unique design	a user needs convenience in managing applications efficiently
Third respondent	requires gameplay analysis and match highlights	a user needs highlights from the best moment of the match

b. User personas

Producing three personas about personal data, goals, needs, and challenges. The persona is shown in the Figure 3.

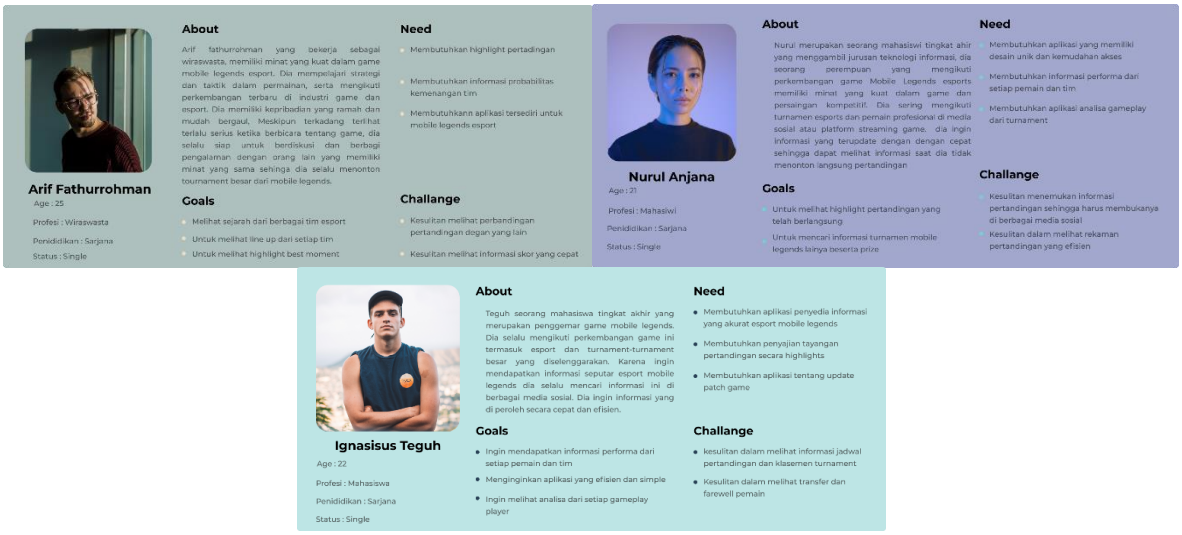

Figure 3. User Personas

3.4. Ideate

Here are some of the brainstorming results that were obtained from the results of the define stage which were made into a mind map tree shown on Figure 4.

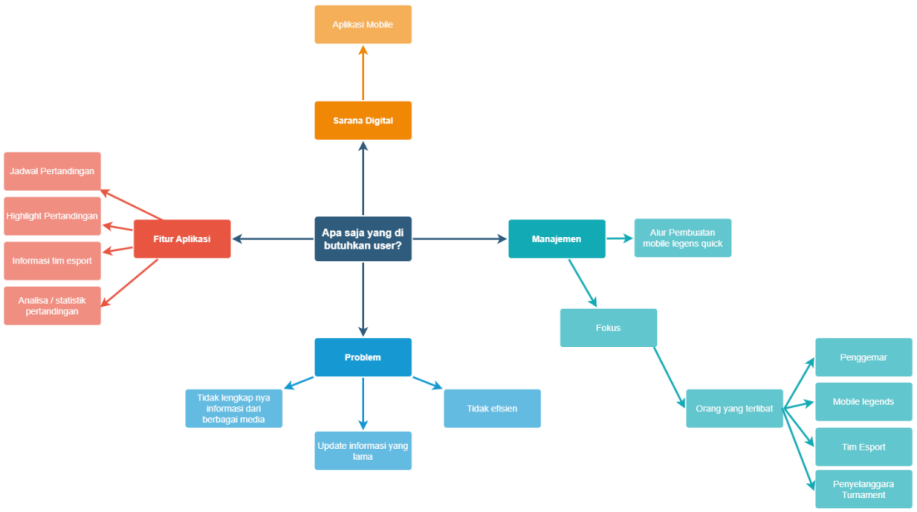

Figure 4. Mind Map Tree (in Indonesia)

In the mind map tree image, it has four user needs which are the main focus for making this application prototype, including:

a) Application Features

User needs are divided into four, formed in the application features: match schedules, match highlights, e-sport team information, and match analysis/statistics.

b) Digital Facilities

The digital advice needed is in the form of a mobile application.

c) Management

The management section has two needs: the quick and focused flow of making Mobile Legends.

d) Problem

From the problem section, there are three problems found in incomplete information from various media, updating long and inefficient information.

The figure 5 is the collection of observation results through the Now How Wow Matrix.

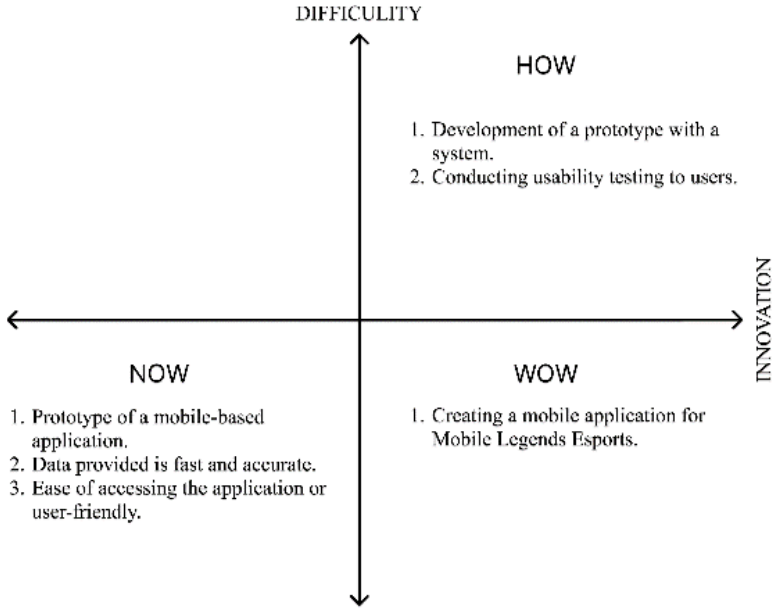

Figure 5. Now How Wow Matrix

3.5. Prototype

3.5.1. User flows

At this stage, it is shown how a user can enter the application through the stages that have been made to enter the home page (Figure 6).

The next stage, the application begins with the home view and is displayed with several available features (Figure 7).

3.5.2. Wireframes

Wireframe is a subtle display of the development of an application prototype to make it easier to work on (Figure 8).

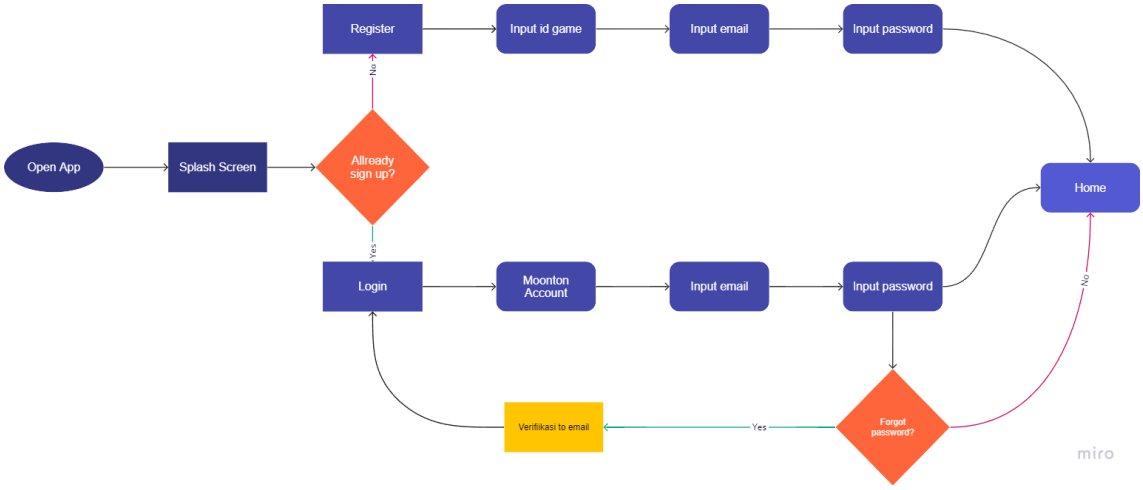

Figure 6. User flow login into the application

Figure 7. User Flow of Match Schedule, E-sport Team, Match Highlights, and Match Analysis

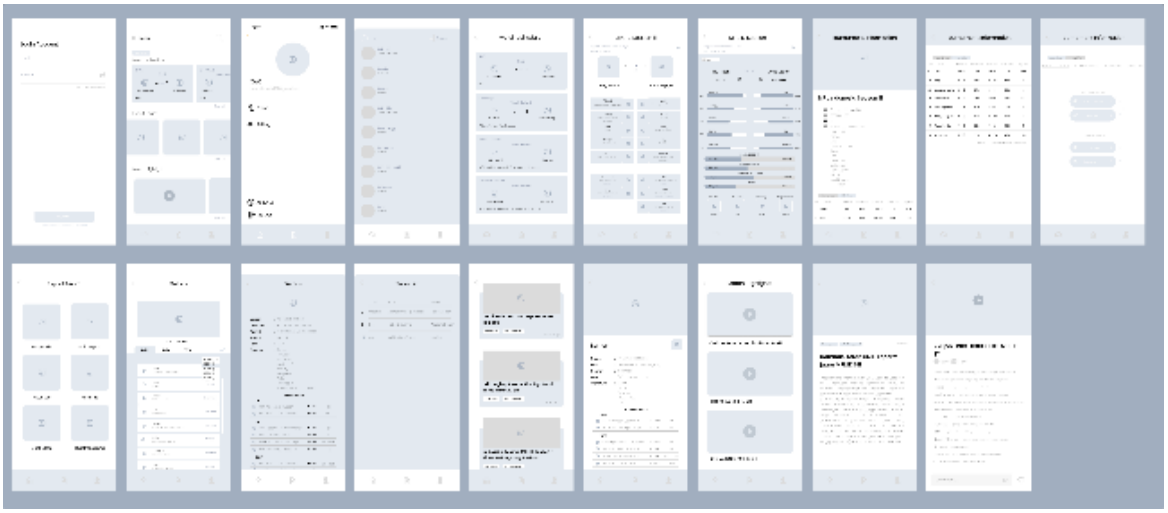

Figure 8. Mobile Legends Quick Wireframe Application

3.5.3. Mock-ups

Mock up is a visual representation of the appearance and layout of the elements in the product used by the interface display in this prototype application.

Figure 9. Prototype of the Mobile Legends Quick Application

3.6. Test

Each question has a scale from 1 – 5, including 1 "strongly disagree" to 5 "strongly agree" with the odd numbers having positive questions and even numbers having negative questions. The following is a table of the following system usability scale. These results generate feedback for prototype design.

Table 3. System Usability Scale Questions

No	Questions	Scale
1	I often use this application	1-5
2	I find it difficult to use this application	
3	I find it easier to use this application	
4	I need people to use this application	
5	I feel the application features work properly	
6	I rate the consistency of this application	
7	I find it easy for others to use this app	
8	I find this application confusing	
9	I feel when using this application, there are no problems	

4. Discussion

4.1. Test results

In this section, usability testing of the prototype was conducted with 7 respondents by providing a Maze link to prototype testing. Respondents are Mobile Legends players who always follow developments in Mobile Legends *e-sport* using the system usability scale method. Scenario tasks can be seen in Table 4.

After conducting prototype testing, the obtaining scores using the System Usability Scale (SUS) can be observed. The results of calculations from seven respondents have obtained the value of SUS by calculating each odd question is reduced by 1, while the even questions are reduced by 5. After doing the subtraction, the results of the odd and even questions are added up and multiplied by 2.5. From the data obtained, the calculation result is 85.35%, which means that this achievement shows if the system under study has a very good usability level and provides concrete evidence of effectiveness and high quality. Therefore, these results have a positive impact and contribute which is significant in improving user experience and satisfaction in accordance with the flow of the Mobile Legends Quick prototype application that has been made.

Table 4. Task Scenarios

User Tasks	Goals
Login feature	Users can enter the Mobile Legends Quick application
Search feature	Users can search for player, tournament, and *e-sport* team information
Match schedule feature	Users can see a list of matches from several *e-sport* teams, match times, what tournaments they are participating in, and what day the matches are.
E-sports team match feature	The user can get information on who is the list of players competing in the match along with the role of each player and has a detail match information icon section.
Tournaments feature	Users can find out details about the tournament organizer, including the name, venue, date, door prize, tier tournament, sponsorship, and the result button icon to see the standings and playoffs.
Teams *e-sports* feature	Users can view the list of players who competed in various tournaments per season, historical information icons from the *e-sport* team, and player transfers.
News feature	Users can see the latest news about what happened to Mobile Legends *e-sport.*
Match highlights feature	Users can see the best moment impressions from each match.

Table 5. Results Respondents

No	Name	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Score
1	Arya Safa Maulana	5	2	4	1	5	1	4	1	5	2	90
2	Moch Baiz Kamarulredzuan	5	3	4	3	4	3	4	3	4	2	67,5
3	Martin Hutapea	4	3	4	3	5	2	3	2	5	4	67,5
4	Ignasius Teguh Raharjo Rubiyo	5	1	5	1	5	1	5	1	5	2	97,5
5	Nazar Azmi	5	1	5	3	4	2	4	1	5	3	82,5
6	Arif Fathurohman	5	1	5	3	5	1	5	1	5	1	95
7	Akmal Abdullah	5	1	5	1	5	1	5	1	5	2	97,5
Average												85,35

4.2. Analysis of test results

This research aims to ensure that the UI/UX prototype design for the Mobile Legends Quick application has met the needs and resolved the prioritized problems by carrying out the testing process. By testing the prototype on seven respondents and getting the results of observations on making the application design progressed well according to the scenario stages that have been made, the results show that making a prototype can help respondents to complete all of the task points properly.

From the results that have been tested, it helps to facilitate fans of Mobile Legends *e-sport* at various levels to manage the application as evidenced by the results of validation using the SUS method. The prototype Mobile Legends Quick application gets a score of 85,35% in Table 5. This value is included in the grade B or Excellent category. The UI/UX prototype for the Mobile Legend Quick application with the design thinking method (case study: Mobile Legends *e-sport*) meets the eligibility category of acceptable.

5. Conclusion

After completing the entire series of research, the conclusions obtained are as follows:

a. This research resulted in a prototype design of the Mobile Legends Quick application developed using the design thinking method which has features that are tailored to the needs and has been tested using the usability method.

b. Based on the usability test by calculating the system usability scale (SUS) contained in Table 5, the SUS value is 85,35%. The results of these calculations show that the prototype design meets the acceptable requirements in the usability testing assessment.

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