



Developing a Web-Based Basketball Court Booking Application (Baszone) Using Design Thinking

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Abstract: This study designs Baszone, a web-based basketball court booking application developed through design thinking methodology. As basketball participation increases, manual reservation processes create significant obstacles for users and administrators. The research employed interviews with field administrators at DC Basketball in Denpasar, Bali, to identify operational challenges and user needs. Design thinking was implemented across five stages: empathize, define, ideate, prototype, and test. During empathize, interviews revealed booking difficulties including time-consuming manual processes and schedule conflicts. The define stage established user personas representing target audience characteristics. Ideate produced storyboards visualizing application workflows. Prototype development utilized Figma to create high-fidelity interface designs. Testing involved potential users evaluating the application through System Usability Scale (SUS) methodology. Results demonstrate that Baszone significantly enhances booking efficiency and accessibility. The application provides real-time field availability, streamlined reservation processes, and transparent payment management. SUS testing yielded a score of 92, indicating excellent usability performance. Respondents reported satisfaction with operational simplicity, optimal functionality, and comfortable interaction patterns. Baszone successfully addresses manual booking limitations while meeting user expectations for modern sports facility management systems.

Keywords: Website; Design Thinking; Basketball; Booking Application; Baszone.

1. Introduction

Exercise today is no longer just a way to improve physical health but has become a lifestyle choice for many people. The community's growing health consciousness presents opportunities for business people to manage sports venues professionally. However, obstacles occur in field rentals, namely the existence of peak hours where some customers cannot secure a slot when they want to book the field, and conflicting schedules where customers who routinely rent suddenly cancel without notice [1]. Exercise is fundamentally a need for every human being to maintain physical condition and health. Public awareness of sports importance makes people increasingly interested in visiting sports rental facilities. Managers who recognize the current situation allocate capital by competing to build and renovate venues. Sports field rental is one business sector that has developed considerably; knowing this, managers must create new breakthroughs to prevent customers from moving to other venues [5].

Along with increasing public interest in sports, especially basketball, the need for adequate playing facilities also grows. Standard and easily accessible basketball courts represent a significant need, particularly

in dense urban areas [2]. With information technology development, various business sectors have experienced substantial digitalization, including the sports facility rental industry. One increasingly popular innovation is field rental websites that facilitate the booking process for sports fields such as basketball courts. In modern times, applications prove helpful in applying for field leases. Applications are closely related to Information Systems, according to [3]. Web-based platforms enable users to access information about field availability, make reservations, and manage payments more efficiently and transparently.

In traditional systems, the field leasing process is usually done manually by phone or in person, which often causes inconvenience for both field owners and tenants [17]. These limitations result in difficulties in time management, irregular recording of reservations, and potential violations of rental schedules. Obstacles frequently found in manual ordering include customers required to come directly to make field orders, thus wasting time and energy. Customers are also sometimes constrained by field availability already booked by other customers because they must visit the field directly; this certainly disappoints customers. The obstacle experienced by field operators involves maintaining manual customer arrangement books prone to loss or damage [4].

The literature review used in this study covers UI/UX, wireframe, and prototype. Currently, technology and information development has been very rapid. The internet's existence has provided easy access to information. Technological advances are so closely related to daily activities that today almost everyone—children, teenagers, and adults—uses technology. Application design preparation is often done without user observation, which leads to errors. Often, design results after completion do not match user needs. Creating inappropriate designs can cause problems when using the application after completion. Creating application designs is necessary to generate ideas. User Interface (UI) design and User Experience (UX) design are crucial stages in software development [16]. User Interface (UI) is interface design that focuses on display aesthetics and good color selection, while User Experience (UX) is the process of increasing user satisfaction with a particular site or application through usability and pleasure provided in the interaction between users and products [6].

Several methods exist for solving user needs problems. This study uses the Design Thinking method in creating field rental web applications. Design Thinking is an approach method used as an innovation strategy in the design process and approaching users through the empathy process. Design Thinking serves as an analysis method through understanding user needs and focusing on form, relationships, behaviors, interactions, and human emotions to produce optimal solutions. There are five stages in the design thinking method: empathize, define, ideate, prototype, and test. By understanding these five stages in the design process, complex problems faced by users can be solved [7]. Based on research, UI/UX design can be done with various techniques and methods as demonstrated by [8] in "Design of the UI/UX Sales Application by Aligning Business Needs Using the Design Thinking Approach," which states that testing uses Usability Testing by giving four User Scenarios to each respondent to run and complete on the prototype.

Before proceeding to the prototype step, a wireframe must first be created. A wireframe is the initial framework before a website page or application interface is designed. Wireframes are an important stage in product design that must be understood well. Wireframes represent a crucial stage before stakeholders approve information placement for the application before user interface design is created [9]. In this study, the wireframe is designed specifically to suit online court booking websites with features that will facilitate users in ordering basketball courts. After that, prototype creation begins.

A prototype is a visual representation of the system to be built, allowing users and developers to understand and interact with the proposed concept before actual implementation [18]. The prototype process is carried out with Figma software. Figma is a web-based graphic design application that allows users to create interactive User Interface (UI) and User Experience (UX) designs. The application is very popular among UI/UX designers due to its ability to enable real-time collaboration and provide features that simplify the design process [19]. Additionally, Figma has advantages in ease of use and accessibility because it can be accessed through a web browser without needing to download the application first [20]. One of Figma's advantages is its ability to enable real-time team collaboration, making it easier for design teams to work together on a single project and speeding up the design process. Furthermore, Figma provides features that facilitate the design process, such as prototyping features and component features that allow users to create consistent and efficient designs [21]. Basically, Figma is one tool that can help in creating wireframes and prototypes [10].

Therefore, a field rental website represents an effective solution to overcome these problems by offering more modern features, such as real-time schedule integration, online payment method options, and an intuitive user interface. With this platform, tenants can book fields according to their needs without the hassle of coming in person, while field owners can optimize field management with a more organized reservation system. This research aims to design and develop a field rental website that provides convenience for users and improves operational efficiency for field owners. The research focuses on the system's design aspects, main functions, and benefits resulting from field rental web implementation.

2. Related Work

Research on sports facility booking systems and UI/UX design has been explored through various approaches and methodologies by several scholars. M.G.S and Dinata (2020) developed an online booking website for sports facilities that enables digital reservation processes [1]. Similar work by Sinaga, Sucipto, and Muhaqiqin (2021) focused on mobile-based online booking systems for Bandar Lampung Sport Center [4]. Hidayat, Satriansyah, and Nurhayati (2022) applied the Waterfall method in building a sports field rental application [5], while Iskandar and Suwandi (2024) created a business plan for basketball court rental through the "Basket Kita" application, demonstrating the potential of digitalization in the sports industry [2].

Akbar, Usman, and Budiman (2023) worked on UI/UX design for a website-based selfcare startup application [6]. Soedewi, Mustikawan, and Swasty (2022) implemented Design Thinking method on KiriHuci MSME website design, proving its effectiveness in understanding user needs [7]. Angelina, Sutomo, and Nurcahyawati (2022) used Design Thinking approach to align business requirements in sales application UI/UX design [8]. Yudhanto, Susilo, and Sulandari (2022) applied Design Thinking method in developing company profile web UI/UX that resulted in user-centered design [21]. Hartawan (2022) utilized User Centered Design (UCD) on wireframe design for movie synopsis application [9]. SURIANTO *et al.* (2023) conducted Figma training for information system prototype design, showing the significance of modern tools in the design process [10]. Santoso (2024) implemented UI/UX concepts and techniques in web layout design using Figma [19], while Kimseng *et al.* (2024) developed Figma-based UI/UX with inclusive design approach [20]. Ariyana, Susanti, and Haryani (2022) designed storyboards for interactive multimedia-based applications [12], and Sinsuw and Najooan (2013) created academic information system application prototypes on Android devices [13].

Ghufron, Kusuma, and Fauzan (2020) employed User Persona to evaluate and improve user expectations in academic information system requirements [11]. Ardhana (2022) evaluated e-learning usability using System Usability Scale (SUS) [14], as did Kurniawan, Nofriadi, and Nata (2022) who applied SUS in measuring study program website usability [15]. Chan and Honey (2022) conducted an integrative review on user perceptions regarding acceptability and usability of mobile mental health applications [16]. Sandesara *et al.* (2022) performed a pilot survey on mobile application design and experience that provided valuable insights for application development [18]. These studies demonstrate that developing sports facility booking systems requires integration between robust system functionality and user-friendly UI/UX design, along with thorough usability evaluation to ensure user satisfaction.

3. Research Method

This study employs the design thinking method to solve problems and design relevant innovations for basketball court booking, making it easier for users to order basketball courts online. This method is recognized as a holistic thinking approach to creating solutions. The following are the stages in the design thinking method.

1) Empathize

Empathize is the first stage conducted through an in-depth interview process with several respondents from their closest circles and surrounding environment. The interview aims to gather information regarding obstacles or factors that cause difficulties in booking a court. The results help the author find solutions for designing the UI/UX of the Baszone application. A direct interview was conducted with a basketball coach who also works as a basketball court administrator at DC Basketball in Denpasar, Bali. The interview focused on the difficulties of finding or ordering a basketball court that suits consumer needs. Table 1 presents the list of interview questions for respondents.

Table 1. List of Interview Questions

No	Questions
1.	How is the basketball field booking process at DC Basketball?
2.	What are some obstacles that customers often face when ordering the field?
3.	What are your expectations for the field rental system in the future?

2) Define

Based on the empathize stage results, the define stage involves analyzing and determining problems that need to be solved in the UI/UX design of the Baszone online basketball court booking application. At this stage, a user persona will be created to describe the needs and challenges faced by users. A user persona is a combined representation of several users summarized into a single fictitious character, obtained from interview or survey results. The purpose of creating this user persona is to understand the characteristics, concerns, and needs of the users.

3) Ideate

The ideate stage involves brainstorming sessions to explore user needs and generate several ideas and solutions. This stage aims to produce innovative ideas and solutions to problems analyzed at the define stage, and to select the best solution among various available options. User needs serve as a reference in determining solution priorities. At this stage, a storyboard will be created to describe ideas or solutions in the form of a storyline. A storyboard is a series of images or sketches arranged in order to illustrate the sequence of events, mapping from one scene to another, and helping understand the use of the Baszone application.

4) Prototype

Ideas and solutions obtained from the ideate stage will be realized at the prototype stage in the form of high-fidelity prototypes. This phase focuses on developing solutions to address previously identified problems. Through this process, the author will gain a deeper understanding of how users will behave, think, and feel when interacting with the final product. The purpose of this prototype stage is to produce an interface design of the Baszone application.

5) Testing

The final stage of the design thinking method is testing the prototype that has been created. In this study, testing will be carried out by involving potential users and using the System Usability Scale (SUS) method to evaluate usability and user experience. The purpose of this usability test is to measure the extent to which the application can meet user needs, which serves as an indicator of the application's acceptance by the public. This testing is necessary to assess the application's ease of use and whether the user interface design meets requirements. For usability testing, the System Usability Scale (SUS) is used. Each question in SUS has 5 answer options, each assigned a score ranging from 1 (strongly disagree) to 5 (strongly agree). The score results are then calculated using the formula described below, which will produce an average score for each respondent. This average SUS score indicates how well the application is developed in terms of usability. Table 2 shows the range of answers on the SUS questionnaire.

Table 2. Questionnaire Answer Range

Answer	Score
Strongly Disagree (STS)	1
Disagree (TS)	2
Neutral (N)	3
Agree (S)	4
Strongly Agree (SS)	5

$$\bar{x} = \frac{\sum x}{n}$$

Where:

\bar{x} = Average score

$\sum x$ = Sum of SUS scores

n = Number of respondents

The Design Thinking method was chosen because this approach prioritizes direct user involvement in every stage, from problem identification to solution testing. Design Thinking allows for more flexible iteration and development of solutions. This method ensures that the final application will truly meet user needs and expectations, as every design decision is based on direct input from users. Through the testing process with the System Usability Scale (SUS), the quality of the application interface can be assessed and necessary improvements can be made to enhance user experience.

4. Result and Discussion

4.1 Results

4.1.1 Empathize

The interview was conducted with Mr. Barra, a basketball coach who also serves as a court manager at DC Basketball, one of the well-known basketball courts in Denpasar, Bali. This interview aims to understand the problems in basketball court rental and find solutions to improve accessibility and ease of booking for consumers.

Question: "What is the process for booking basketball courts at DC Basketball?"

Mr. Barra explained that the process of booking a court at DC Basketball is still done manually. Prospective tenants usually have to come directly to the location to check field availability or make reservations by phone. "We have a schedule that is recorded in the books, but often customers don't know if the field is empty at the time they want," he said. He added that miscommunication errors often occurred, resulting in some customers arriving and finding that the field was already occupied. This shows the urgent need for more efficient systems, such as digital applications, that can provide real-time information on field availability. "If there is an application, customers can see the field schedule directly and make reservations without having to come here," said Mr. Barra.

Question: "What are some of the obstacles that customers often face when booking the field?"

Mr. Barra revealed that many customers have difficulty finding information related to the field. "Many don't know how to order or don't even know we're here. They usually only know by word of mouth," he said. He also noted that some customers who have already ordered often do not receive clear confirmation, causing confusion when they arrive. In addition, he noted problems related to rental rates. "There are times when customers feel that our rental prices are too high compared to other fields. However, we provide good facilities, such as lighting and cleanliness of the field. Sometimes, this problem arises just because of the lack of information about what they get from the price," he explained.

Question: "What are your expectations for the field leasing system in the future?"

Mr. Barra hopes that there will be a more modern and integrated system to overcome the problems that have been described. "I hope there is an application that can help us and our customers. For example, if customers can see the availability of the field directly, they can plan their playing schedule better," he said. He also suggested considering a review or rating feature in the application. "With feedback from customers, we can continue to improve our services. In addition, new customers can see what is expected of us based on the experience of others," he added. Mr. Barra also hopes that the application will provide an online ordering feature that makes it easier for customers to pay and get confirmation instantly. "This will not only make it easier for customers, but also reduce errors that may occur when we record orders manually," he said.

4.1.2 Define

The user needs were determined through user persona. User persona is used to identify or analyze the needs of users (clients). By using the user persona approach technique, it is expected to analyze and understand the problems of the client's abilities and shortcomings, as each person's ability standards are different. This research aims to create features and functions in software that are in accordance with the capabilities and behavior of user behavior [11]. Figure 1 presents the user persona in this study.

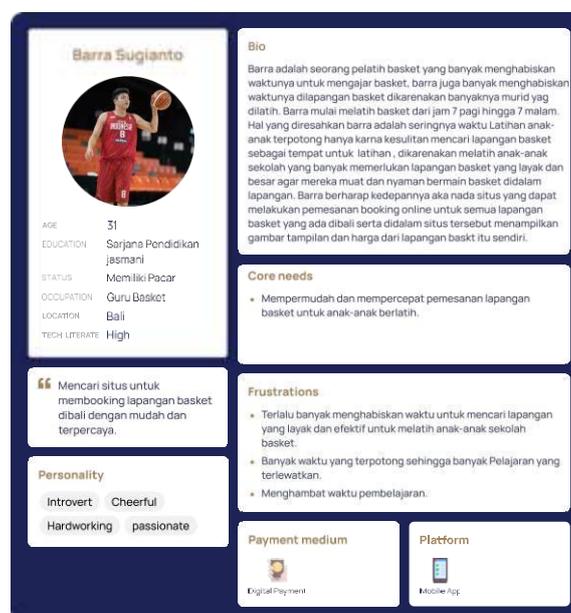


Figure 1. User Persona

4.1.3 Ideate

The next stage is brainstorming, where a storyboard is created. The storyboard contains the flow or sequence of the application concept to visualize in detail the application to be made. In this case, the Baszone

application will make it easier for users to book basketball courts online [12]. Figure 2 shows the results of the storyboard developed.



Figure 2. Storyboard

4.1.4 Prototype

The prototype creation stage is useful for preparing all system implementation activities in accordance with the predetermined design, in this case in the form of an application that can run on mobile devices such as Android [13]. The designed application design must align with user expectations and be efficient for developers so that they can identify problems or errors in the design and functionality of the application faster, allowing the problem to be fixed immediately before further development is carried out. Figure 3 presents the results of the prototype developed.

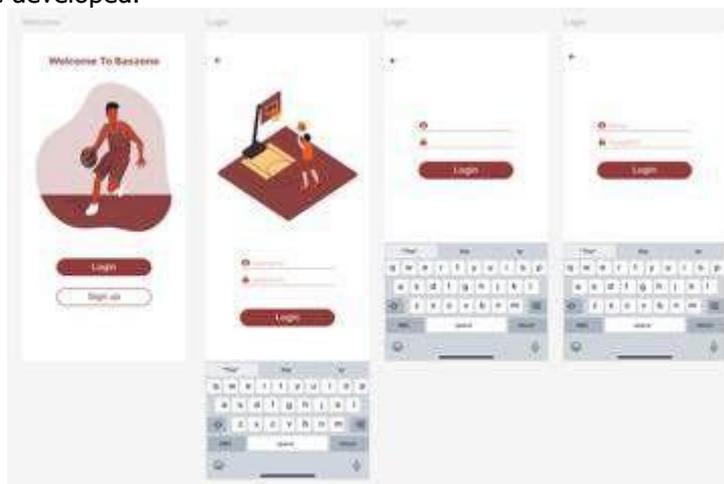


Figure 3. Prototype

4.1.5 Testing

In the final stage, testing was carried out by involving potential users and applying the System Usability Scale (SUS) method to evaluate usability and user experience. The SUS method goes through several stages of analysis, starting with the collection of data from the SUS questionnaire that has been filled out by the respondents. The preparation of the questionnaire is needed to find and collect data obtained from the questionnaire results. All data are analyzed and evaluated to be used as research results [14]. The SUS score is calculated for each respondent's outcome with a formula that involves subtracting the value on each statement. If the respondent's score is odd, then it is subtracted by 1, while if the respondent's score is even, it is subtracted by 5. The final score given by each respondent is obtained by adding the score from questions 1 to 10 for each respondent, then the result is multiplied by 2.5. The final score of the System Usability Scale (SUS) was obtained by taking the average of the total scores that had been calculated from all respondents. Understanding the results of the SUS score is carried out by referring to the predetermined assessment guidelines as seen in Figure 4.

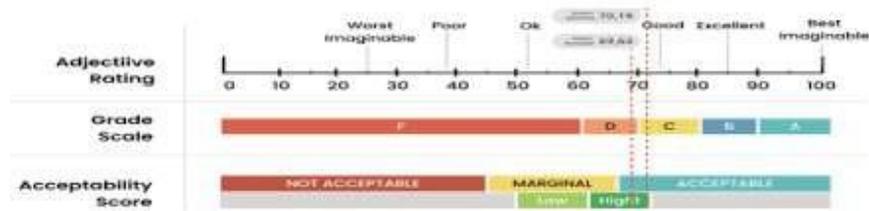


Figure 4. Guidelines for assessing SUS score results

The results of the questionnaire are then calculated with a predetermined formula to obtain a SUS Score [15]. The results of the SUS score assessment can be seen in Table 3.

Table 3. Results of SUS score calculation

No	Respondent	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Amount	Value (Total x 2.5)
1	Respondent 1	4	4	3	3	4	3	4	3	4	4	32	80
2	Respondent 2	4	3	4	4	3	3	4	4	4	4	37	92.5
3	Respondent 3	4	4	3	4	3	4	4	4	4	4	38	95
4	Respondent 4	4	4	3	4	4	4	4	4	3	3	37	92.5
5	Respondent 5	4	3	4	3	4	4	3	4	4	4	37	92.5
6	Respondent 6	4	3	4	4	4	4	4	3	3	3	36	90
7	Respondent	4	4	4	4	4	3	4	4	3	3	37	92.5
8	Respondent 8	4	4	3	4	3	4	4	4	3	4	37	92.5
9	Respondent 9	4	4	3	4	4	3	4	4	4	4	38	95
10	Respondent 10	4	4	4	4	4	3	4	4	4	4	39	97.5
Average Score Total												92	

4.2 Discussion

Based on the testing results, the Baszone application achieved an average SUS score of 92. This score indicates that the application has an excellent level of usability based on user opinions. Users are satisfied with the ease of operating the application, the functions that run optimally, and the comfort of interacting with the application. According to the SUS assessment guidelines, this application received a Grade A rating, demonstrating that the design and functionality meet user expectations effectively. The high score reflects successful implementation of the design thinking method, where user needs identified during the empathize stage were properly addressed through the define, ideate, prototype, and testing stages. The application successfully solves the manual booking problems identified at DC Basketball by providing real-time field availability, easy reservation processes, and instant confirmation features that users and field managers expected.

5. Conclusion

This research concludes that the development of a web-based basketball court booking application called Baszone is an effective solution to overcome problems in the manual court booking process. By applying the design thinking method, the research successfully designed an intuitive and user-friendly interface. This application not only provides convenience in field reservations but also increases transparency and efficiency in time management and payment. The usability test conducted shows a score of 92, indicating that this application meets user needs effectively. Therefore, it is expected to be widely implemented to improve the sports experience for the community.

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