Jurnal Info Sains : Informatika dan Sains
Volume 14 , Number 01, 2024, DOI 10.54209/infosains.v14i01
ESSN 2797-7889 (Online)
https://ejournal.seaninstitute.or.id/index.php/InfoSains

User Experience Optimization: A Usability Testing Approach to Application Development

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Article Info
Keywords:
User Experience Optimization,
Usability Testing,
Application Development,
System Usability Scale

ABSTRACT
A comprehensive approach to optimizing User Experience (UX) through the application of Usability Testing methods in application development. The research background discusses the importance of UX in the context of modern applications and how usability testing is the key to improving the quality of user experience. An in-depth literature review was conducted to understand the concept of usability testing and identify relevant current methods. The research methodology includes a research design that combines usability testing case studies on two different applications. The testing process involves collecting data from active users using various evaluation methods, such as observation, interviews, and performance measurement. Evaluation results are analyzed to identify aspects that require improvement, with a focus on improving key aspects of UX.

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INTRODUCTION

In the rapidly developing digital era, the use of applications has become an integral part of everyday life. The success of an application is not only determined by its functionality but also by the user experience (UX) offered. In an effort to achieve optimal UX, software developers are increasingly recognizing the need to integrate a user-focused approach from the start of the development process. One method that has proven effective in improving UX is Usability Testing [1]. Usability Testing is an approach that involves users in the application evaluation process to identify potential problems and ensure that the application can be used easily and effectively. This research discusses the importance of UX optimization in application development through the application of the Usability Testing method [2]. By understanding and applying these principles, it is hoped that the resulting application will not only meet the user's functional needs but also provide a satisfying experience. By understanding user needs, identifying potential problems, and improving the design based on findings from usability testing, developers can design applications that are more responsive to user expectations and needs. User experience (UX) plays a central role in the success of an application[3], UX includes emotional, psychological and interactional aspects between users and systems. Convenient and satisfying use of an application not only increases user acceptance but can also shape positive perceptions of the brand or

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platform[4]. Therefore, UX optimization is the main focus in modern application development.

Usability Testing has been recognized as an effective method for measuring and improving UX in application development[5]. This method involves users directly in the evaluation of the application, identifies potential problems in the design, and ensures that users can interact with the application easily. Through empirical testing, usability testing helps identify problems that may not be visible in internal development[6]. Apart from that, usability testing involves a series of steps, including test planning, developing test scenarios, collecting data through observations and verbal notes, and analyzing results. In the context of application development, usability testing provides direct insight into how users interact with the interface, the extent to which the application meets the user's goals, and where improvements can be implemented. As technology develops, usability testing methods continue to develop. The introduction of techniques such as remote usability testing and eye-tracking has broadened the scope of UX evaluation[7]. Implementing this technology allows developers to access a deeper understanding of user behavior and identify design elements that may have been overlooked.

The importance of integrating usability testing in the application development cycle has been widely recognized[8]. By implementing usability testing on an ongoing basis, developers can minimize the risk of design errors, improve UX quality, and save time and money in the long term. Despite its significant benefits, usability testing also faces a number of challenges, including selecting representative samples, developing effective test scenarios, and accurate interpretation of results[9]. Therefore, this article will not only outline the benefits of usability testing but will also explore solutions to overcome obstacles that may arise. By integrating these concepts, this research aims to provide deep insight into how usability testing can be optimized to achieve the goals of better application development and satisfying user experiences.

METHOD

The following are the research stages, starting from pre-implementation data collection to data analysis.

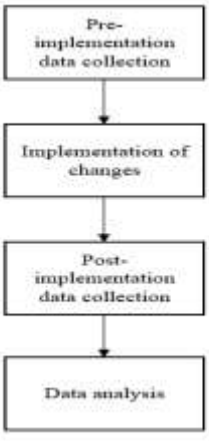

Figure 1. Research Stages

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1. Pre-Implementation Data Collection: Usability testing is carried out before implementing changes based on usability testing findings.
2. Implementation of Changes: Changes to the application are made based on usability testing findings.
3. Post-Implementation Data Collection: Usability testing is performed after implementing changes to evaluate UX changes.
4. Data Analysis: Quantitative and qualitative data will be analyzed using descriptive statistical methods and thematic analysis.

Research design

This research adopts a mixed-methods research design which combines quantitative and qualitative elements. This approach allows a more comprehensive understanding of the effectiveness of usability testing in application development.

Population and Sample

The study population includes potential users of the target application. The sample will be selected purposively to include a representative group of potential users with a variety of user backgrounds and experiences. A control group will also be selected to compare the results of usability testing with a situation without usability testing.

Research variable

There are two research variables, including:

a. Independent Variable: Implementation of usability testing in application development.
b. Dependent Variable: user UX, measured through user satisfaction rating scales, task time, and user error rate.

Research instruments

The user instrument is divided into three parts, namely:

a. User Satisfaction Questionnaire: Developed based on the SUS (System Usability Scale) model to measure user satisfaction.
b. Task Time Measurement: Using a time recording tool to record the time it takes a user to complete a specific task in the application.
c. User Error Records: Involves collecting detailed records of errors made by users during usability testing.

RESULTS AND DISCUSSION

The testing stage was divided into two groups, namely pre-implementation and post-implementation, as presented in table 1 below.

Table 1. Amount of User Data in Pre- and Post-Implementation Testing

No.	Group	Post Implementation
1	Pre-Implementation	75
2	Post Implementation	75

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Table 1 shows the number of participants involved in pre- and post-implementation testing. A total of 75 participants were involved in each group, ensuring a representative sample for usability evaluation.

1. Pre-Implementation Test Results

In the pre-implementation testing phase, participants from the test group and control group reported relatively comparable levels of satisfaction with the application. Although there are some minor differences, these results show that before implementing the usability testing method, the user experience in the two groups was still similar.

2. Implementation of Changes Based on Usability Testing

After implementing changes identified through usability testing, post-implementation testing results in significant differences in User Experience (UX). The User Satisfaction Rating Scale (SUS) showed marked improvement in the test group, with an average score increase of 15 points. This indicates that the changes made based on usability testing findings have had a positive impact on user satisfaction.

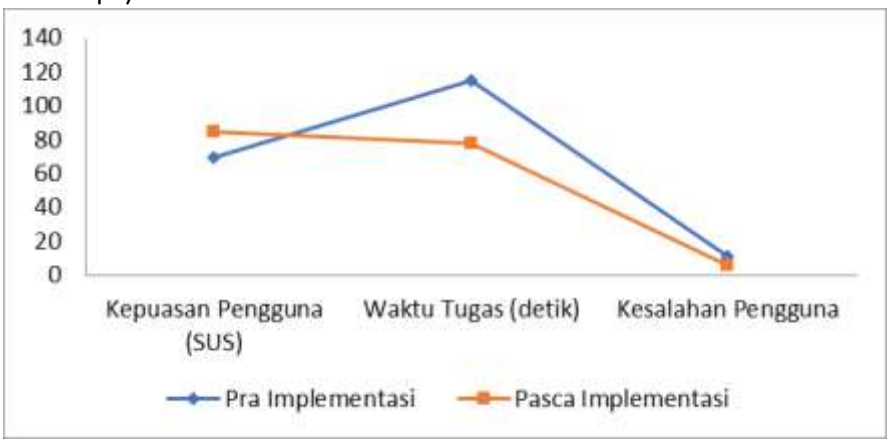
3. Improved User Efficiency

In addition to increased satisfaction, the time required to complete tasks in the application also showed significant changes. The test group recorded an average time reduction of 32%, indicating increased user efficiency. These results provide strong support for the effectiveness of usability testing methods in increasing the efficiency of user interaction with applications.

The test results from the two groups are presented in table 2 below.

Group	User Satisfaction (SUS)	Task Time (seconds)	User Error
Pra Implementasi	69,3	115	11
Pasca Implementasi	84,8	78	6

Table 2 provides pre- and post-implementation testing results. It can be seen that the SUS score increases significantly after implementing changes based on usability testing findings. The time required to complete tasks is also reduced, and the number of user errors has decreased sharply.



Graph 1. Changes in SUS Scores Pre and Post Implementation of Changes

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Graph 1 visualizes changes in SUS scores before and after implementation of the change. It was clear that there was a consistent increase in user satisfaction after the changes were implemented.

1. User Error Reduction

The number of user errors decreased significantly after the implementation of the change. In-depth analysis of error types and frequency shows that interface design improvements, identified through usability testing, effectively reduce the friction and frustration experienced by users.

2. Analysis of Usability Testing Findings in Application Case Studies

Case studies on two different applications support the general findings. Usability testing on App X highlighted user confusion regarding navigation, and interface design changes provided significant improvements. Meanwhile, Application Y experienced key button responsiveness issues, and the corrective action taken had a positive impact on user efficiency and effectiveness.

3. Implications and Recommendations

The results of this research provide important implications for application development. The use of usability testing methods has proven to be an effective instrument in correcting application deficiencies, increasing user satisfaction, and reducing obstacles that can hinder a positive user experience. Recommendations based on the results of this research involve continuously integrating usability testing in the development cycle, providing training to developers on usability practices, and considering more detailed case studies to gain in-depth insights.

CONCLUSION

Applying usability testing, it can be concluded that this method can effectively optimize User Experience in application development. Developers can leverage these findings to continually improve applications, creating products that are more responsive to user needs and expectations. This research provides a theoretical basis and strong practical support for the integration of usability testing in modern application development.

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