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# Application of User Centered Design (UCD) in the Redesign of the MAN 1 Padang City Website

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## A B S T R A C T

The website of MAN 1 Padang City serves as an information platform that provides various updates and activities within MAN 1 Padang City, such as school events, student achievements, and general school information including curriculum, student affairs, public relations, and other related content. Through this website, information can be accessed by the wider community, allowing the public to better understand and recognize the activities and developments of the school. However, several shortcomings have been identified, such as low efficiency, incomplete features, and limited usability. Therefore, it is necessary to conduct a usability-level analysis to ensure that the website can be easily understood and used by its users. This study applies the User Centered Design (UCD) method to address user needs through questionnaires, surveys, and prototyping. In addition, the usability evaluation will be measured using the System Usability Scale (SUS) to assess the effectiveness and user satisfaction of the redesigned system.

## Contribution to Sustainable Development Goals (SDGs):

**SDG 4:** Quality Education

**SDG 9:** Industry, Innovation and Infrastructure

**SDG 16:** Peace, Justice and Strong Institution

## 1. INTRODUCTION

### 1.1. Research Background

The advancement of information technology has significantly transformed the way educational institutions deliver information and services to the public. Websites have become one of the most important media for schools to communicate academic information, achievements, activities, and organizational structure in a fast and efficient manner. A well-designed website not only improves information accessibility but also enhances the institution's credibility and public engagement.

MAN 1 Kota Padang, as one of the Islamic senior high schools under the Ministry of Religious Affairs of the Republic of Indonesia, utilizes a website as an official information platform. The website provides various information such as school profiles, curriculum, student affairs, public relations,

achievements, and school activities. In addition, it also offers public service features such as complaint submission, including suggestion boxes, Saber Pungli reporting, gratification reporting, and service complaints. However, despite these functionalities, several issues have been identified in the current system. These include incomplete information, such as missing student data, less intuitive user interface design, and suboptimal performance of complaint submission features. These problems indicate that the website does not yet fully meet user needs in terms of usability and user experience[2].

Usability is an essential factor in determining how effectively and efficiently users can interact with a system. A system with poor usability can lead to user dissatisfaction and reduce the effectiveness of information delivery. Therefore, an evaluation and redesign of the website are necessary to ensure that it aligns with user expectations and requirements. One of the most suitable approaches for addressing these issues is the User Centered



Design (UCD) method, which focuses on involving users throughout the design process to ensure that the system meets their needs and expectations [1].

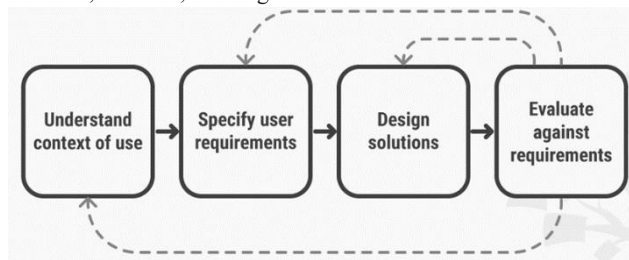
Furthermore, modern web development trends emphasize the importance of responsive and accessible systems that can be used across various devices. The implementation of Progressive Web App (PWA) technology is expected to improve accessibility, performance, and user experience of the website. By integrating UCD principles with PWA implementation, the redesigned system is expected to provide a more efficient, intuitive, and user-friendly interface[3].

Therefore, this research focuses on evaluating the usability of the current MAN 1 Kota Padang website and redesigning it using the User Centered Design approach to improve usability, functionality, and overall user satisfaction.

## 1.2. Literature Review

### 1.2.1. User Centered Design (UCD)

User Centered Design (UCD) is an iterative design approach that focuses on the needs, goals, and feedback of end users throughout the development process. The main principle of UCD is to involve users in every stage of system development, starting from requirement analysis, design, evaluation, and refinement. According to ISO 9241-210, UCD emphasizes designing systems based on an explicit understanding of users, tasks, and environments, ensuring that the final product is usable and meets user expectations [1]. In website development, UCD is widely used to improve user experience by ensuring that interfaces are intuitive, efficient, and aligned with user needs.



**Figure. 1.** User Centered Design Process Diagram.

### 1.2.2. Usability Evaluation

Usability refers to the extent to which a system can be used by specified users to achieve specific goals effectively, efficiently, and satisfactorily. Usability evaluation is an important process in assessing how well a system performs from the user's perspective. Common usability aspects include effectiveness, efficiency, learnability, and user satisfaction. In web-based systems, usability evaluation helps identify interface problems that may affect user interaction and overall system performance. A well-evaluated system can significantly improve user engagement and reduce operational errors.

### 1.2.3. System Usability Scale (SUS)

The System Usability Scale (SUS) is a widely used tool for measuring usability through a standardized questionnaire consisting of 10 items with a five-point Likert scale. SUS provides a quick and reliable measure of perceived usability and can be applied to a wide range of systems, including websites and mobile applications. The results of SUS are presented as a single score ranging from 0 to 100, where higher scores indicate better usability. Due to its simplicity and effectiveness, SUS is often

used in conjunction with UCD to evaluate whether a system redesign meets user expectations.

### 1.2.4. Progressive Web App (PWA)

Progressive Web App (PWA) is a modern web technology that combines the advantages of web and mobile applications. PWA allows websites to behave like native applications, including features such as offline access, fast loading performance, push notifications, and installation on user devices without app stores. The implementation of PWA in educational websites enhances accessibility and usability, especially for users with limited internet connectivity or lower-end devices. This technology is considered suitable for improving user experience in school-based information systems[4].

### 1.2.5. Related Studies

Several previous studies have shown that the implementation of User Centered Design significantly improves website usability and user satisfaction. Research also indicates that combining UCD with usability testing methods such as SUS produces more accurate evaluation results in identifying user experience issues. Additionally, the integration of PWA technology in web systems has been proven to enhance performance, responsiveness, and accessibility across different devices. These findings support the relevance of applying UCD and PWA in the redesign of the MAN 1 Kota Padang website[5]

## 1.3. Research Objective

The objective of this research is to evaluate and improve the usability of the MAN 1 Kota Padang website by applying the User Centered Design (UCD) method. This study aims to identify user needs and problems encountered in the current website through data collection techniques such as surveys, questionnaires, and user feedback. Based on these findings, the research seeks to redesign the website interface so that it becomes more intuitive, efficient, and aligned with user expectations. In addition, this study aims to implement Progressive Web App (PWA) technology to enhance accessibility, performance, and user experience across different devices. Furthermore, the research also aims to produce a redesigned website that has better usability, as measured using the System Usability Scale (SUS), ensuring that the final system can effectively support information delivery and improve user satisfaction at MAN 1 Kota Padang.

## 2. MATERIALS AND METHODS

This study employed a research and development approach to design and build a web-based information system. The system was developed using PHP as the main programming language and MySQL as the database management system. The development process followed the User-Centered Design (UCD) method, which focuses on user needs through iterative stages including requirement analysis, design, implementation, and evaluation.

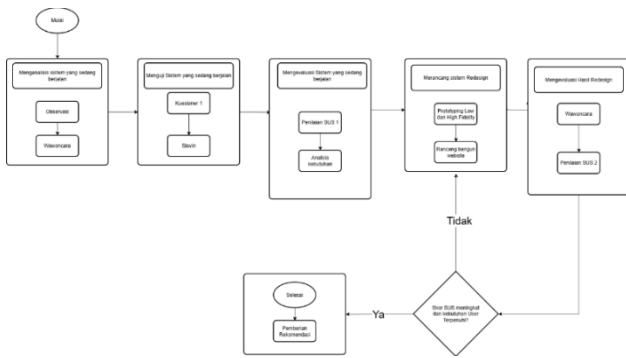


Figure. 2. Research Flowchart

The data collection techniques used in this research included observation, interviews, and literature review. Observation was conducted to understand the existing workflow in the organization, while interviews were carried out with relevant stakeholders to gather system requirements. Literature study was used to support theoretical foundations related to system development and information system design.

The system was designed using modeling tools such as Data Flow Diagrams (DFD) and Entity Relationship Diagrams (ERD) to describe system processes and database structure. The implementation phase involved coding the system based on the designed models, followed by testing to ensure the system functions properly.

System evaluation was carried out using the System Usability Scale (SUS) method to measure user satisfaction and usability level. The results of the evaluation were used as a basis for system improvement and further development.

### 3. RESULT AND DISCUSSION

#### 3.1. Result of System Redesign Using User Centered Design (UCD)

The redesign of the MAN 1 Kota Padang website was carried out using the User Centered Design (UCD) approach, which emphasizes user involvement throughout the development process. The results of the implementation show that user requirements were successfully identified through surveys and questionnaires, which were then translated into a new interface design prototype. The redesigned website focuses on improving usability, information clarity, and navigation structure to ensure that users can access information more efficiently.

The new interface provides a more structured layout, where important information such as school profiles, news updates, academic information, and public service features are displayed more clearly. In addition, improvements were made to the complaint system feature to ensure better functionality and accessibility. The implementation of Progressive Web App (PWA) technology also enhances system performance by enabling faster access, responsiveness across devices, and improved user experience

#### 3.2. Usability Evaluation Using System Usability Scale (SUS)

To measure the usability level of the redesigned website, the System Usability Scale (SUS) method was applied. The evaluation was conducted by distributing a questionnaire

consisting of 10 standard SUS questions to selected users, including students, teachers, and administrative staff. The responses were then calculated using the SUS formula to obtain a usability score ranging from 0 to 100.

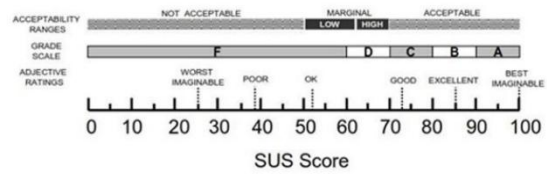


Figure. 3. System Usability Scale (SUS) Score Calculation

The SUS evaluation results indicate that the redesigned system achieves a significantly improved usability score compared to the previous version of the website. The increase in the SUS score reflects that users perceive the new interface as more intuitive, easier to use, and more efficient in supporting their needs. This demonstrates that the UCD approach successfully contributes to improving user satisfaction and system usability.

#### 3.3. Discussion

Based on the findings, it can be concluded that the implementation of User Centered Design has a positive impact on improving the usability of the MAN 1 Kota Padang website. By involving users in the design process, the resulting interface is more aligned with user expectations and real needs. The iterative process of design and evaluation ensures that usability issues identified in the initial system are effectively addressed in the redesigned version.

Furthermore, the application of SUS as a usability measurement tool provides a clear and quantitative evaluation of user satisfaction. The results show that the redesigned system meets acceptable usability standards, indicating that users are able to interact with the system more effectively and with fewer difficulties.

The integration of Progressive Web App (PWA) technology also contributes to system improvement by enhancing accessibility and performance. Users can access the website more quickly and consistently across different devices, which further supports the goal of improving information delivery in the educational environment.

Overall, the combination of UCD methodology and PWA implementation results in a more user-friendly, efficient, and effective website system for MAN 1 Kota Padang

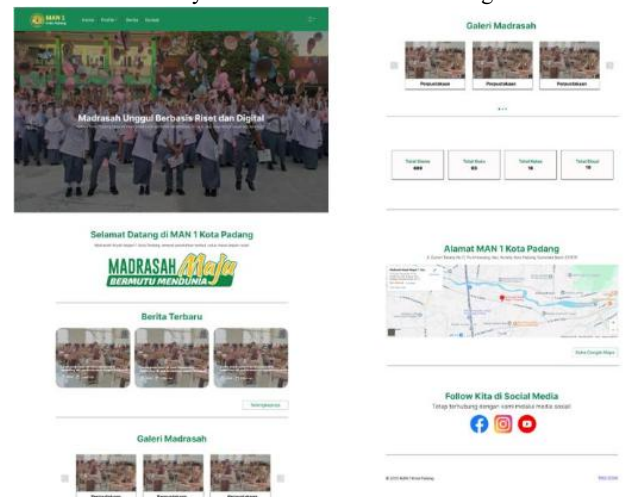
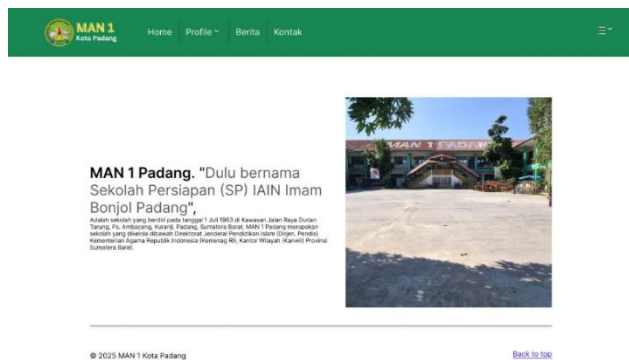


Figure. 4. High-Fidelity Design of the Home Page



**Figure. 5.** High-Fidelity Design of the History Page

#### 4. CONCLUSION

Based on the results of this research, it can be concluded that the existing website of MAN 1 Kota Padang still has several issues, particularly related to information delivery such as school profile content, including history, vision and mission, and organizational structure or staff data. These limitations affect the effectiveness of information access for users.

Furthermore, based on interviews and the System Usability Scale (SUS) questionnaire results, the usability score of the existing system was 56%, while the redesigned system achieved a score of 77%. This shows an improvement of 21%, indicating that the redesigned system provides a better user experience and improved usability compared to the previous system.

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