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Strengthening Javanese literature material through the Novaja.id application as a form of Javanese cultural preservation

Penguatan materi sastra Jawa melalui aplikasi novaja.id sebagai salah satu pelestarian budaya Jawa

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Abstract
The preservation of regional languages, including Javanese, increasingly requires digital innovations that can support literacy development and sustain readers' engagement. However, existing digital platforms for Javanese literary access often lack systematic development frameworks and user-centered design features, limiting their effectiveness and long-term usability. Responding to this gap, this study develops the Novaja.id Javanese Novel Library application through the integration of the System Development Life Cycle (SDLC) and User-Centered Design (UCD) methodologies. The research began with a user needs analysis conducted through surveys and in-depth interviews, which informed the design of an intuitive interface and optimized user experience. A prototype was subsequently tested through usability evaluations, and user feedback was incorporated into iterative refinements. The findings show that the final application meets user needs effectively, demonstrating high navigation ease, satisfactory feature performance, and stable and secure functionality. These outcomes indicate that combining SDLC and UCD enhances application quality and usability. Overall, Novaja.id has strong potential to expand access to Javanese literary works and contribute to Javanese language literacy and cultural preservation.

Abstrak
Pelestarian bahasa daerah, termasuk bahasa Jawa, semakin membutuhkan inovasi digital yang dapat mendukung pengembangan literasi dan mempertahankan keterlibatan pembaca. Namun, platform digital yang ada untuk akses sastra Jawa sering kali kurang memiliki kerangka pengembangan sistematis dan fitur desain yang berpusat pada pengguna, sehingga membatasi efektivitas dan kegunaan jangka panjangnya. Menanggapi kesenjangan ini, penelitian ini mengembangkan aplikasi Perpustakaan Novel Jawa Novaja.id melalui integrasi metodologi Siklus Hidup Pengembangan Sistem (SDLC) dan Desain Berpusat pada Pengguna (UCD). Penelitian dimulai dengan analisis kebutuhan pengguna yang dilakukan melalui survei dan wawancara mendalam, yang menjadi dasar desain antarmuka yang intuitif dan pengalaman pengguna yang optimal. Sebuah prototipe kemudian diuji melalui evaluasi kegunaan, dan umpan balik pengguna dimasukkan ke dalam penyempurnaan iteratif. Temuan menunjukkan bahwa aplikasi akhir memenuhi kebutuhan pengguna secara efektif, menunjukkan kemudahan navigasi yang tinggi, kinerja fitur yang memuaskan, serta fungsionalitas yang stabil dan aman. Hasil ini menunjukkan bahwa penggabungan SDLC dan UCD meningkatkan kualitas dan kegunaan aplikasi. Secara keseluruhan, Novaja.id memiliki potensi yang kuat untuk memperluas akses ke karya sastra Jawa dan berkontribusi pada literasi bahasa Jawa dan pelestarian budaya.

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A. Introduction

The decline in interest in learning Javanese can be attributed to several factors. First, the influence of globalization and modernization has shifted people's attention away from regional languages, including Javanese, creating challenges for both teachers and students in integrating culturally rooted materials into modern learning contexts (Daniar et al., 2022). The widespread use of Indonesian and foreign languages across media and formal education further diminishes the perceived relevance and necessity of learning Javanese. Second, the limited availability of innovative educational resources and supportive curricula also contributes to this decline (Bilqis et al., 2023). When school curricula do not emphasize the importance of understanding and preserving Javanese, learners' motivation to study the language tends to weaken.

Moreover, lifestyle changes influenced by increasingly urban and modern environments play a role in reducing interest in Javanese (Elika & Nurhayati, 2024). Individuals heavily exposed to international pop culture may feel that understanding or using Javanese is no longer essential in their daily lives. Therefore, efforts to revitalize interest in learning Javanese must employ creative and contextually relevant approaches that resonate with contemporary experiences (Tahyudin & Sholihati, 2022).

The development approach used in this research integrates the System Development Life Cycle (SDLC) and User-Centered Design (UCD). SDLC is a structured system development framework that outlines the main stages of development, typically consisting of five key activities: analysis, design, implementation, testing, and maintenance (Widharma, 2017). Meanwhile, UCD is an approach that prioritizes user involvement, both current and potential users, throughout the processes of data collection, design evaluation, and testing (Hartawan, 2022). Together, these approaches support the development of digital Javanese literacy initiatives aimed at addressing the ongoing decline in Javanese language use in today's digital era.

The use of Javanese as part of cultural heritage and tradition has decreased due to the increasing dominance of Indonesian and foreign languages in digital spaces. The development of Novaja.id through the SDLC framework is expected to ensure that the application offers reliable and stable functionality while remaining adaptable to evolving technological demands. SDLC provides a systematic structure for planning, developing, testing, and maintaining applications, which is essential for ensuring the long-term sustainability and effectiveness of Novaja.id (Nakić et al., 2022).

In parallel, the application of User-Centered Design emphasizes the importance of understanding user needs, preferences, and experiences at every stage of development. By centering the design process on users, Novaja.id is expected to become more intuitive, accessible, and aligned with the expectations of Javanese-speaking users, ultimately increasing their interest in reading Javanese novels (Christanto & Singgalen, 2023).

The proposed problem-solving approach for developing the Novaja.id Javanese Novel Library application consists of a series of planned and structured steps. First, the use of the System Development Life Cycle (SDLC) enables the research to proceed systematically from the planning stage through to maintenance, ensuring that each phase of Novaja.id's development is clearly organized and well executed. These phases include user needs analysis, system design, implementation, testing, and maintenance, with a strong focus on application reliability and availability. Furthermore, the User-Centered Design (UCD) method is applied to prioritize an optimal user experience. This involves identifying potential user characteristics, collecting feedback from users throughout the development process, and tailoring the user interface to their preferences and needs. By actively involving users at every stage of the development cycle, Novaja.id is designed not only to offer adequate technical features but also to remain easily accessible and usable for Javanese-speaking users (Laato et al., 2022). This integrated approach aims to create an application that is not only technically robust but also relevant and user-friendly. By combining SDLC and UCD, this solution is expected to make a positive contribution to Javanese language

literacy and reading interest, address the challenges of the digital era, and support the preservation of local culture.

The development of regional language literacy-based applications continue to evolve alongside advancements in technology. Although several applications have been created to enhance regional language literacy, many still face limitations, particularly in integrating comprehensive development methods such as the System Development Life Cycle (SDLC) and User-Centered Design (UCD) (Sylvain & Chaniaud, 2023). Some platforms also lack attention to the long-term sustainability of regional language use in the digital era. In response, Novaja.id, the Javanese Novel Library, offers a more integrated solution by combining a robust development methodology with a user-centered approach (Lidya Maukar et al., 2023).

The uniqueness of this research lies in its comprehensive approach to developing a Javanese literacy application by adopting the SDLC framework to ensure a stable and well-tested system and implementing User-Centered Design to create a user-friendly interface (Kim et al., 2022). Its strong focus is on the sustainability of regional languages and literacy positions Novaja.id as an innovative contribution to cultural preservation and the enhancement of reading interest within the Javanese-speaking community, while also serving as a model for the development of similar solutions in other regional cultural and linguistic contexts.

The roadmap for the development of the Novaja.id Javanese Novel Library application from 2022 to 2026 begins with planning and needs analysis. In 2023, the system and user interface are designed using the User-Centered Design approach. The year 2024 focuses on implementation and testing, followed by maintenance activities in 2025. Finally, in 2026, the application's impact on literacy and reading interest within the Javanese community will be evaluated. This roadmap reflects a strong commitment to supporting literacy development and preserving Javanese culture (see Figure 1).

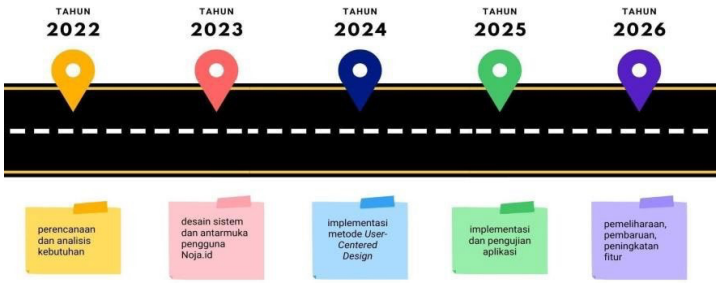

Figure 1. Novaja.id application development roadmap

To limit the scope of the discussion, this research focuses on the following core questions, how should the Novaja.id application be developed? Specifically, can the Javanese Novel Library application be effectively developed using the System Development Life Cycle (SDLC) approach to ensure optimal reliability, security, and availability and how can the application of User-Centered Design (UCD) improve the Novaja.id user interface so that it aligns with the needs, preferences, and experiences of Javanese language users, thereby increasing their interest in reading and enhancing Javanese language literacy.

B. Method

This study employs the System Development Life Cycle (SDLC) and User-Centered Design (UCD) approaches (Maukar et al., 2023). These approaches were selected to ensure that the Novaja.id application is developed systematically, with a strong focus on user experience and user needs. The research is conducted within a single primary setting, the Javanese Language Study

Program, Faculty of Languages and Arts, Universitas Negeri Semarang (UNNES), which serves as the site for collecting initial supporting data, conducting trials, and implementing the application. This setting is intended to support the achievement of key objectives related to the development of the Novaja.id Javanese Novel Library application.

The stages carried out in this study began with the design phase, during which a needs analysis and the preparation of an application development plan were conducted. The research team identified and compiled the features to be included based on user needs and research objectives. The next stage involved designing the user interface and application flow (Siregar & Melani, 2019), followed by the creation of an initial prototype to provide a visual representation of the application. During the development stage, the application was built in accordance with the approved design, using the latest technologies to ensure compatibility and smooth performance across various devices. Once development was completed, the application underwent testing to ensure that all features functioned properly. This testing covered functionality, security, and usability aspects. After the application was launched, continuous monitoring and updates were carried out based on user feedback. The research team will continue to make periodic improvements and feature enhancements to ensure long-term performance and user satisfaction.

The UCD approach is applied by involving users at every stage of development (Karunia & Hidayati, 2024). By prioritizing the user perspective, UCD helps produce an intuitive, efficient, and engaging interface (Han et al., 2022). The activities carried out include collecting data on users' needs and expectations for the application, followed by conducting testing sessions in which users try the application and provide feedback. This process helps the team identify problems and refine the interface (Hartawan, 2022).

The type of research data used in this study is mixed-methods, incorporating both quantitative and qualitative data to support the analysis. The quantitative data include the total number of registered users of the application; frequency of use (average number of user sessions per day or per week); average usage time (average duration of each user session in the application); survey results in the form of scores from questionnaires measuring user satisfaction (on a scale of 1–6); the number of available novels (the total collection of Javanese novels accessible within the application); interaction statistics (such as the number of searches conducted); the most frequently accessed novel categories; and the most frequently used features.

Meanwhile, the qualitative data in this study include user opinions while using the application, in-depth interview results, and user observations (notes on user behavior when interacting with the application, including how they explore content and use features). In addition, thematic analysis of survey data was conducted, focusing on the categorization of themes or patterns that emerge from open-ended responses, such as users' reasons for being interested in reading Javanese novels.

This research employed several data collection techniques, namely: surveys, using questionnaires to collect data from users regarding their needs and preferences; interviews, conducting in-depth interviews with selected users to obtain more detailed information; observations, observing user interactions with the application to gain a direct understanding of their experiences; and literature review, gathering information from relevant literature and previous research related to the topic.

The validity of the data in this study was ensured through several methods, namely validity, reliability, and triangulation. Validity was maintained by designing data collection instruments, such as questionnaires and interview guides, so that the questions accurately reflected the needs and preferences of application users. Reliability was ensured by repeating the data collection process using the same methods to obtain consistent results. Triangulation was carried out by combining various data collection techniques, including surveys, interviews, observations, and usability testing, enabling the verification of findings from multiple sources and thereby increasing the validity and credibility of the data. Through these steps, the research is expected to produce valid, reliable, and accountable results.

The analysis techniques used in this study include both qualitative and quantitative approaches. Qualitative analysis was conducted using thematic analysis to identify patterns and

themes that emerged from interview and observation data. Quantitative analysis involved the use of descriptive and inferential statistics to examine survey data and present the findings in the form of graphs or tables. In addition, hypothesis testing was performed using statistical tests to examine assumptions regarding the relationships between variables in the quantitative data.

Data obtained from usability testing and user feedback are analyzed using both quantitative and qualitative approaches. The results of these analyses are used to evaluate the level of user satisfaction and the effectiveness of the application in increasing reading interest. To ensure that the research is carried out efficiently, the following research schedule was prepared.

C. Results and Discussion

The research results are descriptive in nature, connecting the findings with relevant theories and previous studies. Numerical data from the testing phase demonstrate both the level of user satisfaction and the effectiveness of the Novaja.id application interface in increasing interest in reading Javanese literature. For instance, survey results show that 85% of users were satisfied with the application's ease of navigation, while 78% reported an increase in their reading interest after using the application. These survey outcomes are based directly on user feedback. These findings are consistent with previous research showing that a well-designed user interface can enhance user experience and encourage reading interest (Tahyudin & Sholihati, 2022). The quantitative data thus provide strong evidence of the application's success in achieving the research objectives.

1. Planning and Needs Analysis

The survey results indicate that users require an application that is easy to use, equipped with an intuitive interface, and supported by rich and diverse content. They also expect features such as search functionality and novel categorization based on genre and author. The Novaja.id application is designed to address the limitations of existing digital platforms that provide access to Javanese novels. Recognizing the importance of preserving the Javanese language and its literary heritage, Novaja.id aims to serve as a resource that is easily accessible to the general public, especially younger generations, so they can better understand and appreciate literary works in their regional language.

a. Project Scope

(1) Development of a web-based application with a responsive design that can be accessed via both desktop and mobile devices.
(2) Provision of search, categorization, and management features for the Javanese novel collection.
(3) Integration of a Content Management System (CMS) to facilitate library management by administrators.
(4) Development of an intuitive and easy-to-use user interface.

b. Resources Required

(1) Human Resources: The development team consists of a Project Manager, System Analyst, UI/UX Designer, Web Developer, and Tester (Muktamar et al., 2023).
(2) Technologies: Programming languages (e.g., HTML, CSS, JavaScript, PHP/Node.js); frameworks (e.g., React, Laravel); databases (e.g., MySQL); and hosting servers.
(3) Time: The project is estimated to be completed within six months, covering all stages of the SDLC (Misriani et al., 2022).

c. Functional Requirements

(1) Novel Collection Management: The system must be able to manage a collection of Javanese novels by providing features for adding, editing, and deleting novel entries.
(2) Search and Categorization: Users must be able to search for novels by title, author, or specific keywords, as well as access novels by categories such as genre, year of publication, and other relevant criteria.
(3) User Management: The system must support user registration, login, and profile management. Registered users must have access to additional features such as reading bookmarks, reading history, and novel recommendations.
(4) User Interaction: Users must be able to rate and review novels and share novel information via social media platforms.
(5) Notifications and Updates: The system must be able to send notifications to users regarding novel updates or other library-related news.
(6) Security and Privacy: The system must ensure the security of user data and protect the copyright of the available novel content.

d. User Analysis

(1) Target Users: Students, university students, academics, and members of the general public who are interested in Javanese literature.
(2) User Needs: Users require easy access to a library of Javanese novels, with features that support practical browsing, reading, and management of novels.
(3) User Personas: Persona 1: High school students who want to learn more about Javanese literature as part of their school assignments. Persona 2: University students majoring in Javanese Literature who need references for academic research. Persona 3: Javanese novel enthusiasts who are seeking a platform to discover classic and modern novels written in Javanese.

2. User Interface Design

Based on User-Centered Design (UCD) principles, the Novaja.id interface is designed to be user-friendly, with clear navigation, contrasting colors, and easy-to-read typography (Arif et al., 2022). The user personas developed in this study indicate that the majority of users are students, particularly secondary school and university-level learners, with a relatively high level of digital literacy. Therefore, Novaja.id has been designed by carefully considering the needs and preferences of these primary users. The main aspects implemented include: first, clear navigation: ensuring that users can easily find the information or features they need without confusion. Second, contrasting colors: using color combinations that make interface elements easy to see and distinguish, thereby increasing readability and visual comfort. Third, easy-to-read typography: selecting appropriate font types and sizes to ensure that text can be read comfortably by users. Forth, user personas: focusing on students with relatively high digital literacy ensures that the interface supports their technological capabilities while remaining intuitive, efficient, and accessible.

A low-fidelity interface is an early representation or simple prototype of a user interface (UI) design created with minimal detail, which does not yet depict the final product, similar to a sketch. Its main purpose is to test basic ideas and concepts before investing significant time and resources in developing a more detailed and refined design. Low-fidelity interfaces typically use rough black-and-white lines, basic geometric shapes, and placeholder text. They do not include details such as colors, images, or complex typography. Instead, these prototypes emphasize the arrangement of elements, navigation, and user flow rather than visual appearance and aesthetics.

Because they require relatively little time and effort to produce, low-fidelity prototypes can be quickly created, modified, and tested. They are often used in the early stages of development to obtain feedback from users or stakeholders so that major changes can be made at low cost. Many low-fidelity interfaces are created by hand using simple tools such as paper and pencil, although various software tools are also available to support low-fidelity prototyping (see Figure 2).

In contrast, a high-fidelity interface is a more detailed and realistic version of a UI design that closely approximates the appearance and functionality of the final product (Andriani et al., 2021). high-fidelity prototypes are usually created after the basic concepts and structure have been validated through low-fidelity prototypes (see Figure 3).

Figure 2. Novaja.id low-fidelity interface

Figure 3. Novaja.id high-fidelity interface

3. Development and Implementation

The application was developed using responsive web technology, enabling access across various devices, including both desktop and mobile platforms. The implementation process followed the planned timeline, with core features such as search functionality, category organization, and user data storage successfully implemented (Pargaonkar, 2023). The use of a Content Management System (CMS) facilitated efficient creation and management of digital content without requiring extensive technical or programming expertise (Huda & Priyatna, 2019). WordPress, one of the most widely used CMS platforms globally, was utilized due to its flexibility and capacity to support a wide range of web applications, from simple blogs to complex e-commerce systems (see Figure 4).

Figure 4. Novaja.id Application

4. Testing and Maintenance

Usability testing showed that most users were satisfied with the application's user interface and overall functionality (Dasmen et al., 2021). Several minor issues identified during testing—such as slightly longer loading times on low-spec devices—were subsequently addressed and resolved. User feedback will continue to be collected to support the development of future versions of the application. In addition, black-box testing was conducted as part of the evaluation process. Black-box testing is a software testing method in which the tester assesses the functionality of an application without having access to internal details such as source code or system architecture (Pratama et al., 2023). This method focuses on evaluating inputs and outputs to ensure that the system performs according to the established specifications (Christian et al., 2023).

The use of SDLC and UCD methods in the development of the Novaja.id application has proven effective. SDLC ensures a systematic development process, from planning to maintenance, while UCD ensures that user needs, and preferences are at the center of every stage of development. Advantages success in development: The application was successfully developed according to plan, with the features desired by users. This shows that the implementation of SDLC has succeeded in maintaining the timeline and quality of the product. Focus on users: The implementation of UCD makes the application more user- friendly, as evidenced by the results of usability testing. Users find the application interface intuitive and easy to use. The disadvantages are time and resources: The iterative UCD process requires more time and resources, which can be a challenge if there are budget or time constraints. Adaptation to feedback: The application needs to be continuously developed to adapt to changing user needs. Therefore, improvements and additions to features must be made periodically.

Table 1. Black-box testing aspects

Tested Aspects	Black-Box Testing Questions	Description
Input Validation	Does the system accept valid input and reject it if it is invalid?	Testing data validation, such as format, length, etc.
Basic Functions	Does feature X work according to specifications when used?	Testing whether core functions or features work normally.
Navigation	Do all links or buttons on the page function correctly?	Ensuring navigation within the application
Error Management	Does the system display informative error messages when errors occur?	Checking error handling and messages.
Boundary Conditions	Can the system handle input at maximum and minimum limits?	Testing how the system responds to extreme input.
UI Responsiveness	Does the user interface respond correctly to various actions?	Testing the speed and accuracy of UI responses
Data Integrity	Does the entered data remain consistent across operations?	Ensuring no data is lost or corrupted
Security	Does the system prevent unauthorized access to data or features?	Testing user authentication and authorization.
Conformance to Specification	Does the system behave according to specifications in all scenarios?	Verifying compliance with specification documents.
Session Management	Do user sessions end according to rules (e.g., automatic logout)?	Checking session management and related security.
Browser Compatibility	Does the application work correctly across browsers and versions?	Testing cross-platform compatibility.
Transaction Processing	Does the system process transactions accurately and consistently?	Testing payment functions, ordering, etc.
Resets	Does the system reset or restore data to its original state correctly?	Testing password reset features, form resets, etc.
Response Time	Does the system respond within a reasonable time for all actions?	Checking loading and response times.
System Output	Is the output produced as expected?	Checking system outputs, such as

D. Conclusion

The conclusion of this study shows that the development of the Novaja.id Javanese Novel Library application using the System Development Life Cycle (SDLC) approach ensures optimal application reliability, security, and availability. Furthermore, the implementation of the User-Centered Design method successfully improved the user interface, making the application more intuitive and tailored to the needs and preferences of Javanese-speaking users. Thus, this study answers the research problem formulation by demonstrating that the combination of the two methods is effective in increasing Javanese literacy and reading interest.

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