

Redesign of Academic Information Media for Faculty of Law Students: UI/UX Approach with Usability Testing at UHAMKA

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Abstract— This study investigates usability challenges in a web-based academic information system and proposes a user-centered UI/UX redesign using a Design Thinking approach. Usability evaluation was conducted using the System Usability Scale (SUS) and task-based performance metrics involving students, lecturers, and academic staff. The results indicate a substantial improvement in system usability, with SUS scores increasing from 52.16 (Not Acceptable) to 81.48 (Acceptable), while task completion rates improved from 29.6% to 96.3%. These findings provide empirical evidence that usability-driven redesign significantly enhances system effectiveness, efficiency, and user satisfaction, and contributes a scalable and replicable usability evaluation framework for academic information systems in higher education institutions.

Keywords— User Experience, Usability, Academic Information System, Design Thinking, UI/UX.

I. INTRODUCTION

The rapid advancement of information and communication technology (ICT) has fundamentally transformed the educational landscape. Universities are no longer limited to providing physical infrastructure but increasingly rely on digital platforms to support academic activities. Web-based academic information systems—such as student information systems, e-learning platforms, and digital libraries—have become essential tools for managing academic workflows, including course registration, curriculum management, academic records, and communication between students, lecturers, and administrative staff. The growing adoption of cyberlearning technologies highlights the importance of integrating digital solutions that not only support instructional delivery but also enhance personalized learning experiences, although further empirical investigation remains necessary to optimize their implementation in higher education contexts (Alomari et al., 2020).

1.1 Importance of Usability and User Experience (UX)

According to ISO 9241-11, usability is defined as the extent to which a system can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use, providing an internationally standardized foundation for usability evaluation in interactive systems.

Furthermore, Nielsen's usability principles emphasize that system effectiveness, efficiency, and user satisfaction are critical determinants of successful human-computer interaction, particularly in information-intensive systems such as academic platforms.

From a user experience perspective, Hassenzahl highlights that UX extends beyond functional usability by incorporating users' emotional responses and perceived value, reinforcing the importance of addressing both pragmatic and hedonic qualities in system design.

Despite the widespread adoption of academic information systems, their effectiveness largely depends on the quality of usability and user experience (UX). Usability refers to the extent to which a system enables users to achieve specific goals effectively, efficiently, and with satisfaction within a given context of use (Ferreira et al., 2023). UX extends beyond functional performance to encompass users' perceptions, emotions, and motivations throughout their interaction with a system. Recent studies emphasize that systems that are merely usable are no longer sufficient; instead, digital platforms must also provide engaging and enjoyable experiences to meet evolving user expectations (Nakamura et al., 2022).

Comprehensive UX evaluation therefore requires consideration of both pragmatic qualities, such as task efficiency and clarity, and hedonic qualities, including aesthetics and perceived attractiveness, as these factors jointly influence overall user satisfaction and system acceptance (Kuhar & Mercchun, 2022). Inadequate attention to these aspects can result in user frustration, reduced system adoption, and inefficiencies in academic workflows.

1.2 Evaluation and Redesign of Academic Information Systems in Higher Education

Within the higher education domain, academic information systems also serve as representations of institutional identity and credibility. Well-designed systems can positively influence students' perceptions and engagement, while poorly designed interfaces may hinder access to information and reduce system trust. Prior research indicates that many university information systems continue to face usability, performance, and accessibility challenges, often failing to meet minimum usability standards (Alim, 2025). Moreover, usability research in academic environments remains less developed compared to commercial and financial sectors, underscoring the need for more focused and context-specific investigations (Alzghaibi, 2023).

Studies on self-service portals in universities further reveal that, although digital transformation has increased reliance on internal academic systems, limited research has systematically examined usability improvements using integrated design and evaluation approaches (Matloobtalab & Ferati, 2025). This gap is particularly evident in discipline-specific contexts, such as legal education, where students require fast, structured, and reliable access to academic materials, legal documents, and schedules to support intensive learning processes.

1.3 Research Gap and Contribution

In response to these challenges, this study focuses on evaluating and redesigning a web-based academic information system at the Faculty of Law, Universitas Muhammadiyah Prof. Dr. Hamka (UHAMKA). Unlike previous studies that primarily assess usability as a standalone evaluation, this research integrates a Design Thinking approach with multidimensional usability metrics, including the System Usability Scale (SUS) and task-based performance measures. By combining user-centered design processes with quantitative usability evaluation, this study aims to demonstrate how usability-driven redesign can lead to measurable improvements in system effectiveness, efficiency, and user satisfaction.

Although the empirical investigation is conducted within a single faculty, the proposed usability evaluation and redesign framework is designed to be scalable and adaptable to other higher education institutions with similar academic workflows. Consequently, this research contributes empirical evidence and a replicable methodological framework for enhancing academic information systems in higher education environments.

II. RESEARCH METHODOLOGY

This study employs a user-centered research methodology based on the User-Centered Design (UCD) paradigm, utilizing a Design Thinking approach to evaluate and redesign a web-based academic information system at the Faculty of Law, Universitas Muhammadiyah Prof. Dr. Hamka (UHAMKA). This approach was selected due to its strong emphasis on understanding users' needs, behaviors, and challenges, which is essential for developing intuitive and effective user interface and user experience (UI/UX) solutions.

The Design Thinking process in this study consists of five iterative stages: empathize, define, ideate, prototype, and testing, as described below.

2.1 Design Thinking Stages

Empathize

The empathize stage aims to gain an in-depth understanding of users' experiences with the existing academic information system. Data were collected through direct observations and semi-structured interviews involving students, lecturers, administrative staff, and academic administrators. This stage focused on identifying user behaviors, pain points, and expectations when interacting with the system.

Define

In the define stage, the data collected during the empathize phase were analyzed to identify core usability problems and user needs. Techniques such as user personas were employed to

represent different user groups, while mind mapping was used to visually organize and synthesize key findings. This process resulted in a clear definition of usability issues that guided subsequent design decisions.

Ideate

The ideate stage involved structured brainstorming sessions to generate potential design solutions addressing the identified problems. Multiple UI/UX concepts were proposed and evaluated based on feasibility, usability impact, and alignment with user needs. Selected ideas were then prioritized for implementation in the prototype design.

Prototype

During the prototype stage, the selected design solutions were translated into a UI/UX prototype. The prototype incorporated visual layout, navigation structure, and core functionalities of the redesigned academic information system. This low- to mid-fidelity prototype served as a tangible representation of the proposed improvements.

Testing

The final stage involved usability testing of the prototype with representative users. The objective of this stage was to evaluate the effectiveness of the redesigned interface, collect user feedback, and identify areas requiring further refinement. The testing results informed iterative improvements to enhance overall usability and user satisfaction.

2.2 Data Collection and Analysis Approach

This study adopts a mixed-methods approach to obtain a comprehensive understanding of usability issues and improvements in the academic information system. The methodology integrates both quantitative and qualitative data analysis techniques.

2.2.1 Data Collection

To systematically capture user needs, this study utilizes a structured needs elicitation instrument based on the Usability Requirements Elicitation Method (UREM) decision-tree framework (Ormeño et al., 2023). The instrument is divided into three main sections:

1. General Background and Experience

This section collects demographic information, device usage patterns, and users' overall experiences with the existing academic information system.

2. Critical Functions and Tasks

This section focuses on frequently performed academic workflows, such as accessing course information, learning materials, grades, and academic schedules. Decision-tree-based questions were used to identify usability barriers and task inefficiencies experienced by users.

3. UI/UX Needs and Expectations

This section captures users' expectations regarding system features, interface design preferences, and context-specific requirements, including access to legal resources such as journals and case databases.

2.2.2 Quantitative Data Analysis

Quantitative analysis focuses on numerical data collected from questionnaires, surveys, and usability testing metrics.

- Descriptive Analysis

Descriptive statistics, including mean, median, and standard deviation, were used to summarize participant demographics, System Usability Scale (SUS) scores, task completion time, and number of clicks.

Inferential Analysis

Inferential statistical techniques were applied to examine relationships between usability metrics and user characteristics.

- Correlation analysis was used to assess relationships between SUS scores and demographic factors such as age and computer experience (Demirkol et al., 2020).
- Regression analysis was conducted to evaluate the influence of system features on usability outcomes, including effectiveness, efficiency, and user satisfaction (Ferreira et al., 2023).

Mean Opinion Score (MOS) Analysis

MOS analysis was applied to quantify perceived user satisfaction based on questionnaire responses, providing a single aggregated score representing perceived system quality (Hasan et al., 2024).

2.2.3 Qualitative Data Analysis

Qualitative analysis was conducted on data obtained from interviews, observations, and think-aloud sessions.

Thematic Analysis

Interview transcripts and observation notes were analyzed to identify recurring themes related to usability issues, such as navigation difficulties and information accessibility (Matloobtalab & Ferati, 2025).

User Journey Analysis

User journeys were mapped based on observed task flows to visualize user interactions, identify friction points, and highlight areas of user frustration or ease.

Heuristic Analysis

Expert evaluations and cognitive walkthroughs were performed using Nielsen’s usability heuristics, including visibility of system status, consistency and standards, and error prevention, to support evidence-based design recommendations (Alomari et al., 2020; Neff et al., 2024).

III. RESULTS AND DISCUSSION

This section presents the results of the usability evaluation and discusses the findings based on the metrics defined in the research methodology. The analysis compares the performance of the legacy academic information system (Design A) with the redesigned prototype (Design B) in terms of effectiveness, efficiency, and user satisfaction.

3.1 Quantitative Usability Evaluation

3.1.1 Visual and Perceptual Assessment

Table 1 presents users’ perceptions of visual appeal, professionalism, trustworthiness, and navigational clarity for both designs. The results indicate consistent improvements across all assessed aspects in Design B. The largest improvement was observed in the “Professional and Modern” dimension, which increased by 1.52 points, followed by improvements in faculty identity and ease of finding information.

No	Assessment Aspect	Average Desain A	Average Desain B	Difference
1	Visually Appealing	3.22	4.37	+1.15
2	Professional & Modern	2.74	4.26	+1.52
3	Trustworthy	3.15	4.19	+1.04
4	Faculty Identity	3.11	4.33	+1.22
5	Clear Navigation	3.22	4.30	+1.08
6	Ease of Finding Info	3.07	4.30	+1.23

Table 1. difference

These results suggest that the redesigned interface not only enhanced aesthetic quality but also strengthened institutional identity and navigational clarity, which are critical factors influencing users’ initial trust and engagement with academic information systems.

3.1.2 System Usability Scale (SUS) Analysis

The System Usability Scale (SUS) was employed to measure perceived usability. As shown in Table 2, the legacy system (Design A) achieved an average SUS score of 52.16, which falls within the “Not Acceptable” category, indicating user dissatisfaction with system functionality and interface design.

Research Object	Average SUS Score	Acceptability Category	Description
Design A (Legacy System)	52.16%	Not Acceptable / Marginal	Users feel dissatisfied with the functionality and the outdated interface.
Design B (NewPrototype)	81.48%	Acceptable	The redesign successfully created a much more satisfying and improved user experience.

Table 2 Average SUS



Picture 1. Old Desain System



Picture 2. New Design System



Picture 3. Old Desain System



Picture 4. New Design System

In contrast, the redesigned prototype (Design B) achieved an average SUS score of 81.48, classified as “Acceptable.” This improvement reflects a substantial enhancement in overall usability perception. According to prior usability studies, SUS scores above 80 indicate high user acceptance and are typically associated with systems perceived as easy to use and efficient (Alomari et al., 2020; Ferreira et al., 2023). Therefore, the SUS results confirm that the usability-driven redesign significantly improved user satisfaction.

3.1.3 Task Completion Rate Analysis

Task completion rate was used as an indicator of system effectiveness. The legacy system demonstrated a low average task completion rate of 29.6%, indicating that users frequently encountered difficulties in completing essential academic tasks. The lowest success rate was observed in tasks related to accessing legal journals, highlighting critical usability barriers in information retrieval.

The redesigned prototype significantly outperformed the legacy system, achieving an average task completion rate of

96.3%, exceeding the commonly accepted usability threshold of 80%. This finding demonstrates that the redesigned interface effectively supports users in completing academic tasks with minimal obstacles, thereby improving overall system effectiveness.

3.1.4 Efficiency Analysis: Completion Time and Number of Clicks

Efficiency was evaluated through task completion time and the number of clicks required to complete tasks. The results indicate that tasks performed using the redesigned prototype were completed substantially faster than those using the legacy system. For example, course registration tasks required an average of 45 seconds in the new prototype, compared to approximately 120 seconds in the legacy system.

Similarly, the number of clicks required to complete tasks was significantly reduced in the redesigned system. Fewer interaction steps directly correlate with lower cognitive load and reduced user frustration, contributing to improved user satisfaction and system efficiency.

3.2 Discussion

The findings of this study provide empirical evidence that a usability-driven redesign approach can substantially improve the performance of academic information systems. The observed SUS score of 81.48 exceeds the average usability scores reported in previous studies of academic systems, which typically range between 68 and 75 (Alomari et al., 2020; Ferreira et al., 2023). This suggests that integrating Design Thinking with task-based usability metrics offers greater usability gains than evaluation-only approaches.

Furthermore, the significant improvement in task completion rates and efficiency metrics highlights the importance of aligning system design with users’ real academic workflows. These results support prior research emphasizing that usability improvements directly influence system acceptance and operational efficiency in higher education environments (Matloobtalab & Ferati, 2025).

Although this study was conducted within a single faculty, the consistency of improvements across all usability metrics indicates that the proposed redesign framework is scalable and adaptable to other academic information systems with similar functional requirements. Consequently, this research contributes a replicable usability evaluation and redesign model that can inform future development of academic information systems in higher education institutions..

REFERENCES

- [1]. Alomari, H. W., Ramasamy, V., Kiper, J. D., & Potvin, G. (2020). A user interface (UI) and user experience (UX) evaluation framework for cyberlearning environments in computer science and software engineering education. *Heliyon*, 6(6), e03917. <https://doi.org/10.1016/j.heliyon.2020.e03917>
- [2]. Demirkol, D., Seneler, C., Daim, T., & Shaygan, A. (2020). Measuring perceived usability of university students toward a student information system (SIS): A Turkish university case. *Technology in Society*, 62, 101281. <https://doi.org/10.1016/j.techsoc.2020.101281>
- [3]. Ferreira, J. M., Rodriguez, F. D., Santos, A., Dieste, O., Acuña, S. T., & Juristo, N. (2023). Impact of usability mechanisms: A family of experiments on efficiency, effectiveness, and user satisfaction. *IEEE Transactions on Software Engineering*, 49(1), 251–267. <https://doi.org/10.1109/TSE.2021.3133258>

- [4]. Hudha, M., & Haryono, K. (2025). Perancangan desain UI/UX website e-learning berbasis learning management system dengan metode design thinking. *Jurnal Indonesia: Manajemen Informatika dan Komunikasi*, 6(1), 598–609.
- [5]. Jauculan, L. L., & Patayon, U. B. (2024). Enhancing UX/UI: A mixed-approach evaluation of a web-based student clearance system at a state university in the Philippines. *Procedia Computer Science*, 234, 1061–1068. <https://doi.org/10.1016/j.procs.2024.03.132>
- [6]. Matloobtalab, M., & Ferati, M. (2025). User perspectives and usability insights in a self-service portal. *International Journal of Web Portals*, 15(1), 1–30.
- [7]. Neff, M. C., Schütze, D., Holtz, S., Köhler, S. M., Vasseur, J., Ahmadi, N., Storf, H., & Schaaf, J. (2024). Development and expert inspections of the user interface for a primary care decision support system. *International Journal of Medical Informatics*, 192, 105651. <https://doi.org/10.1016/j.ijmedinf.2024.105651>
- [8]. Nielsen, J. (1995). 10 usability heuristics for user interface design. *Nielsen Norman Group*. <https://www.nngroup.com/articles/ten-usability-heuristics/>