



# Enhancing user experience of the UNIMMA online course registration system through interface redesign using the Vue.js framework

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## Abstract

The Study Plan Card (KRS) process is an important activity for students in determining their study plans each semester. However, various digital KRS systems still face usability challenges such as unintuitive navigation, inconsistent displays, and confusing course selection processes. This study aims to optimize the interface design of the Online KRS system using a User-Centered Design (UCD) approach and a Vue.js-based prototype implementation. The UCD method is implemented through four stages: understanding the context of use, determining user needs, developing design solutions, and evaluating the resulting design. Data were collected through interviews and usability testing using the System Usability Scale (SUS). The results show an increase in usability scores to the excellent category (SUS = 81.67), as well as a decrease in user errors by  $\pm 40\%$ . These findings are not only relevant to one institution, but reflect a common problem pattern in web-based academic systems in higher education. This study also empirically validates the combination of the UCD approach with a Vue.js-based Single Page Application architecture as a strategy for improving user experience in modern academic systems.

## Keywords

Framework, KRS Online, UI/UX Design, User centre Design, Vue.Js.

## Introduction

The development of information technology in recent years has driven major transformations in higher education systems around the world [1]. Academic administration processes, including student study planning, are now largely conducted online to increase the efficiency and accessibility of services [2]. However, various studies show that many digital academic systems still face usability, navigation, and interface responsiveness constraints, which can reduce system effectiveness and user satisfaction levels [3], [4].

Published:  
May 04, 2026

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BIS-STE 2025 Committee

Universitas Muhammadiyah Magelang (UNIMMA) is one of the universities that implements an online Study Plan Card (KRS) System, which is used to select courses, view schedules, view grade history (KHS), provide personal data, and pay tuition fees (UKT). Based on observations and initial interviews with several student users, several problems were found with the online KRS display, including a densely packed interface, poor responsiveness when accessed via mobile devices, and inconsistent menu navigation between pages. These conditions cause some students to experience difficulties when filling out the KRS or searching for important information in the system. These findings are in line with previous research showing that an unstructured academic system interface can reduce user comfort and effectiveness in completing academic administration tasks [3], [4].

The User-Centred Design (UCD) approach is the main method that is oriented towards user needs and characteristics to produce a system that is easy to use and efficient [5]. Through an iterative process involving user feedback, UCD has been shown to improve interface design quality and user satisfaction across a variety of educational contexts [6]. The application of this principle is also supported by the ISO 9241-11 standard, which emphasizes the importance of effectiveness, efficiency and satisfaction in interactive systems [7]. Several studies have shown that the application of UCD and measurement tools such as the System Usability Scale (SUS) can significantly improve the quality of academic system design [8],[9].

On the technology side, modern frameworks such as Vue.js offer innovative solutions for building interactive and responsive web-based interfaces [10]. Vue.js enables the development of Single Page Applications (SPAs) with high performance, easy integration, and light processing load [10],[11]. Comparative studies show that using this framework can improve performance and user experience compared to traditional multi-page application-based approaches [12]. In the context of academic systems, the implementation of Vue.js has been shown to speed up data access, simplify navigation, and improve user visual comfort [13], [14].

In addition to technical improvements, the integration of learning analytics and adaptive design approaches also contribute to improving the usability and personalization of academic services [2], [14]. By utilizing user interaction data, the system can be tailored to the needs of students and lecturers to create a more effective learning experience [1]. Similar principles are applied in the evaluation of modern e-learning systems that combine user behaviour analysis and UCD-based adaptive design [9].

Most previous research has focused on usability evaluations of academic systems or partial implementation of User-Centred Design methods. Meanwhile, studies integrating user-centred design approaches with the implementation of modern front-end frameworks are still relatively limited, particularly in the context of course registration systems. However, studies specifically combining the UCD approach with modern frameworks like Vue.js in the context of academic systems, particularly online KRS (Kartu Rencana Studi/Study Card), are still very limited. Therefore, combining the

User-centred Design approach and the Vue.js framework is a strategic step to optimize digital academic systems such as the Online Study Plan Card (KRS). The integration of the two is expected to produce a modern, efficient, and responsive interface for various devices, while meeting international usability standards [5], [7], [8].

Furthermore, much usability research on academic systems remains a single-institution case study without exploring broader implications for the higher education system as a whole. Yet, issues such as inconsistent navigation, lack of mobile responsiveness, and information overload are common characteristics of various academic portals. Therefore, there is a research gap on the integration of an empirically validated User-centred Design approach with the implementation of modern frontend technology based on Single Page Application in the context of an academic registration system.

This study aims to redesign the interface of the Online KRS system using the UCD approach with the implementation of the Vue.js framework with the main contributions of this study being: Identifying usability problem patterns of the academic registration system that are general and generalizable. Integrating the User-centred Design approach with the implementation of a Vue.js-based Single Page Application architecture. Providing empirical validation of usability improvements using the System Usability Scale (SUS). Offering a design framework that can be replicated in academic systems at other universities.

## Method

This study uses descriptive quantitative research with a User-Centered Design (UCD) approach. This approach emphasizes user involvement at every stage of the design to ensure the resulting solution meets user needs [15]. The research participants consisted of 20–30 active students selected using purposive sampling based on their experience using the KRS system. This number refers to the recommendation of usability studies which state that 15–30 participants are sufficient to identify the majority of usability issues in interactive systems [16]. However, the relatively small sample size is acknowledged as a limitation of the study and will be addressed in the discussion section. Usability evaluation was conducted using the System Usability Scale (SUS). In addition to descriptive analysis, interpretation of SUS scores was conducted using grade categories and international usability benchmarks to increase the validity of the interpretation of the results. This approach has been proven to improve design quality, user satisfaction, and the effectiveness of digital systems in the context of education and web-based applications [17]. The UCD stages used in this study are shown in Figure 1. These stages consist of: Specify the Context of use, Specify the user and organizational requirements, Product design Solutions and Evaluate design against user requirements.

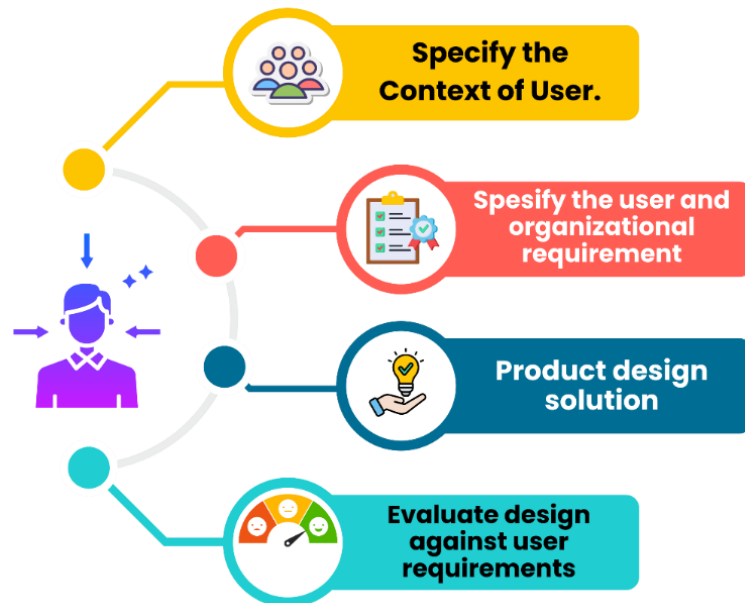


Figure 1. UCD Method Stages

### *Specify the context of user*

Specifying the Context of Use is an initial phase activity. This process involves identifying the system's users, when the system will be used, and how they will use it. This activity involves conducting initial observations and interviews to understand: who the system users are, the devices used, the purpose of the system, and the obstacles and behaviors of users when using the system. The goal of this activity is to identify the actual conditions and needs of users.

### *Specify the user and organisational requirements*

This stage involves grouping specific user problems. These problems are obtained from survey results. Activities carried out include converting observation and interview findings into a list of user needs, grouping needs based on priority, and compiling functional and non-functional requirements. The goal is to obtain clear requirements as a basis for solution design.

### *Product design solutions*

This is the activity of creating wireframes and high-fidelity prototypes. Implementing the design results using the Vue.js framework to produce a Single Page Application (SPA) display. Vue.js was chosen because it has faster rendering performance and is more responsive than other frameworks [18]. The goal is to produce an interface design that is modern, fast, and easy to use.

### *Evaluate design against user requirements*

This activity involves users testing the prototype and measuring its usability using the System Usability Scale (SUS).

The goal is to assess whether the design meets user needs and improve the system's usability [19].

## Results

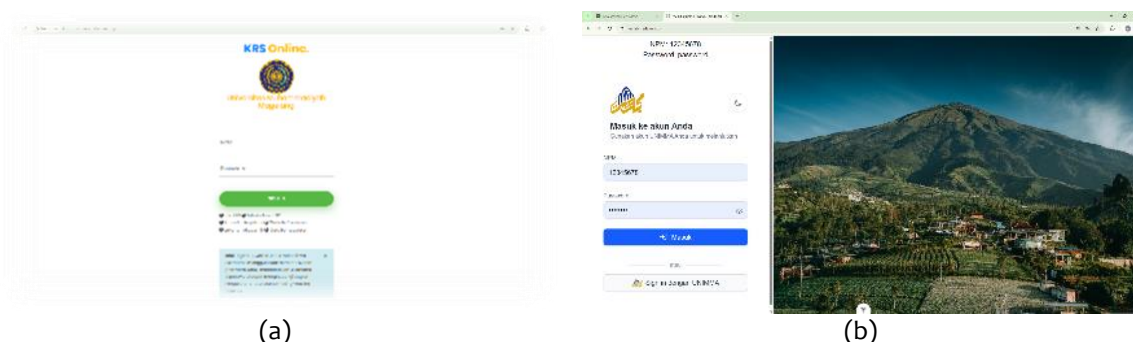
The system overview before the redesign based on observations that have been made found several problems as shown in [Table 1](#).

[Table 1](#). Problems in the existing system

Problems in the existing system	Impact on Users
Interface information is dense and mixed	Students are confused about finding important menus
Inconsistent navigation between pages	Increases information search time
Not responsive on mobile devices	Requires manual zoom when filling out the KRS
Visual appearance is not modern	Makes the system less comfortable for users

### Login page

The login page on the redesigned KRS Online system is designed with a simpler, cleaner, and more responsive appearance. Input elements such as student ID numbers and passwords are displayed in larger sizes and with clear color contrast, making it easier for users to complete the authentication process, especially on mobile devices. The centralized layout and minimal distractions help users focus directly on the login process without confusion. Based on user feedback, the new design of the login page improves convenience and reduces input errors compared to the previous system, as seen in [Figure 2](#).



[Figure 2](#). (a) Login Page Before Redesign (b) Login Page After Redesign

[Figure 2](#). shows the final result of the login menu interface redesign process. This design adopts a modern split-screen approach, dividing the user's visual focus into two main areas: functional and contextual aesthetics.

### Dashboard page

The redesigned student dashboard on the KRS Online system serves as a central information centre, presenting an integrated summary of academic and administrative data. Key information such as academic status, number of credits taken, semester GPA, and payment status is displayed in structured, easy-to-understand information cards. The clear hierarchy of visual elements allows users to quickly access key information without having to navigate pages. Design dashboard which the new also prioritizes consistency of navigation and readability of information, both on mobile devices. Desktop or mobile. The use of the Vue.js framework allows for dynamic and responsive data updates, resulting in faster and more efficient user interactions. Based on usability evaluations and user feedback, the redesigned dashboard was deemed more

informative, intuitive, and able to improve students' efficiency in accessing academic information compared to the previous system.

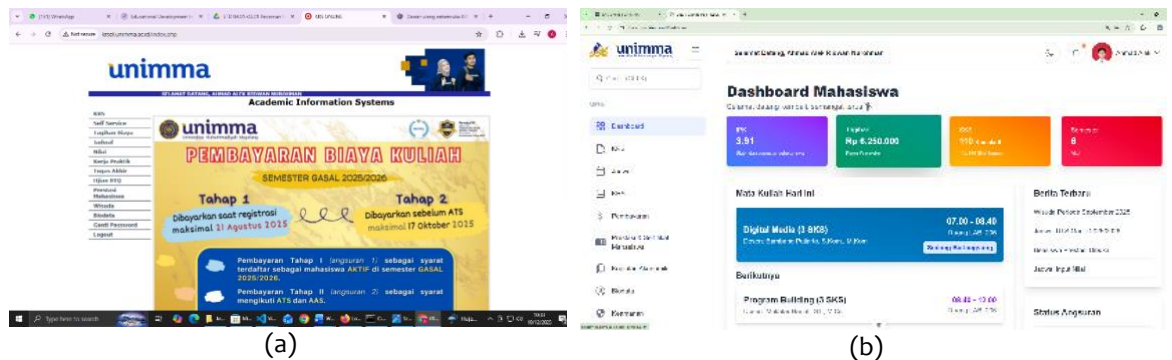


Figure 3. Dashboard Page Before Redesign. (b) Dashboard Page After Redesign

Figure 3 shows the implementation results of the Course Registration System dashboard redesign. This redesign focuses on Information-Oriented Design principles and visual hierarchy to ensure users can access key data and functions quickly and efficiently, a significant departure from the previous dashboard layout which was dense and less structured.

### KRS page

The KRS entry page is a key feature in the academic system that has undergone significant improvements in information structure and navigation. The redesigned course list is structured with clear information separation, such as course code, course name, number of credits, class, and lecturer. A search feature and course status indicator make it easier for students to select courses quickly and accurately. Furthermore, the Vue.js-based responsive design allows the KRS entry page to be optimally accessed from both desktop and mobile devices. These improvements have resulted in a reduction in user error rates of up to ±40% and a faster KRS filling process. KRS page before-after redesign shows in Figure 3.

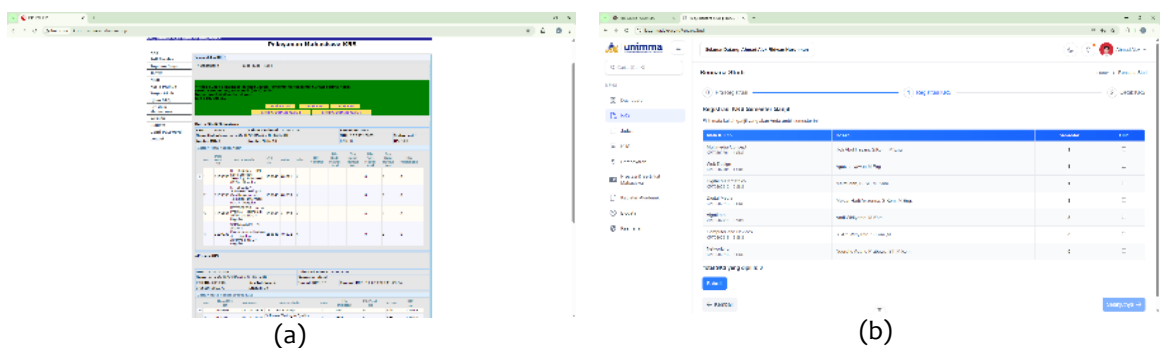


Figure 4. (a) KRS page before redesign. (b) KRS page after redesign

### Payment page

The redesigned payment page on the KRS Online system displays billing information more concisely and informatively presents in Figure 5. Important information such as the total bill, payment status, and cost component details are presented in a structured and easy-to-read format. The use of visual elements such as information cards and

colour-coordinated payment statuses help users quickly understand their academic financial situation. Furthermore, a responsive interface ensures users can conveniently access payment information across various devices. Based on the usability evaluation, the redesigned payment page is deemed easier to understand and increases user trust in the system.

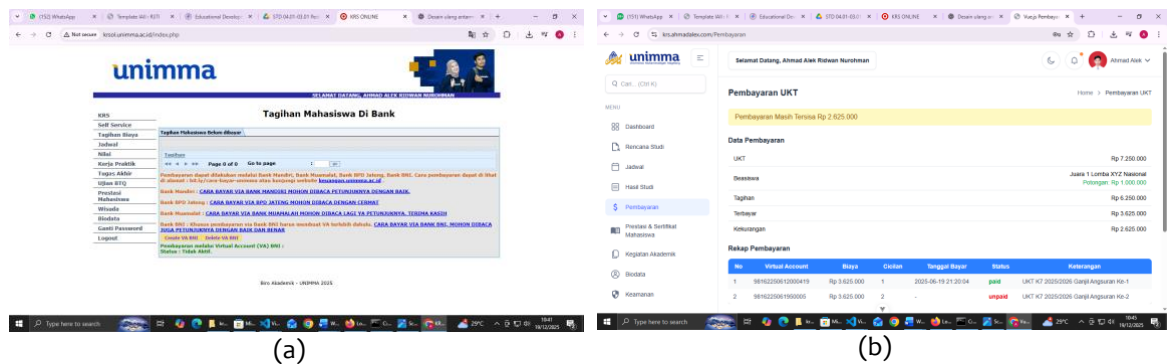


Figure 5. (a) Payment page before redesign. (b) Payment page after redesign

The previously used online KRS system displayed a disorganized interface. Pages such as the login, dashboard, KRS menu, schedule, grades, payment invoices, final assignments, and graduation all contained dense information and were less responsive on mobile devices. On the login page, the student ID number (NIM) and password input forms appeared small and difficult to access, especially on devices with small screens, requiring users to zoom in. Similarly, the KRS page appeared cluttered and contained too much information at once, making it difficult for users to find the courses they wanted. The KRS menu, which should have made it easier for students to select courses, actually slowed the process down due to its unintuitive layout. The payment invoice and grade pages were also poorly structured, making it difficult for users to quickly find the information they needed. Overall, the system created an uncomfortable user experience, with difficult navigation and a cluttered layout.

The redesigned KRS Online system displays significant improvements in structure, readability, and responsiveness across multiple devices (desktop and mobile). All redesigned pages feature a cleaner appearance, more structured information organization, and more intuitive navigation, making the system more efficient and enjoyable for students. This redesign provides a better user experience, in line with User-Centred Design (UCD) principles.

## Discussion

Usability testing was conducted on a redesigned prototype involving 30 respondents (active students). Data were collected from 10 SUS questions, resulting in a final score of 32.5. The final SUS score calculation yielded a value of 81.67, which is categorized as Excellent (Grade A). These results indicate that the UCD approach is effective in improving the quality of the user experience of the academic system. According to Brooke, a SUS score above 80 indicates a highly usable system and is recommended

[20]. When compared to global usability benchmarks, a score above 80 indicates high user acceptance and potential for wider adoption. These results align with research by Fahriyah et al., which found that implementing UCD significantly improved perceived ease of use and user satisfaction [21].

A comparison between the legacy system and the redesigned system is shown in Table 2. The legacy system had major issues with information structure, navigation, and responsiveness, particularly on mobile devices. After the UCD-based redesign, the system became more structured, navigation more consistent, and the interface more responsive.

Table 2. Comparison of KRS online system before and after redesign

Aspect	Existing System	System Redesign	Impact
Information Structure	Unstructured	Structured and hierarchical	Easier to understand information
Navigation	Inconsistent	Consistent and clear	Reduces user confusion
Responsiveness	Not optimal for mobile	Responsive across devices	Increases convenience
Visual Appearance	Conventional	Modern and minimalist	Increases satisfaction
Error Rate	Relatively high	Decreased by $\pm 40\%$	More effective KRS process

The application of the UCD method in this study proved effective because it directly involved users in the design process. This approach aligns with research on the Jakarta MRT, which emphasized the importance of understanding user needs as the basis for developing an intuitive interface [21].

From a technical implementation perspective, the use of Vue.js as a Single Page Application (SPA) framework supports increased responsiveness and speed of system interactions. This reinforces previous research findings that modern front-end frameworks can improve the overall user experience.

Thus, the results of this study demonstrate that the combination of the UCD method and the use of Vue.js significantly improves the usability of the Online KRS System. These findings are expected to serve as a reference in the development of academic information systems at other universities.

This study has several limitations. First, the study was conducted at a single institution, so the organizational context and technological infrastructure may have influenced the results. Second, the usability sample size was relatively small, requiring caution in generalizing the findings. Third, the usability evaluation used the SUS, which is perceptual in nature and lacks other quantitative metrics such as task completion time or experimental error rate.

Although conducted at a single university, the findings of this study have broader implications. The usability issues identified such as information overload, inconsistent navigation, and lack of mobile responsiveness are common characteristics of many academic systems in higher education. Therefore, the integrative approach of User-Centered Design and a Vue.js-based SPA architecture has the potential to be applied to

other academic systems, including learning management systems, student portals, and higher education administration systems. Future research is recommended to include multiple institutions and additional usability metrics to increase the external validity and generalizability of the findings.

## Conclusion

This research resulted in a redesign of the KRS Online system interface using a User-Centred Design approach and Vue.js implementation. The usability evaluation showed a SUS score of 81.67, which is categorized as Excellent. Conceptually, this research confirms that integrating user-centred design methods with modern frontend architecture can be an effective strategy in improving the quality of the academic system user experience. Practically, the resulting design framework can be replicated and adapted to academic systems at other universities, particularly in the development of modern web-based student portals. These findings strengthen UCD's position not only as a design method but also as a strategic approach to the digital transformation of higher education services.

## Acknowledgement

The authors would like to express their sincere gratitude to R. Arri Widyanto, S.Kom., M.T., as the Head of the Information Technology Study Program at Universitas Muhammadiyah Magelang (UNIMMA) and the main supervisor, for his invaluable guidance, continuous support, and constructive feedback throughout the completion of this research. Special appreciation is also extended to Agus Setiawan, M. Eng Head of the Information Systems Bureau, as the second supervisor, for his insightful suggestions, technical assistance, and encouragement during the research process. Furthermore, the authors would like to convey their deepest appreciation to Prof. Dr. Muji Setyo, S.T., M.T., as the Conference Chairman of The 7th Borobudur International Symposium on Science and Technology 2025, for providing the opportunity to present and publish this work at the conference. Finally, sincere thanks are given to all parties who have contributed directly or indirectly to the successful completion of this study.

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