

The Development of a Partnership Satisfaction Survey Using User-Centered Design and System Usability Scale

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ABSTRACT

Strategic partnerships between universities and external stakeholders such as industries, government agencies, and academic institutions are essential for enhancing research innovation, graduate employability, and institutional competitiveness. However, the effectiveness of these collaborations is often hindered by the absence of systematic tools for evaluating partner satisfaction. This study aims to develop a web-based partner satisfaction management system using the User-Centered Design (UCD) approach to ensure alignment with user needs and to evaluate its usability using the System Usability Scale (SUS). The UCD methodology was applied through iterative stages involving need identification, context analysis, user requirement specification, prototype development, and usability evaluation. The SUS instrument was employed to quantitatively assess usability, including learnability, efficiency, and user satisfaction. The results indicate that the system achieved an average SUS score of 95.32, categorized as excellent usability, demonstrating that the platform is highly intuitive, efficient, and supportive of stakeholder engagement. Expert feedback confirmed the system's effectiveness in facilitating satisfaction monitoring, enabling institutions to make data-driven decisions for continuous improvement in collaboration strategies. These findings highlight the significance of UCD in developing user-centric systems within higher education management and confirm the feasibility of web-based solutions for partnership optimization. Moreover, this research supports SDG 17 (Partnerships for the Goals) by promoting effective institutional collaboration through digital innovation, contributing to sustainable educational and societal advancement.

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1. INTRODUCTION

Universities play a strategic role in fostering collaborations with diverse partners, including industries, government institutions, and other academic entities. Such strategic partnerships are crucial for higher education institutions because they provide access to a wide range of resources, expertise, and opportunities beyond the academic environment (Rossoni et al., 2024; Yashchyshyna, 2024). Collaborations enable universities to conduct more comprehensive and innovative research projects, enhance the relevance of education to labor market demands, and strengthen graduates' employability and institutional competitiveness (Chovriy et al., 2024; Damoc, 2017). Moreover, these partnerships contribute to broader economic and social progress by facilitating knowledge transfer and innovation (Alieksieieva, 2023). However, despite their importance, the effectiveness of university-partner collaborations often faces limitations due to the absence of systematic evaluation systems for assessing partner satisfaction. Without structured mechanisms for identifying partner expectations and feedback, institutions risk developing superficial partnerships that lack long-term sustainability and fail to support strategic performance targets.

Recent developments in web-based technologies offer promising solutions to these challenges by enabling the creation of integrated information systems that can streamline communication, evaluation, and data management processes. Web-based systems are particularly advantageous because of their flexibility, scalability, and accessibility—users can interact with the platform from any location using various devices, including mobile phones and computers (Rozi et al., 2022; Fatoni et al., 2020; Alelo et al., 2021). The dynamic nature of web applications supports the continuous growth of users and business processes while maintaining adaptability to institutional needs (Harisnur & Gunawan, 2022; Nasution & Nusa, 2021). These characteristics make web technology an ideal platform for developing information systems that aim to support partner relationship management and satisfaction monitoring within higher education settings.

Developing an effective information system, however, requires more than technical implementation; it necessitates a user-centered design approach to ensure usability, efficiency, and acceptance among end-users. The User-Centered Design (UCD) methodology has emerged as a key paradigm in system development because it emphasizes user needs, behaviors, and contexts throughout the design process (Cahyani & Dwi, 2022). UCD involves iterative cycles of design, testing, and refinement, allowing designers to continuously adapt the system based on user feedback. This iterative process ensures that the resulting product aligns closely with real user expectations, thereby reducing the risk of design failures (Yanti et al., 2022). The approach further focuses on understanding how users interact with a system in their

actual work environments, ensuring that the final product delivers both functional and experiential value (Ferliamo et al., 2023). Consequently, UCD not only enhances system usability but also improves overall satisfaction, making it a preferred approach for developing user-oriented systems.

In the context of higher education, the implementation of UCD principles can address the persistent issue of inadequate usability in institutional systems. Traditional top-down approaches to system development often neglect the diverse needs of stakeholders, including faculty members, administrative staff, and external partners. By integrating UCD, developers can engage users in every phase of system development—requirement analysis, interface design, and usability testing—ensuring the product’s relevance and usability. The iterative feedback mechanism in UCD helps bridge the gap between user challenges and design solutions, ultimately creating systems that are intuitive and efficient. Prior studies have shown that UCD can significantly improve system performance and user satisfaction in various domains, including education, health, and business administration (Rudin et al., 2025; Yudaputra et al., 2024). These findings highlight the potential of UCD as a methodological framework for designing web-based systems that cater to complex organizational needs, such as monitoring university partnership satisfaction.

Previous research has demonstrated the effectiveness of UCD in diverse system development contexts. For instance, Nouriska et al. (2023) applied UCD to develop an automated answer evaluation system and achieved a 90% effectiveness rate among teachers and students, with high satisfaction scores based on UEQ-S and PSSUQ metrics. Similarly, Ferliamo et al. (2023) utilized ethnographic field studies and UCD to design a notarial operational application prototype, achieving a success rate of 97.2% and a SUS score of 93 (grade A, Excellent). Grizelda and Septiani (2020) implemented UCD for a web-based licensing system at PT Alfa Goldland Realty, resulting in improved service efficiency and effectiveness for both consumers and administrators. These studies collectively affirm that UCD not only produces functional software but also enhances user experience by incorporating user feedback throughout the design lifecycle. The approach’s adaptability and focus on end-user perspectives make it especially relevant for institutional systems that rely on diverse stakeholder interactions.

Building on this foundation, several recent studies have integrated UCD principles into higher education contexts, particularly in system design for academic and administrative processes. Adanson and Fitriana (2022) employed UCD in developing a web-based management desk (Midesk) application, emphasizing iterative user testing to ensure accessibility and responsiveness. Likewise, Cahyani and Dwi (2022) redesigned a school website using UCD to improve user satisfaction and information accessibility. In healthcare, Yudaputra et al. (2024) utilized UCD to

design a mobile-based tele-dermatology system for Indonesian clinics, demonstrating the method's flexibility in adapting to different domains. Despite the proven success of UCD, few studies have specifically applied this approach to the domain of university–industry or institutional partnership management. Most existing systems remain focused on administrative or academic management, leaving a gap in designing user-centered solutions that address partner engagement and satisfaction within higher education institutions.

To address this research gap, the present study proposes the development of a web-based partner satisfaction management system for the Faculty of Mathematics and Natural Sciences, Universitas Negeri Semarang (FMIPA UNNES). This system aims to enhance the institution's capacity to evaluate and manage strategic collaborations with external partners by applying UCD principles to ensure high usability and stakeholder relevance. The study's primary objectives are twofold: first, to design and implement an effective and efficient partnership satisfaction system using the User-Centered Design approach; and second, to evaluate the system's usability level through the System Usability Scale (SUS) to determine its readiness for deployment. The novelty of this research lies in applying UCD to the context of university partnership management—a domain that has received limited attention in prior research—while integrating systematic usability evaluation to validate the system's performance. By doing so, this study contributes to expanding the body of knowledge in the intersection of human-computer interaction, web-based system development, and higher education management. Furthermore, it provides practical insights for academic institutions aiming to strengthen collaboration management through user-centered technological innovation.

2. RESEARCH METHODS

2.1 User-Centered Design

This study employs the User-Centered Design (UCD) methodology as its primary framework to guide the development of the partner satisfaction management system for the Faculty of Mathematics and Natural Sciences, Universitas Negeri Semarang (FMIPA UNNES). UCD is widely recognized as a human-computer interaction (HCI) approach that emphasizes users as the focal point of every design and development process (Cahyani & Dwi, 2022; Ferliamo et al., 2023). According to Rudin et al. (2025) and Yudaputra et al. (2024), UCD operates through an iterative cycle that involves understanding users' contexts, identifying their needs, creating design solutions, and evaluating these solutions to ensure they meet users' expectations. This approach ensures that the system developed is not only technically functional but also aligns with the users' real-world workflows and cognitive patterns. The iterative nature of

UCD allows continuous refinement of the system through user feedback, which is essential for producing solutions that are both efficient and satisfying for end-users.

In this research, the UCD framework is applied through a structured process that begins with identifying institutional needs, followed by understanding and defining the context of system use, determining specific user requirements, developing design solutions, and evaluating those solutions against the initial needs. This cyclical process continues until the system design meets both institutional and user expectations. Figure 1 illustrates the overall problem-solving approach applied in this study, adapted from Rudin et al. (2025) and Yudaputra et al. (2024).

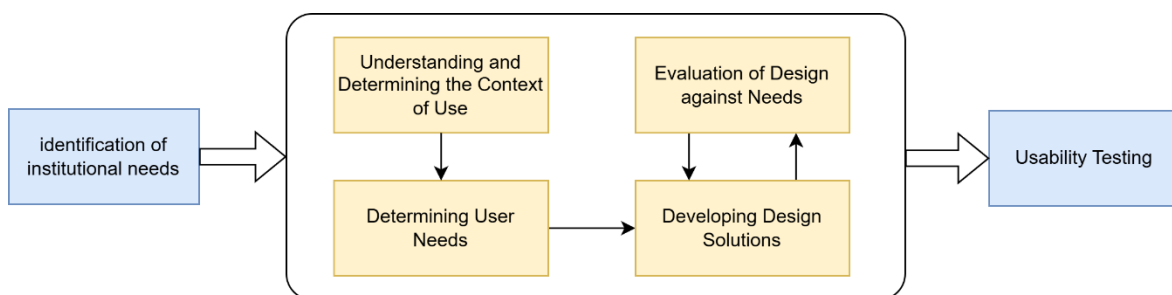


Figure 1 Problem-solving approach adapted from Rudin et al. (2025) and Yudaputra et al. (2024).

The initial stage, identification of institutional needs, involves analyzing the university's partnership management goals, performance indicators, and existing collaboration mechanisms. This phase aims to gather comprehensive data about how partner satisfaction is currently managed and identify inefficiencies or missing evaluation components. Such an analysis ensures that system development aligns with organizational objectives and contributes meaningfully to institutional performance (Rossoni et al., 2024; Chovriy et al., 2024). Data for this phase were collected through document reviews, institutional reports, and preliminary interviews with university administrators.

The subsequent phase, understanding and defining the context of use, involves gathering information about how the system will be utilized in real-world settings. This includes identifying user profiles such as collaboration managers, administrative staff, and external partners, as well as analyzing the physical and technical environments in which the system will operate. In line with the recommendations by Ferliamo et al. (2023) and Rudin et al. (2025), this stage combines literature review, observation, and stakeholder interviews to ensure a comprehensive understanding of the users' working conditions and digital interaction patterns. By deeply understanding this context, the design process can anticipate potential usability issues and align the interface with users' expectations.

The next step, determining user requirements, translates the contextual understanding into specific design objectives and functional needs. These requirements encompass both functional aspects (e.g., data entry, reporting, feedback management) and non-functional aspects (e.g., accessibility, usability, and security). The process adheres to the user requirement elicitation framework outlined by Yanti et al. (2022), emphasizing inclusivity and participatory engagement from all key stakeholders. The outputs of this stage serve as a foundation for prototype development and subsequent usability evaluations.

The design solution development phase focuses on transforming user needs into system prototypes that incorporate intuitive interfaces and efficient workflows. This stage leverages modern web technologies—specifically, the Laravel framework—to ensure that the system is scalable, secure, and compatible across devices (Harisnur & Gunawan, 2022; Alelo et al., 2021). Design mock-ups are developed using iterative prototyping, where each version undergoes small-scale evaluations to refine layout, navigation flow, and visual elements. This process is consistent with UCD principles, which emphasize iterative validation and user feedback integration (Cahyani & Dwi, 2022).

Following design development, the evaluation phase involves assessing how well the prototypes meet the predefined user requirements. This phase plays a crucial role in ensuring that the developed solutions align with user expectations and institutional objectives. Consistent with previous studies (Nouriska et al., 2023; Grizelda & Septiani, 2020), usability tests and heuristic evaluations are conducted to identify design inconsistencies or interaction inefficiencies. Feedback collected during this phase informs iterative revisions until the design achieves optimal usability performance. The evaluation process is therefore not a final step but an ongoing validation that ensures the product evolves in response to real user input. Once the final iteration is achieved, the system proceeds to usability testing using the System Usability Scale (SUS) instrument.

Overall, the UCD methodology adopted in this study embodies the principle that design success depends on aligning technological capabilities with human needs and institutional goals. The iterative and participatory nature of UCD allows developers and users to co-create a solution that maximizes functional efficiency and user satisfaction. This framework provides a rigorous foundation for developing systems that are adaptable to diverse institutional contexts, ensuring not only technical robustness but also sustainable adoption by the intended users.

2.2 System Usability Scale

The System Usability Scale (SUS) serves as the primary instrument for evaluating the usability of the developed partner satisfaction management system. Originally

introduced by John Brooke in 1986, SUS is a standardized and reliable tool widely used across disciplines to measure users' perceived usability of systems (Brooke, 1996; Sauro, 2011). It comprises ten statements that alternate between positive and negative formulations, rated on a five-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5). The SUS score is calculated by adjusting for the polarity of each item, summing the results, and multiplying by 2.5 to yield a final score between 0 and 100. Scores above 68 are generally interpreted as indicating above-average usability, with values exceeding 85 classified as excellent (Bangor, Kortum, & Miller, 2008).

SUS has been widely validated in various domains, including health informatics (Rudin et al., 2025), education (Nouriska et al., 2023), and business applications (Grizelda & Septiani, 2020). Its advantages include simplicity, reliability, and versatility in capturing overall usability perceptions without requiring extensive test sessions. In this study, SUS is chosen because it provides a standardized quantitative measure that complements qualitative findings obtained through interviews and observations. The integration of SUS within the UCD process enables a more comprehensive evaluation, ensuring that the system's design improvements are grounded in measurable user feedback.

The implementation of SUS in this research follows the final phase of the UCD cycle—usability testing. Once the design has undergone several iterations of refinement, the system prototype is tested by expert evaluators who represent key user roles within the university partnership management ecosystem. The SUS questionnaire is administered after participants interact with the system, allowing them to reflect on their experiences regarding ease of use, interface clarity, functionality, and overall satisfaction. The resulting scores are then analyzed to determine the system's usability level. As demonstrated in related studies by Ferliamo et al. (2023) and Yudaputra et al. (2024), SUS provides actionable insights that can guide final design optimizations and validate system readiness for deployment.

Moreover, the SUS assessment in this research does not merely function as a validation metric but as an integral feedback mechanism within the iterative UCD framework. It ensures that the system design adheres to usability standards and supports user-centered outcomes. High SUS scores reflect effective integration of UCD principles, confirming that the developed system fulfills both the functional and experiential expectations of its intended users. Conversely, if the SUS score indicates suboptimal performance, the iterative cycle continues—returning to the design or evaluation phases until the desired usability threshold is achieved.

In this study, the results of the SUS evaluation demonstrate that the system achieved an average score of 95.32, which classifies it under the "Excellent" category

according to Bangor et al. (2008). This score indicates a high level of user satisfaction and ease of use, aligning with findings from previous UCD-based research projects that achieved comparable SUS outcomes (Nouriska et al., 2023; Ferliamo et al., 2023). The implication of this result is twofold: first, it validates the effectiveness of the UCD approach in developing user-friendly web-based systems within academic institutions; second, it confirms that the developed system meets the practical and emotional needs of users, thereby supporting the long-term sustainability of the university's partnership management efforts.

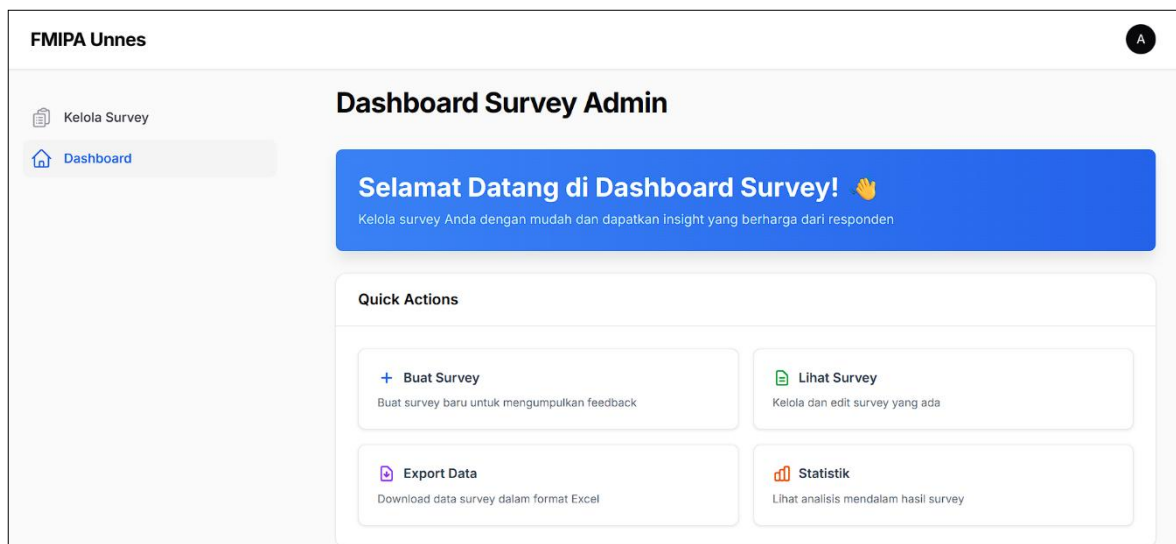
Through the integration of UCD and SUS, this research establishes a comprehensive methodological framework that balances qualitative and quantitative evaluation dimensions. The UCD process ensures participatory, iterative design grounded in user needs, while SUS provides empirical validation of usability outcomes. Together, they offer a robust foundation for designing, developing, and validating web-based systems that are efficient, satisfying, and aligned with institutional objectives.

3. RESULTS AND DISCUSSION

The current study obtained a total of 729 genuine responses from the participants. Among the entire sample of respondents, 680 (93%) were female and 49 (7%) identified as male. In the last study, 490 (67%) of the participants were from high school. A significant proportion of participants, 332 (46%), identified as being between the ages of 20-22. In relation to TikTok use, 274 (38%) users use TikTok on social media in a day.

3.1 User Interface of Survey System

The satisfaction survey system is an information system developed to survey various activities and services for quality assurance at the FMIPA, UNNES. In Admin page, the satisfaction survey system consists of two main pages: dashboard and survey management page.



On the *Survey Management* page, users can view all surveys in a structured table that displays key information such as the number of questions, total respondents, and an internal index indicating quality, priority, or performance. New surveys can be created using the *Add Survey* button, while the *Edit* action allows updates to titles, question content, or active status, and *Delete* enables removal with confirmation to prevent accidental loss. Surveys can be sorted or searched by available columns, and clicking on a row provides access to details, previews, and distribution options for efficient administration. From this view, administrators can navigate to the *Question Management* page (Figure 3), where they can add items using various formats such as Likert scales (e.g., very satisfied–not satisfied), dropdown selections, or text responses. Each question can be configured with attributes like required status, answer labels, hints, and ordering for logical survey flow, and previewed before saving. On the *Analytics* page, each question is displayed alongside an index derived from respondents' scale-based answers, allowing quick identification of strong and underperforming areas. Selecting a question reveals detailed response distributions—such as Likert scale proportions, dropdown selections, or categorized text inputs—enabling data-driven evaluation of question effectiveness and facilitating informed decision-making for improvement.

In the satisfaction survey system, the respondent interface consists of two main pages: the survey input page and the statistical results page. On the *Survey Input* page, respondents are required to answer questions according to their types—selecting a single option on a Likert scale (e.g., strongly disagree to strongly agree), choosing from a dropdown list when options are provided, or entering responses in a text field. Mandatory questions are clearly marked and respondents can navigate between questions using the right-side scroll bar, review their responses, and then submit them by clicking *Submit*, after which a confirmation message indicates that their responses have been recorded. All submitted data is used solely for survey analysis and is kept confidential in accordance with applicable regulations. The *Statistical Results* page mirrors the layout of the admin analytics view, enabling respondents to view aggregated results once they are made accessible

3.2 SUS Score for Satisfaction Survey System

The System Usability Scale (SUS) questionnaire was employed to gather expert evaluations of the system's overall performance based on key usability dimensions, including learnability, usability, and user satisfaction. As a widely adopted and validated instrument in usability studies, SUS provides a reliable metric for assessing how intuitive the system is to learn, how efficiently it can be used, and how satisfactory the interaction experience is from the perspective of expert users. In this study, SUS was administered to media experts who were asked to respond to a series of standardized statements reflecting their perceptions of the system's ease of use, consistency, complexity, and confidence during interaction. The insights derived from this questionnaire serve as the foundation for interpreting the system's usability quality and are presented in the following section as part of the result analysis.

Table 1. Indicator of SUS Questionnaire

Code	Aspect	Indicator
L01	<i>Learnability</i>	I feel most people will learn to use this system quickly.
L02	<i>Learnability</i>	I feel I will need technical assistance to use this system.
L03	<i>Learnability</i>	I need to learn a lot before I can use this system.
U01	<i>Usability</i>	I feel the functions in this system are well integrated.
U02	<i>Usability</i>	I find this system difficult to use.
U03	<i>Usability</i>	I feel the system's interface is appropriate for its primary function.
S01	<i>Satisfaction</i>	I find the system's interface attractive and easy to navigate.
S02	<i>Satisfaction</i>	I feel this system provides a comfortable experience for its users.

Two media experts evaluated the usability of the system developed through responses using the SUS questionnaire. Both are experts in software development and lecturers in the information systems study program with 7 and 5 years of experience, respectively. The results of the two media experts' responses can be seen in Table 2.

Table 2. Indicator of SUS Questionnaire

Expert	Total Score	Final Score
1	32	100
2	29	90.63

3.3 Discussion

Based on the assessment results of two experts on the eight System Usability Scale (SUS) indicators, the system generally demonstrated excellent usability. Most indicators scored highly, particularly in the areas of ease of learning and functional integration. Indicators such as L01 (ease of learning), U01 (integration of system functions), U03 (suitability of

the interface to the main functions), S01 (attractive and easy-to-navigate display), and S02 (user comfort) received average scores above 3.5, indicating that the system was perceived as intuitive, functional, and capable of providing a pleasant user experience. This indicates that the system design successfully met basic user expectations for ease and comfort of use, with an interface deemed attractive and well-integrated.

However, several indicators with relatively low scores, namely L02, L03, and U02, related to the need for technical assistance, the initial learning process, and perceived difficulty in using the system. Average scores in the range of 1–2 for these three indicators indicate that some users still felt they needed initial adaptation and support before they could use the system optimally. However, these results can also be interpreted positively, as these weaknesses only emerged in the initial stages of use, while core aspects such as the interface and usability have demonstrated strong performance. Overall, the system has high potential to achieve excellent usability with minor improvements in training and user guidance.

Based on the System Usability Scale (SUS) calculations performed by two experts, the total scores were 32 and 29, respectively, with final scores of 100 and 90.63, resulting in an average SUS score of 95.32. This value indicates that the system falls within the excellent usability category and can be considered very suitable for use without the need for major improvements. A score close to the maximum reflects that the system is considered very easy to use, has an intuitive interface, and provides an optimal user experience. With a high level of expert satisfaction, it can be concluded that the system design meets the principles of effective, efficient, and enjoyable usability for users, making it ready for implementation in a broader operational context.

4. CONCLUSION

Based on the results of the System Usability Scale (SUS) analysis involving two experts, this study indicates that the developed system has a very high level of usability, with an average score of 95.32, which falls into the excellent usability category. These results reinforce previous findings from indicator analysis, which found the system was easy to use, had an intuitive interface, and provided a positive and comfortable user experience. These scores also reflect the system's ability to efficiently support user needs without requiring extensive technical assistance or a complex learning process. Therefore, these findings confirm that the system design successfully meets basic usability principles, such as effectiveness, efficiency, and user satisfaction.

The implications of these results suggest that the system can be readily implemented in broader usage contexts, such as field testing with end users, to ensure the consistency of usability results across a more diverse population. Academically, this research contributes to the development of the body of knowledge in the field of human-computer interaction (HCI), particularly in the aspect of usability measurement based on a quantitative approach using the SUS. This research also

opens up opportunities for further studies that focus on a more in-depth analysis of user experience (UX), including exploration of emotional factors, perceptions of interface beauty, and system adaptation to various usage contexts and user digital literacy levels.

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