ISSN: 2623-1662 (online), 2460-092X (printed)
DOI: https://doi.org/10.19109/jusifo.v10i2.25258
Vol. 10, No. 2 (2024), p.135-142

JUSIFO
JURNAL SISTEM INFORMASI

Research Article [OPEN ACCESS]

Designing an Academic Advising Information System: A Human-Centered Design Approach

Angelia Angelia*, Johan Jimmy Carter Tambotoh

ABSTRACT

The digital transformation in higher education necessitates a reliable academic advising information system to enhance student support and academic decision-making. This study presents the design of an Academic Advising Information System using a Human-Centered Design (HCD) approach to address various challenges in academic advising, including ineffective communication, fragmented platforms, and inefficient documentation. By applying HCD principles, the system prioritizes usability, accessibility, and emotional considerations, ensuring an intuitive and supportive user experience for both students and academic advisors. This study follows an iterative development framework, integrating user insights through observations, interviews, and iterative improvements to refine system features such as advising history tracking and streamlined communication channels. The results indicate that the application of HCD effectively optimizes advising interactions, reduces administrative burdens, and enhances student engagement. This study contributes to the broader discourse on user-centered educational technology, emphasizing the importance of aligning digital solutions with user expectations. Future research should explore the scalability and adaptability of this system across various academic institutions to validate its broader applicability.

Keyword: Academic advising information system, higher education technology, human-centered design

Received: October 31, 2024; Revised: December 25, 2024; Accepted: December 30, 2024

Corresponding Author: Angelia Angelia, Department of Information System, Universitas Kristen Satya Wacana, Indonesia, 682020039@student.uksw.edu
Authors: Johan Jimmy Carter Tambotoh, Department of Information System, Universitas Kristen Satya Wacana, Indonesia, johan.tambotoh@uksw.edu

1. INTRODUCTION

The digital transformation in higher education has significantly changed academic processes, making efficient information systems essential for educational institutions. At Universitas Kristen Satya Wacana (UKSW), information systems play a crucial role in supporting both administrative and academic activities. The implementation of the Sistem Informasi Akademik Satya Wacana (SIASAT) has improved student services, enabling various academic processes such as completing semester study plans, viewing academic performance results, applying for tuition payment dispensations, reviewing library borrowing histories, and registering for theses upon meeting specific requirements. One important feature of SIASAT is its ability to allow students to submit their study plans each semester, a process that requires prior consultation with their academic advisors.

Academic advising is a vital part of ensuring student success, although it often receives less attention compared to other academic responsibilities. Research highlights that academic advising plays a crucial role in helping students achieve their educational goals (Suprihatin, 2017; Zakiyatunufus, 2019). Similarly, Zaher (2024) notes that while academic advising is important, it is frequently overshadowed by teaching

activities. At UKSW, the academic advising process faces several challenges, particularly in adapting to digital developments. Key issues include ineffective communication between advisors and students, difficulties in managing academic performance data, and the use of multiple platforms such as email, Google Meet, and Zoom for consultations. These challenges indicate the need for a more integrated system to support academic advising (Hemidli, 2023).

Designing an effective academic advising system requires a user-centered approach to ensure it meets user needs and expectations. User-centered design, as discussed in the literature (Da Silva et al., 2011; Dhandapani, 2016; Hernández-Velázquez et al., 2021; Lopes et al., 2018; Mizani & Lubis, 2022; Salinas et al., 2020; Wallach & Scholz, 2012; Wilson, 2014), focuses on creating systems that prioritize user experiences. Research by Puspitasari et al. (2018), Hasim et al. (2019), and Kurniasih et al. (2016) emphasizes the importance of this approach in enhancing user satisfaction. Building on this concept, Norman & Draper (1986) introduced the broader framework of human-centered design, which considers emotional, cultural, and environmental factors, providing a more comprehensive system design.

This study aims to design an academic advising information system using a human-centered design approach to address these challenges. By incorporating this approach, the system is designed to fulfill both functional and emotional needs, ensuring a better user experience. As Norman (2013, 2023) explains, human-centered design emphasizes a holistic view of user interactions, taking into account emotional and psychological aspects. The proposed system seeks to enhance communication between academic advisors and students, thereby supporting the academic advising process more effectively.

2. MATERIALS AND METHODS

2.1 Materials

This study focuses on developing the design of an academic advising information system using a Human-Centered Design (HCD) approach, which emphasizes a deep understanding of users' needs, contexts, and limitations. The primary participants consist of students (20 respondents) and academic advisors (2 respondents), selected through purposive sampling based on their active roles in the academic advising process. The criteria for student participants include having undergone academic advising for at least four semesters, while academic advisors must have more than three years of advising experience.

The HCD approach is employed to explore user experiences in the academic advising process, with the aim of designing a system that meets both functional and emotional needs. Emotional aspects such as comfort, confidence, and freedom from anxiety are key considerations. Through in-depth interviews, observations, and surveys focusing on emotional aspects, this study seeks to understand the psychological barriers and motivations influencing user interactions. Data on positive and negative perceptions during the advising process are integrated into the design of the system's interface and interaction flow. With this approach, every design element—such as buttons, notification messages, and navigation structures—is intended to provide a sense of security, comfort, and direction for both students and academic advisors, thereby reducing stress and enhancing academic motivation.

2.2 Methods

The Human-Centered Design (HCD) approach emphasizes iterative processes that prioritize the needs, preferences, and limitations of users. This framework ensures that the design and development of systems, such as academic advising information systems, align with user requirements while delivering meaningful and sustainable solutions. The research design, as illustrated in Figure 1, provides a structured framework for conducting the study, consisting of four key stages: Observation, Idea Generation, Prototyping and Iteration, and Holistic Review. Each stage is designed to ensure that the resulting system effectively addresses user needs and provides a meaningful user experience.

The first two stages of the HCD process are observation and idea generation. Observation involves gathering insights into the challenges faced by users through interviews, surveys, and direct observations. The outputs of this stage include a detailed understanding of user needs, preferences, and obstacles in the academic advising process. Building on these findings, the Idea Generation stage focuses on brainstorming

potential solutions to address the identified issues. This stage results in a prioritized list of proposed features, such as automated reminders or an improved scheduling interface, and conceptual models that map the interaction between users and the proposed system.

The next stages, prototyping and iteration, and holistic Review, focus on refining and validating the design. Prototyping involves creating high-fidelity prototypes that enable users to visualize and interact with the system. Feedback gathered through usability testing during this stage guides the iterative improvement of the design. The final stage, holistic review, evaluates the system in terms of accessibility, sustainability, and overall user satisfaction. Key outputs from this stage include finalized system designs, documentation for implementation, and an assessment of how well the system meets user expectations and requirements.

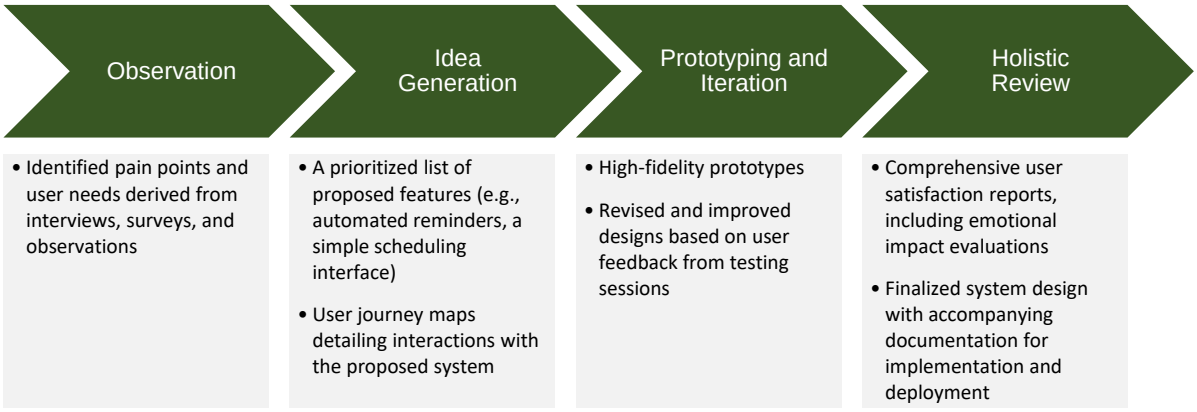

Figure 1. Research design

3. RESULTS AND DISCUSSION

3.1 Identifying Users and Key Issues in Academic Advising

Academic advising is a critical component in higher education, involving students, advisors, and administrators. However, several challenges arise in managing academic advising, including difficulties in scheduling, communication, and documentation. To identify the primary issues and requirements of all stakeholders involved, an observation phase was conducted. The findings from this phase are summarized in Table 1.

Table 1. Summary of the observation phase

Category	Output
User Profiles	• **Students**: Require guidance in scheduling academic advising sessions and selecting courses • **Advisors**: Face challenges in managing multiple advising schedules • **Administrators**: Need tools to monitor and manage the academic advising process
Primary Needs	• Scheduling for advising sessions, both online and offline • Notifications for schedule reminders • Easy access to academic information, such as class schedules and advising status
Key Issues	• Scheduling conflicts between students and advisors • Difficulty in communication for schedule confirmations • Time-consuming manual processes, such as documentation and reporting of advising sessions

3.2 User Journey Mapping

To enhance the effectiveness of academic advising, it is essential to understand the entire user journey, including their activities, needs, challenges, and potential opportunities at each stage (Endmann & Keßner, 2016; Lee et al., 2015; Li, 2019; Samson et al., 2017). This understanding is summarized in Table 2, which

presents a user journey map for academic advising in information systems. The table highlights the main activities performed by users, their needs, challenges (pain points), and opportunities for improvement at different stages of the advising process.

Table 2. User journey map for academic advising system

Stage	Main User Activities	User Needs	Challenges (Pain Points)	Opportunities
Awareness	Students recognize the need for academic advising to select courses or resolve academic issues	Clear information about advising services and schedules	Lack of knowledge about schedules or mechanisms to access advising services	Provide features for requesting advising sessions, both online and offline, with email notifications for advisors
Research	Students search for information about the advising process and available academic advisors	Quick access to advisor lists, schedules, and relevant topics	Fragmented platforms, difficulty accessing advising history, and lack of information on academic achievements or incomplete courses	Develop a centralized academic advising information system that is tailored to user needs and easy to access
Decision-Making	Students schedule appointments with academic advisors	A flexible and accessible advising scheduling system, along with access to academic achievements and incomplete course information	Inflexible scheduling processes and inability to check advisors' availability	Implement a scheduling feature that allows students to submit requests and notifies advisors
Usage	Students attend academic advising sessions	A structured and focused advising process tailored to students' needs	Ineffective sessions due to a lack of preparation from both students and advisors	Create discussion templates or structured question guides to ensure sessions are more focused and productive
Feedback & Iteration	Students provide feedback on their advising experience and request follow-up sessions	A system that can provide quick feedback and accept real-time responses	Lack of a channel for feedback or unaddressed feedback	Introduce a simple survey feature to collect feedback and improve the advising process

3.3 User Interface Design

The User Interface (UI) design of an Academic Advising Information System plays a critical role in ensuring an efficient and user-friendly experience for both students and academic advisors. A well-structured UI enhances accessibility to essential information, streamlines the advising process, and facilitates data-driven decision-making. Figure 2, Figure 3, and Figure 4 illustrate the system's core UI components, including dashboard visualization, advising records, and student achievement tracking. These UI elements are developed based on the Human-Centered Design (HCD) approach, which prioritizes both functional usability and user engagement.

The UI has been meticulously designed to align functional attributes, such as intuitive navigation, real-time data visualization, and a structured advising workflow, with human-centered factors, including user satisfaction, cognitive ease, and visual clarity. The dashboard (Figure 2) provides a comprehensive summary of students' academic performance and advising activities, allowing advisors to quickly assess progress. The advising interface (Figure 3) facilitates seamless access to student records, thereby enhancing the efficiency of the academic advising process. Meanwhile, the student achievement section (Figure 4)

presents a structured visualization of individual progress, contributing to increased student motivation and engagement. By integrating HCD principles, the UI is designed to align with user expectations while fostering a sense of control and active participation.

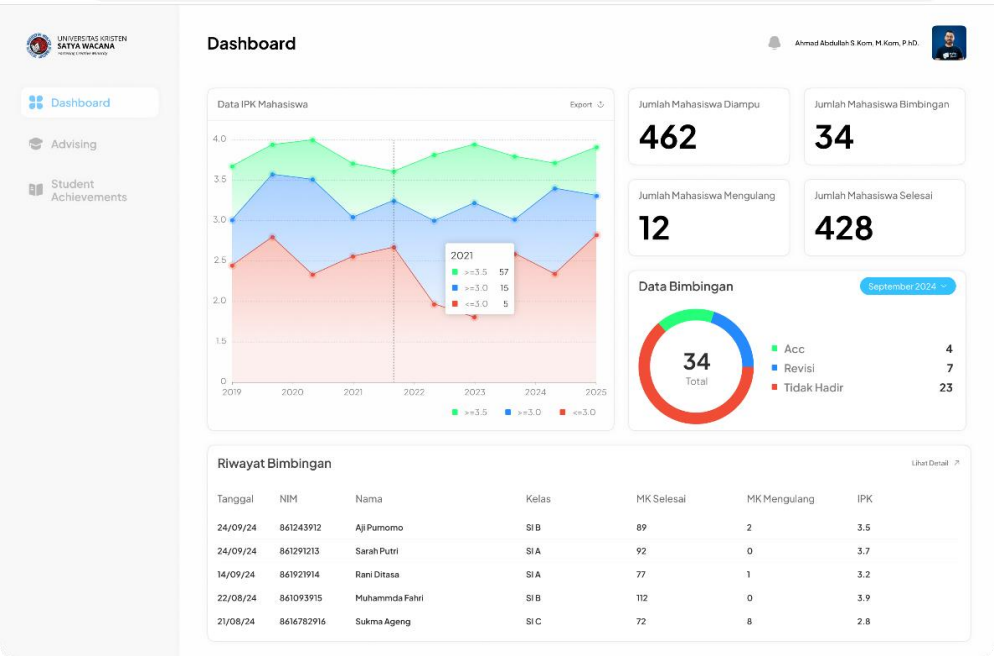

Figure 2. Dashboard visualization

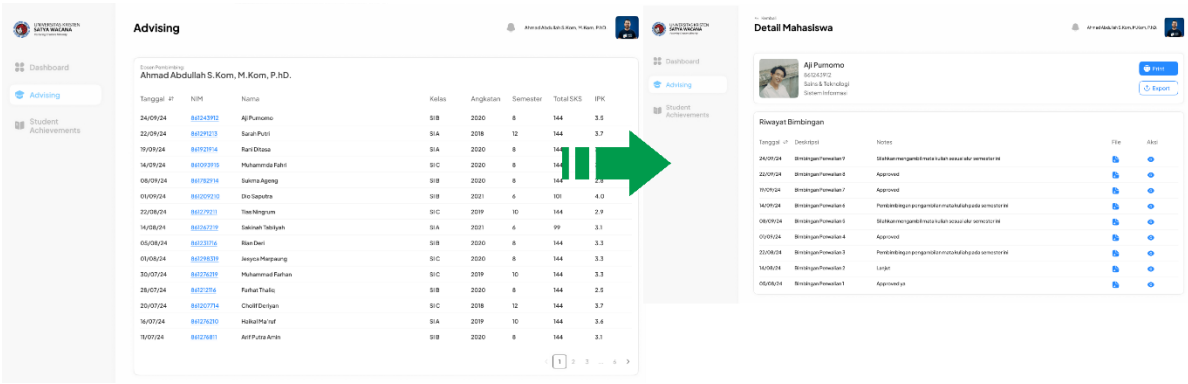

Figure 3. Advising records

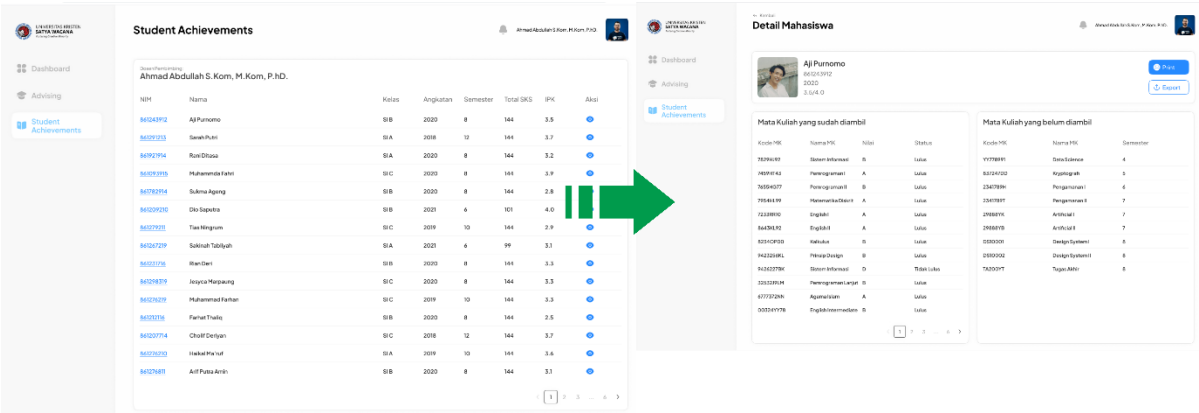

Figure 4. Student achievement tracking

To establish a clearer relationship between UI components and HCD principles, Table 3 presents the integration of functional and emotional considerations in UI design.

Table 3. Mapping UI components to functional and emotional considerations

UI Component	Functional Considerations	Emotional Considerations
Dashboard	Real-time academic insights, filtering mechanisms	Sense of control, reduced cognitive load
Advising interface	Efficient access to student records, structured workflow	Increased advisor confidence, reduced frustration
Student achievements	Academic progress visualization, search functionality	Enhanced student motivation, sense of accomplishment
Navigation system	Intuitive menu architecture, breadcrumb navigation	Reduced cognitive effort, improved clarity
Data input forms	Automated validation, guided input fields	Minimized errors, increased user confidence

3.4 Discussion

The development of an academic information system based on the Human-Centered Design (HCD) approach in this study confirms that user-centered design can enhance the experience of academic mentoring. The principles of HCD ensure that the system is not only technically functional but also considers the emotional aspects of users, including ease of access, navigation convenience, and the effectiveness of communication between students and academic supervisors. This approach aligns with the study by Mizani & Lubis (2022), which highlights the importance of user-oriented interaction design in digital academic systems to improve student engagement in academic processes.

One of the main challenges in academic mentoring is the lack of consistency in record-keeping and the use of various fragmented communication platforms. Research by Hasim et al. (2019) indicates that academic systems incorporating a user-centered design approach can enhance operational efficiency by providing a clearer structure for academic interactions. Therefore, this study has designed a system that allows students and supervisors to access mentoring history in a more structured manner, facilitating the tracking of academic progress and reducing reliance on undocumented communication.

Beyond functional aspects, this study also emphasizes the importance of emotional factors in academic system design. Studies by Norman (2013, 2023) demonstrate that user interaction with a system is influenced by psychological aspects such as perceived comfort and a sense of control in system usage. Therefore, the system is designed with an intuitive interface, concise information presentation, and easy navigation to improve accessibility for students and academic supervisors. Through this approach, the developed system not only supports academic record-keeping but also creates a more comfortable and effective user experience.

4. CONCLUSION

This study has designed an academic mentoring information system based on the Human-Centered Design (HCD) approach, focusing on structuring the academic mentoring process for students. The system was developed by considering both functional and emotional user needs to create a more effective interaction experience between students and academic supervisors. With features such as mentoring history recording and more structured access to academic information, this system facilitates a more systematic management of the academic mentoring process.

Furthermore, the system's design prioritizes ease of navigation and accessibility, allowing both students and academic supervisors to use it intuitively. The HCD-based approach enables the system to be more responsive to user needs, not only in terms of usability but also in supporting better interaction between students and their academic mentors. By taking emotional factors into account, the system is designed to provide a sense of security and greater engagement in the academic mentoring process.

However, this study has limitations in terms of implementation scope. The developed system is currently limited to the environment of Universitas Kristen Satya Wacana (UKSW), meaning that generalizing the findings to other institutions with different conditions requires further research. Therefore, future studies should focus on evaluating the implementation on a broader scale to ensure the system's effectiveness in various academic contexts.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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