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SIPETA Performance Evaluation Integration : EUCS and Equivalence Partitioning Technique

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Abstract

The development of information systems in higher education institutions requires comprehensive performance evaluations to ensure that the systems are capable of supporting learning and administrative processes effectively, efficiently, and in accordance with user needs. This study aims to evaluate the performance of SIPETA in supporting academic processes and to identify factors that affect the quality of the system. The main problems found were suboptimal information quality, data accuracy, and several system functions that affected user trust. The study used an integrative approach with the End User Computing Satisfaction (EUCS) model to measure user satisfaction and the Equivalence Partitioning technique in Black Box testing to assess system functionality. Data was collected through questionnaires administered to 100 users and direct testing of the system's features. The results showed that the system had an effectiveness rate of 86 percent and was rated as good in terms of appearance, ease of use, and timeliness of service. However, the content and accuracy variables were still in the poor category due to several functional failures such as schedule validation, notifications, revision uploads, and guidance history. Overall, SIPETA is suitable for use but requires improvements in data quality and system logic to increase reliability and user satisfaction.

Keywords— *System Evaluation, End User Computing Satisfaction, Equivalence Partitioning, SIPETA*

1. Introduction

The development of information and communication technology has had a major impact on the education sector, including how higher education institutions conduct teaching and learning (Haleem et al., 2022; Soegoto et al., 2023). In this era of massive digitalization, website-based information systems have become an integral part of higher education management, including the management of academic processes (Makkaraka et al., 2024; Sunarjo et al., 2024). One important element in the academic process at the higher education level is the preparation of final projects or theses, which involves various parties, such as students, supervising lecturers, and academic administrators at the study program level (Bayona-Oré, 2021; Sá et al., 2021). Many obstacles in the thesis supervision process are often not systematically documented because the supervision logbook lacks records (Kristiyanti et al., 2024). This makes it difficult to trace the history of supervision, assess student progress, and identify the actual obstacles that occur during the thesis writing process (Amalia & Jaya, 2023). Recognizing the importance of efficiency, accountability, and transparency in this process, Dr. Soetomo University (Unitomo) developed an information system called SIPETA (Sistem Informasi Pelacakan Tugas Akhir).

SIPETA Unitomo is a web-based application designed to facilitate the entire thesis-writing process. This system has features that support title submission, online guidance, scheduling of hearings, and tracking of student progress in completing their thesis. SIPETA serves as an effective communication bridge between students, supervisors, and the Head of Study Program, all within a single integrated system, thereby creating an efficient, traceable, and well-documented thesis-writing process. The launch and implementation of SIPETA is a progressive step by Unitomo in supporting the digital transformation program on campus. However, as a relatively new system, SIPETA's services need to be systematically and comprehensively evaluated to ensure they truly deliver optimal benefits to users. The current issue in the SIPETA system is the lack of records of student guidance with lecturers. This raises the question of whether the SIPETA system is functioning as intended. Measuring the performance of information systems is crucial to ensure that they run effectively and efficiently in supporting operations (Liulliyah & Subriadi, 2020; Varajão et al., 2022). By conducting periodic evaluations, organizations can identify areas for improvement and enhance service quality and data-driven decision-making (Logachev et al., 2021).

Although SIPETA has been implemented and is being used by students and lecturers across various study programs, there is no comprehensive empirical data available on the extent to which this system effectively supports academic processes. Several important questions arise, including: (1) Is this system capable of meeting the functional and non-functional needs of users? (2) Is the technical performance of SIPETA optimal and in line with expectations? and (3) Are there any gaps or obstacles experienced by users when interacting with the system? These questions form the basis for the research questions in this study : how to evaluate the quality of SIPETA Unitomo using a structured approach, and how to identify which functional aspects of the system explain the strengths and weaknesses perceived by its users.

To answer these research questions, this study uses an integrative approach that combines two theoretical frameworks: End User Computing Satisfaction (EUCS) and the Equivalence Partitioning Technique. End User Computing Satisfaction (EUCS) refers to the level of satisfaction end users have with the computer systems they use in their daily activities (Afiah et al., 2024; Aggelidis & Chatzoglou, 2012; Pratomo et al., 2023). EUCS covers various aspects, such as reliability, ease of use, and the system's ability to meet the needs and expectations of its users (Hamzah et al., 2022). EUCS is also an important indicator for evaluating the effectiveness of information systems in supporting user productivity and performance (M. Raihan et al., 2025). With EUCS, this study is expected to produce an in-depth analysis of SIPETA's strengths and weaknesses from an information systems quality perspective.

Meanwhile, the Equivalence Partitioning technique is used to test the functionality of the system features that affect the quality of the SIPETA system. The Equivalence Partitioning technique is a software testing method that reduces the number of test cases by dividing the input into several equivalent classes (Frayudha et al., 2024; Thahir et al., 2025). The basic principle of this technique is that if one value in an input class produces the desired result, then other values in the same class will also produce the same result (Fadhilasari et al., 2024). The main advantage of this technique is its ability to reduce testing complexity by minimizing the number of test cases that need to be executed (Amrulloh et al., 2023; Taufikurrohman & Nuryasin, 2022). This helps to improve efficiency and save time and resources in the testing process.

The novelty of this research lies in integrating EUCS and the Equivalence Partitioning Technique into a holistic evaluation design. Many information system studies focus solely on measuring system performance through questionnaires or from the user's perspective (Afiah et al., 2024; Dwivedi et al., 2020; Syahadiyanti & Subriadi, 2018). This combination provides state-of-the-art novelty in the evaluation of information systems in higher education environments, which previously used more single approaches such as EUCS, TAM (Technology Acceptance Model), UTAUT (Unified Theory of Acceptance and Use of Technology), or PIECES Framework alone (Acosta-Enriquez et al., 2024; Afiah et al., 2024; Al-Mamary, 2022; Fatoni et al., 2020; Razami & Ibrahim, 2022). These approaches tend to yield subjective assessments that do not fully

reflect the system's technical conditions (Afiah et al., 2024; Malatji et al., 2020). As a result, potential structural problems in the system are often overlooked and not handled optimally. Meanwhile, the performance of information systems for developers is often only measured in terms of technical success, such as system stability, response speed, and minimal errors (Ayuningtyas et al., 2023; Fadhilasari et al., 2024; Supriyono, 2020; Thahir et al., 2025). This approach tends to ignore the user experience and the system's effectiveness in supporting business processes. As a result, a system that runs well technically may not necessarily deliver the maximum benefits to all stakeholders.

By combining comprehensive user-satisfaction evaluation with functional testing, this study aims not only to assess SIPETA's effectiveness but also to trace the weaknesses perceived by users back to specific functional failures and provide more targeted, data-driven improvement directions.

2. Method

The research stages were carried out using two measurement tools: an analysis framework and system testing techniques.

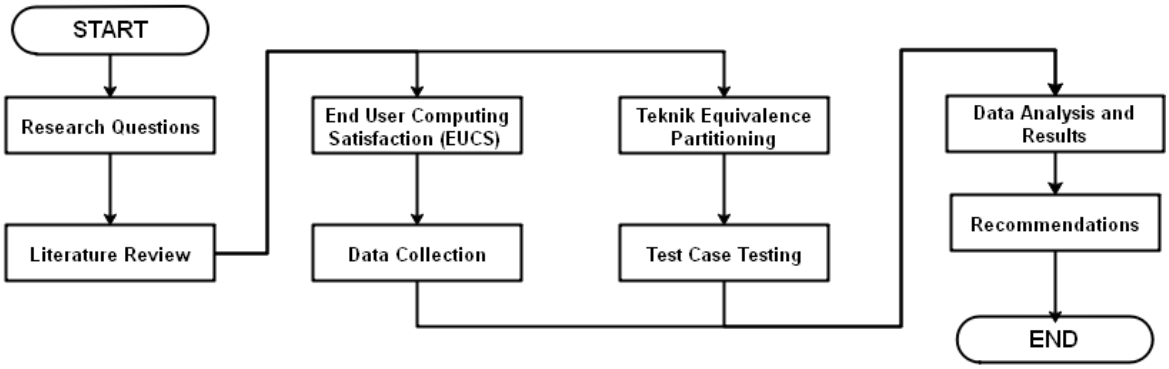

Figure 1. Research Stages

The figure 1 shows the research method flow starting from problem formulation, where researchers identify the main issues to be analyzed. The next stage is a literature review, conducted to strengthen the theoretical basis and support the selection of an appropriate approach. The EUCS Model is then used as a framework for evaluating information systems, followed by data collection from SIPETA user. The data obtained are then complemented by functional testing of the system features using the Equivalence Partitioning Technique to identify the functional failures behind the problems experienced by users. After that, test cases are conducted to validate the findings and assumptions. Finally, the data are thoroughly analyzed, and recommendations for improvement are produced before the research concludes.

In this study, the population that was the object of the study was all users of the SIPETA information system at Dr. Soetomo University, which included students, supervising lecturers, and study program chairs, totaling 1,228 people in the Even Semester 24/25 (UPT IT Universitas Dr Soetomo, 2025). The research sample was drawn from representatives of each user category to obtain representative data on the system's experience and evaluation, with the sample size determined using the Slovin formula because the population size exceeded 100 people.

$$n = \frac{N}{1 + (N\ x\ e^2)} \quad (1)$$

$$n = \frac{1228}{1 + (1228\ x\ (0{,}1)^2)}$$

$$n = \frac{1228}{1 + (1228\ x\ (0{,}1)^2)}$$

$n = 92$

To facilitate data processing, the sample size was rounded to 100 respondents to ensure optimal testing while remaining representative, as it exceeded the minimum required number (Amin et al., 2023). This study used purposive sampling by selecting respondents who were directly involved in using the SIPETA system, namely final year students who submitted their final projects, theses, or dissertations, supervising lecturers, and the Head of the Study Program (12 respondents from each faculty), so that the data obtained was more specific and relevant to the perceptions and experiences of users regarding the performance of SIPETA.

Data collection in this study was conducted through questionnaires distributed to students, academic advisors, and academic administrators who use SIPETA at Dr. Soetomo University to measure functionality, effectiveness, and user satisfaction. This was supplemented with in-depth interviews with several selected respondents to gain a more comprehensive understanding of the system's strengths and weaknesses. The data were then analyzed using the EUCS Model, with respondents' perceptions measured on a Likert scale, as it is effective for assessing individuals' or groups' views on a social condition (Iyong et al., 2021).

The measurement model in this study uses End User Computing Satisfaction (EUCS), which is an approach that assesses the level of user satisfaction with an information system based on its effectiveness and efficiency in meeting user needs (Aggelidis & Chatzoglou, 2012; Pratomo et al., 2023; A. Raihan, 2024). EUCS measures satisfaction through five main variables, namely system reliability, ease of use, information quality, accessibility, and overall satisfaction, which together provide a comprehensive picture of the quality and performance of the system from the end-user's perspective. In this study, the five variables are broken down into 17 indicators used as the basis for measurement and evaluation ini table 1 (Afiah et al., 2024; Anggraini, 2021; Darwati, 2022; Hamzah et al., 2022; Pratomo et al., 2023; M. Raihan et al., 2025).

Table 1. End User Computing Satisfaction (EUCS) Model

Variable	Indicator	Definition
Content	Relevance	This system provides relevant, reliable information tailored to user needs.
	Completeness	The system provides complete information.
	Benefits	The information and data obtained from the system benefit users.
Accuracy	Accuracy	The information and processes within the system have accurate data
	Input-output consistency	The output generated by the system is as expected
	Reliability	The system produces reliable and trustworthy information
Format	Clear	The information displayed by the system is very clear
	Attractive	The system interface is very attractive
	Color composition	The color composition in the system is easy on the eyes
	Report format	The generated report format is easy to understand and comprehend
Ease of use	Ease of use	The system is very user-friendly (easy and convenient to use)
	Easy to understand	Does not take long to learn the system
	System interaction	Easy to interact with the system
Timelines	On time	The system provides the information I need promptly
	Up to date	The system can provide the latest data
	Availability of information	The system provides information quickly when needed

The average of respondents' EUCS model findings is used to measure SIPETA performance. Therefore, Nazir applied the following calculation to determine the average satisfaction level based on the Likert approach (Nazir, 1985).

$$RK = \frac{JSK}{RK} \quad (2)$$

$$RK = \frac{\sum(f_i \times s_i)}{n\ x\ 100\%}$$

Satisfaction levels can be determined using several categories outlined by Kaplan and Norton. The satisfaction level categories can be seen in table 2 below (Wahyu et al., 2021).

Table 2. Satisfaction Level

Value Range	Category
1 – 1.79	Very Poor
1.8 – 2.59	Poor
2.6 – 3.39	Fair
3.4 – 4.19	Good
4.2 - 5	Very Good

The data obtained from the EUCS questionnaire were analyzed using descriptive statistical analysis. Prior to analysis, the instrument was tested for validity and reliability to ensure the consistency of the measurement items. Each respondent's perception was scored on a five-point Likert scale, weighted, and averaged into a satisfaction index (RK) for each variable, which was then classified according to the satisfaction categories presented in Table 2. This descriptive approach was selected because the objective of the study is to portray the actual level of user satisfaction across the EUCS dimensions rather than to test causal hypotheses between latent variables. In addition, system testing was conducted using Black-Box Testing, which focuses on functionality without considering the internal structure, and the Equivalence Partitioning technique, which groups input domains into equivalent classes to reduce the number of test cases, with one value representing each class. This technique is relevant to various features of SIPETA Unitomo as a data management and service system at Universitas Dr Soetomo (Amrulloh et al., 2023; Maspupah, 2024; Thahir et al., 2025). Effectiveness calculations assess the extent to which the system can perform functions within the scenario by measuring the success rate of user tasks. This is calculated by dividing the number of successful tasks by the total number of tasks and multiplying by 100.

3. Results And Discussion

Based on the results of questionnaire data processing and functional testing of the system, this section presents integrated research findings between user satisfaction evaluation using the EUCS method and technical testing through the Equivalence Partitioning technique. The results obtained not only describe the level of user satisfaction with aspects such as content, accuracy, format, ease of use, and timeliness, but also reflect the actual system functionality under the testing scenarios designed. The following discussion interprets the relationship between user perceptions and the system's technical findings to provide a comprehensive understanding of SIPETA's quality and effectiveness.

3.1 EUCS Data Calculation and Analysis

All statement items Q1–Q16 were declared valid because their significance values of 0.001 were below the 0.05 threshold. The instrument was also reliable because the Corrected Item-Total Correlation values were generally moderate to high. The Cronbach's Alpha if Item Deleted values ranged from 0.820 to 0.862, indicating good internal consistency. Thus, the instrument is suitable for analysis and produces consistent data. The questionnaire data were then analyzed using the EUCS method, with a Likert scale, to measure system quality across 5 variables and 16 indicators. The complete calculation of the response weighting results is as follows :

Table 3. EUCS Data Calculation and Analysis

Variable	Indicator	STS	TS	N	S	SS	JSK	JK	RK	Category
Content	Relevance	50	40	8	2	0	736	300	2.45	

	Complete	1	40	36	23	0				Not Good
	Benefits	0	31	46	22	1				
Accuracy	Accuracy	3	43	37	17	0	749	300	2.49	Not Good
	Input-output compatibility	40	35	22	2	1				
	Reliable	0	31	46	23	0				
Format	Clear	0	2	38	50	10	1393	400	3.48	Good
	Interesting	2	3	45	48	2				
	Color composition	0	4	30	62	4				
	Report format	3	32	15	48	2				
Ease of Use	Ease of use	0	2	40	30	28	1125	300	3.75	Good
	Easy to understand	5	3	45	26	21				
	System interaction	2	1	30	43	24				
Timelines	On Time	0	5	44	33	18	1053	300	3.51	Good
	Up to date	0	4	59	36	1				
	Availability of information	2	2	42	47	7				

The questionnaire results in table 3 show variations in ratings for the five main variables. Content and Accuracy were rated poorly because the information was inaccurate and incomplete. The system output also did not fully comply with user commands. In contrast, Format, Ease of Use, and Timelines were rated well because the display, ease of use, and timeliness of the service were satisfactory. Overall, the system is good in terms of appearance and ease of use, but improvements are still needed in terms of content quality and data accuracy.

3.2 Equivalence Partitioning Technique Testing

Testing was conducted to assess the system's functionality and provide a comprehensive overview of its performance and content, enabling appropriate recommendations. At SIPETA Unitomo, the Equivalence Partitioning technique was applied to various system features, with Table 4 presenting the test classes and test items tailored to the system's functions.

Table 4. Test Class and Test Item Plan

No	Test Class	Test Items
1	Registration and account access for students and faculty.	Login menu
2	Submission of proposals for final projects by students.	Submission Form
3	Comments and approval from the supervising lecturer.	Approval Menu
4	Monitoring the status of the final project, such as whether the proposal has been approved, is being supervised, or is ready for examination.	Submission Status
5	Upload guidance documents and revisions by students.	Upload Revisions
6	Schedule for submitting proposals/final projects and proposal/final project exams	Submission/Examination Schedule
7	Recording of guidance history for recapitulation purposes.	Supervision History

Final project system testing is conducted using the Black-Box method, which focuses on functionality without examining the code's internal structure. The Equivalence Partitioning technique groups test data into partition classes to optimize the number of test cases without reducing error detection capabilities. The testing procedure is arranged in a functional table that includes test items, test codes, scenarios, expected results, and actual results, and is carried out by the Head of Department, supervising lecturers, and students in each test class.

Table 5. Result Equivalence Partitioning Technique Testing

Test Code	Test Items	Test Scenario	Test Results	
			Pass	Failed
A1	Login Menu	Enter Username: 202211420076 and Password: 0987 (correct password)	√	
A2		Enter an incorrect Username: 0221140076 and Password: 0987 (correct password)	√	
A3		Enter the correct username: 202211420076 and the incorrect password: 1234 (correct password)	√	
A4		Username and Password are empty	√	
B1	Application Form (Student)	Click *the "*Add" *button*	√	
B2		Fill in all the data on the Application form	√	
B3		Did not fill out the Application Type, Title, Title (English), Abstract, Application Documents, and Advisor forms	√	
B4		Click *the "*Action Details" *button*	√	
B5		Click *the "*Change Action" *button*	√	
B6		Click *the "*Cancel Action" *button*	√	
C1	Approval Menu (Program Coordinator & Advisor)	Click the Submission Menu	√	
C2		Approval Notification		√
C3		Submission Table	√	
C4		Application Response	√	
D1	Application Status (Student)	Click the Application Menu	√	
D2		Application Table	√	
D3		Click *the* "Action" *button* and select "Details"	√	
E1	Upload Revision (Student)	Click the Submission Menu	√	
E2		Submission Table	√	
E3		Click *the* "Details" *button*	√	
E4		Upload the revised document based on the review provided by the supervising instructor		√
F1	Submission/Examination Schedule	Dashboard	√	
F2		The Head of the Study Program sets the deadline for proposal submission on November 30, 2025. Students submit their proposals on December 5, 2025 by clicking *the* "Add" *button*. Students fill in the proposal submission data in the form provided, then click *the* "Save" *button*. It will not be saved.		√
G1	Supervision History	Click the Submission Menu	√	
G2		Application Table	√	
G3		Click *the* "Action" *button* and select "Details"	√	
G4		Click *the* "Application History" *button*		√

Effectiveness calculations assess the extent to which the system can perform its functions in the scenario by measuring the success rate of user task completion in table 5. This is calculated by dividing the number of successful tasks by the total number of tasks and multiplying by 100. This approach provides an objective quantitative measure to evaluate whether the system has met user needs or still requires improvement. This concept is in line with ISO 9241-11 and Nielsen's opinion, which places effectiveness as a major component of usability, where a system is considered effective if users can achieve their goals accurately, completely, and on target (International Organization for Standardization, 2018; Nielsen, 1994)

$$\%\,Effectiveness = \frac{Number\ of\ Successful\ Tasks}{Total\ Number\ of\ Scenario\ Tasks} \times 100\% \quad (3)$$

$$\%\,Effectiveness = \frac{25}{29} \times 100\%$$

$$\%\,Effectiveness = \frac{25}{29} \times 100\%$$

$$\%\,Effectiveness = 86\%$$

An effectiveness result of 86 percent means that users completed 86 percent of tasks in the test scenario. This means: (1) The system is capable of performing almost all functions as expected; (2) A small portion of tasks, namely 14 percent, were unsuccessful or encountered obstacles; (3) The effectiveness level is relatively high because it is close to 100 percent; and (4) The system is ready for use, but the failed tasks still need to be evaluated. In usability standards, a score above 80 percent generally indicates that the system is effective. However, it is still necessary to analyze the failures in the remaining tasks to improve the quality of the system (Wahyu et al., 2021).

3.3 Analysis of the Integration of User Satisfaction Evaluation (EUCS) and Functional Testing (Equivalence Partitioning)

A holistic evaluation of an information system cannot rely on a single assessment dimension. To gain a complete understanding of a system's quality, it is necessary to integrate users' subjective perspectives with the system's functional objectivity. This study examines the Final Project Information System (SIPETA) at Dr. Soetomo University by combining two complementary evaluation approaches: the End-User Computing Satisfaction (EUCS) method to measure user satisfaction, and the Equivalence Partitioning technique in Black-Box Testing to test system functionality. This integration aims to identify not only what users feel, but also why it happens by confirming it at the system functionality level.

The EUCS analysis of 100 respondents revealed a significant satisfaction gap between the system's cognitive and presentation aspects. The Content (RK = 2.45) and Accuracy (RK = 2.50) variables were in the Not Good category, indicating that users considered the system information to be inaccurate, incomplete, and the output to be unsuitable and unreliable. Conversely, the variables Format (RK = 3.48), Ease of Use (RK = 3.75), and Timeliness (RK = 3.51) were in the Good category, indicating that the system interface was considered attractive, easy to use, and responsive, even though users still had doubts about the substance of the data.

Integration with Equivalence Partitioning testing provides an empirical explanation for the low Content and Accuracy scores. The failure of the Submission Schedule feature (F2) indicates that the system cannot validate submission deadlines, leading to inaccurate data and eroding user confidence in the system's reliability. From an EUCS perspective, this condition explains why users rate the system output as inconsistent with commands and unreliable, because the system fails to enforce business rules in a functional manner.

The low Content score was also influenced by several other functional failures, such as the Revision Upload feature (E4), which did not support a continuous revision process, resulting in fragmented information, and the Guidance History feature (G4), which did not display data chronologically, resulting in an incomplete historical context of the guidance. In addition, the failure of the Approval Notification (C2) feature causes users to lose important information about

submissions that require follow-up, further reinforcing the perception that the system content is incomplete and does not meet user needs.

Theoretically and practically, EUCS integration and functional testing show that satisfaction in the dimensions of Format, Ease of Use, and Timeliness is more influenced by the quality of the interface and system responsiveness. In contrast, Content and Accuracy are highly dependent on back-end business logic and data integrity. Although the system's effectiveness rate reached 86% and is considered high by usability standards, failures in the Schedule, Notification, Revision Upload, and History features are fundamental problems that directly affect the user experience. Therefore, improvements in content accuracy and quality are a top priority for enhancing the system's overall quality. The following are recommendations for improvements that can be made to SIPETA in table 6 :

Table 6. recommendations

No	Improvement Focus	Strategic Recommendations
1	Schedule Module (F2)	Improve the validation logic to block submissions outside the specified period. This step will improve data accuracy and system reliability.
2	Notification Feature (C2)	Optimize notifications to display the number of submissions requiring approval in real time. This improvement enhances the completeness of information and the service's responsiveness.
3	Revision Upload Module (E4)	Develop a revision upload feature for ongoing submissions without creating new entries. This maintains process continuity and improves the quality of system content.
4	History Module (G4)	Audit and refine data queries to display history chronologically. Structured data presentation helps users understand the full context of the process.
5	System Requirements Specification	Re-validate the alignment of user requirements with technical implementation, particularly in the revision workflow. Coordination between developers, business analysts, faculty, and students is necessary for accurate business workflow documentation.
6	Continuous Testing	Apply regression testing to every feature update, especially problematic modules. The goal is to ensure that fixes do not cause new errors in other functions.

4. Conclusions

This study evaluated the performance of the Final Project Tracking Information System (SIPETA) by integrating the End-User Computing Satisfaction (EUCS) model with Equivalence Partitioning functional testing. The results show that the system is generally effective, with an effectiveness rate of 86 percent, and is rated well in the Format, Ease of Use, and Timeliness dimensions, while Content and Accuracy remain in the poor category. Theoretically, this study contributes an integrative evaluation design that bridges the long-standing gap between user-centered and developer-centered assessment. By aligning subjective EUCS perceptions with objective functional test results, it demonstrates that the low satisfaction in the Content and Accuracy dimensions is not merely perceptual but is empirically traceable to specific functional failures in schedule validation, notification, revision upload, and guidance-history features. This explanatory linkage, which clarifies why users are dissatisfied rather than only that they are, extends prior information-system evaluation studies that rely on a single subjective or technical perspective. Practically, the study delivers a prioritized and actionable improvement agenda for system developers, directing limited resources first toward the back-end business logic and data-integrity defects that most strongly erode user trust, rather than toward interface aspects that already perform well. For higher education information system development more broadly, the findings imply that institutions should treat usability and functional correctness as complementary rather than interchangeable quality criteria, and that a combined satisfaction-and-functional-testing protocol provides a low-cost and replicable framework for the periodic evaluation of

academic systems both before and after deployment. The main limitations of this study lie in the sample scope and the focus on satisfaction and functionality; future research is therefore encouraged to broaden the respondent base, incorporate additional evaluation methods, and examine system performance, data security, and the long-term impact of system use in order to produce a more comprehensive assessment.

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