



UI/UX EPT Website Improvement using Human-Centered Design and User Experience Questionnaire Methods

Kurnia Ramadhan Putra^{1,*}, Galang Setia Yudana²

^{1,2}Sistem Informasi, Institut Teknologi Nasional Bandung, Indonesia

E-mail: kurniaramadhan@itenas.ac.id, galang.setia.mhs@itenas.ac.id

Email Korespondensi: kurniaramadhan@itenas.ac.id

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Abstrak

Website English Proficiency Test (EPT), yang berfungsi sebagai sistem pendaftaran tes kemampuan bahasa Inggris bagi mahasiswa, masih memiliki beberapa permasalahan pada aspek User Interface (UI) dan User Experience (UX), seperti alur navigasi yang kurang jelas, desain visual yang tidak konsisten, keterbatasan akses informasi, serta proses interaksi yang kurang efisien. Keterbatasan tersebut berdampak negatif terhadap usability, kepuasan pengguna, dan efektivitas sistem secara keseluruhan. Penelitian ini bertujuan untuk meningkatkan UI dan UX pada website EPT dengan menerapkan metode Human-Centered Design (HCD) yang dikombinasikan dengan User Experience Questionnaire (UEQ) sebagai alat evaluasi. Penelitian ini melibatkan 100 responden yang dipilih menggunakan purposive sampling, dengan pengumpulan data melalui wawancara dan kuesioner UEQ, serta analisis menggunakan perbandingan nilai rata-rata dan benchmark UEQ. Hasil penelitian menunjukkan adanya peningkatan signifikan pada seluruh dimensi UEQ, yaitu Daya Tarik (0,64 menjadi 1,60), Kejelasan (0,77 menjadi 1,85), Efisiensi (0,81 menjadi 1,65), Ketepatan (0,86 menjadi 1,75), Stimulasi (0,43 menjadi 1,75), dan Kebaruan (0,16 menjadi 1,65), dengan sebagian besar dimensi berada pada kategori Good hingga Excellent. Temuan ini menunjukkan bahwa perancangan ulang antarmuka secara signifikan meningkatkan kemudahan penggunaan, efisiensi, dan daya tarik visual sistem. Kebaruan penelitian ini terletak pada integrasi pendekatan HCD dengan evaluasi berbasis UEQ menggunakan kerangka perbandingan sebelum dan sesudah (as-is vs to-be). Implikasi penelitian ini menunjukkan bahwa pendekatan desain berpusat pada pengguna dapat diterapkan secara sistematis untuk meningkatkan kualitas layanan digital, meningkatkan kepuasan pengguna, serta mendukung efisiensi sistem layanan akademik.

Kata Kunci: Website EPT; HCD; Rancang Ulang UI/UX; UEQ; Sistem Akademik Berbasis Web;

Abstract

Website English Proficiency Test (EPT), which functions as a registration system for student English proficiency tests, still exhibits several UI and UX issues, including unclear navigation flow, inconsistent visual design, limited information accessibility, and inefficient interaction processes. These limitations negatively affect usability, user satisfaction, and the overall effectiveness of the system. This study aims to improve the User Interface (UI) and User Experience (UX) of the EPT website by applying the Human-Centered Design (HCD) approach combined with the User Experience Questionnaire (UEQ) as an evaluation tool. The study involved 100 respondents selected using purposive sampling, with data collected through interviews and UEQ questionnaires, and analyzed using mean comparison and UEQ benchmark analysis. The results show significant improvements across all UEQ dimensions, namely Attractiveness (0.64 to 1.60), Perspicuity (0.77 to 1.85), Efficiency (0.81 to 1.65), Dependability (0.86 to 1.75), Stimulation (0.43 to 1.75), and Novelty (0.16 to 1.65), with most dimensions falling into the Good to Excellent categories. These findings indicate that the redesigned interface significantly enhances usability, efficiency, and visual appeal. The novelty of this study lies in the integration of the HCD approach with UEQ-based evaluation using a before-and-after (as-is vs to-be) comparison framework. The implications of this study suggest that user-centered design approaches can be systematically applied to improve digital service quality, increase user satisfaction, and support more efficient academic service systems.

Keywords: EPT Website; HCD; UI/UX Redesign; UEQ; Web-Based Academic System;

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INTRODUCTION

The rapid advancement of information technology has significantly influenced various aspects of human life, including how tasks and daily activities are performed. The utilization of technology, particularly through applications and websites, has transformed human interaction into a more efficient and integrated process. A website can be defined as a collection of interconnected web pages consisting of various elements such as text, images, audio, video, and animations that can be accessed via the internet (F. P. Putra & Tedyyana, 2021).

In the field of education, technological developments have significantly transformed teaching and learning processes through the implementation of e-learning systems. These systems enable educational activities to be conducted more flexibly without limitations of time and location. In addition, technology is also utilized in administering English proficiency tests through web-based platforms, such as the English Proficiency Test (EPT), which is used by students to assess their English language proficiency. However, based on interviews with users, several issues were identified that primarily relate to the User Interface (UI) and User Experience (UX) aspects of the EPT website. Users reported confusion during the registration process due to unclear navigation flow, insufficient visual guidance, inconsistent interface design, limited clarity regarding test information, and difficulties in accessing important features such as test schedules, payment instructions, test locations, and score results. Additionally, the website's outdated visual appearance, inconsistent typography, and lack of alignment with modern design standards negatively affect usability and overall user satisfaction. These issues indicate that the system does not yet provide an optimal user experience and requires interface redesign to improve usability, accessibility, and user engagement (Islam et al., 2024).

A good user experience is a crucial factor in determining the success of a system, which is characterized by ease of use, efficiency, and an attractive interface (Octavianti et al., 2025; Rahardian & Fadila, 2025). Conversely, poor user experience can lead to negative perceptions of the system and may discourage users from using it again (Quiñones et al., 2026). Therefore, an evaluation process is necessary to identify the strengths and weaknesses of the system from the user's perspective (Rachmawati & Setyadi, 2023).

One of the methods that can be used to evaluate user experience is the User Experience Questionnaire (UEQ). UEQ is an instrument designed to measure user experience efficiently based on two main aspects: pragmatic quality and hedonic quality (Ntoa, 2024). It evaluates six dimensions, namely Attractiveness, Perspicuity, Efficiency, Dependability, Stimulation, and Novelty. To address the identified problems, a user-centered design approach is required (Pratiwi et al., 2017; Safi'i et al., 2020; Saksono et al., 2024). One of the suitable methods is Human-Centered Design (HCD), which emphasizes the involvement of users throughout the system development process (He et al., 2020; Lubis et al., 2022). The goal of HCD is to produce systems that are more usable, interactive, and aligned with user needs (Firmansyah et al., 2024; Villa et al., 2025).

Based on this background, this study aims to identify user-related problems, redesign the EPT system interface using the Human-Centered Design approach, and evaluate the user experience using the User Experience Questionnaire (UEQ) (Kholin et al., 2025; Pahlevi & Santoso, 2026). The results of this study are expected to produce an improved user interface and enhance the overall user experience of the EPT system.

METHOD

This study adopts a user-centered approach to evaluate and improve the user experience of the EPT website. The methodology integrates the Human-Centered Design (HCD) framework with user experience evaluation using the User Experience Questionnaire (UEQ) (Dwiansyah et al., 2023; Kurniawati & Ratnasari, 2023).

Figure 1 illustrates the overall research methodology adopted in this study, which is structured based on the Human-Centered Design (HCD) approach. The process begins with the observation stage, where initial system analysis is conducted to identify usability issues, followed by a literature study to establish a theoretical foundation.

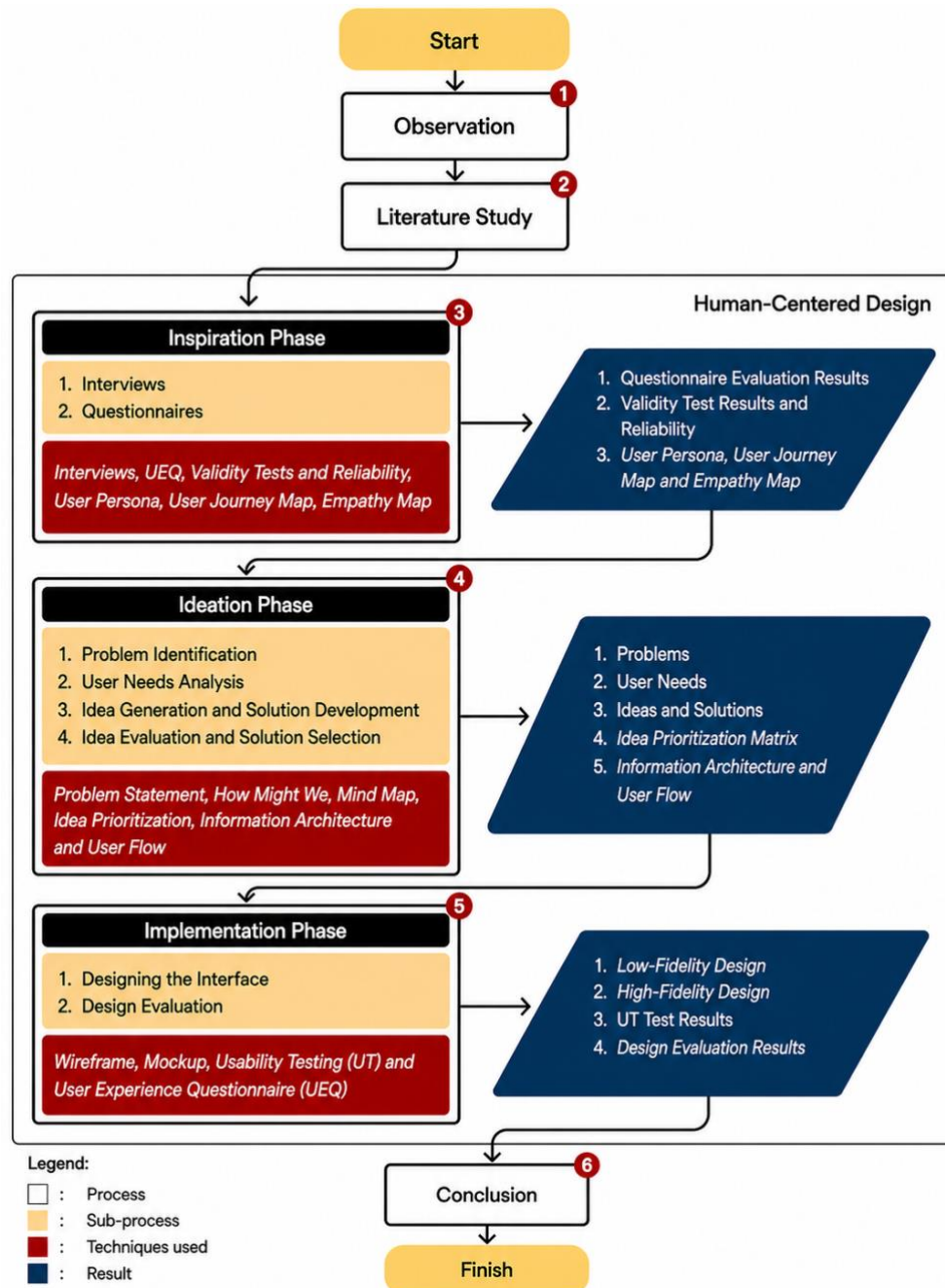


Figure 1. Research Flow

The next stage corresponds to the Inspiration phase, where data collection is carried out through interviews and questionnaires (UEQ). This stage produces several outputs, including user insights, questionnaire evaluation results, validity and reliability testing, as well as user-centered artifacts such as user personas, user journey maps, and empathy maps.

Subsequently, the process enters the Ideation phase, which focuses on transforming identified problems into potential design solutions. This stage includes problem identification, formulation of user needs, idea generation, and prioritization. The outputs of this phase include problem statements, user needs, solution ideas, idea prioritization matrices, as well as information architecture and user flow design.

The next stage is the Implementation phase, where the proposed solutions are translated into interface designs. This phase includes the development of low-fidelity (wireframe) and high-fidelity (mockup) prototypes. The designs are then evaluated through usability testing and user experience assessment using UEQ, resulting in improved interface designs and evaluation outcomes.

Finally, the research concludes with a conclusion stage, which summarizes the findings and highlights the effectiveness of the proposed approach in improving the overall user experience.

A. Observation

The observation stage aims to identify existing problems and evaluate the current condition of the EPT website. The system is analyzed in terms of functionality, available features, and information structure. This stage involves examining how users interact with the system, identifying usability issues, and mapping initial problem points. The findings from this stage provide a preliminary understanding of system limitations and serve as a basis for further investigation.

B. Literature Study

The literature study is conducted to establish a comprehensive theoretical foundation for the research by reviewing and synthesizing relevant academic sources, including journal articles, conference papers, and established frameworks related to Human-Centered Design (HCD), User Interface (UI), and User Experience (UX) evaluation.

The literature review helps to position this research within the broader academic context and highlights its relevance and contribution to improving user experience in web-based systems. This stage aims to:

- Identify best practices in UI/UX design
- Understand previous research on UX improvement
- Justify the selection of HCD and UEQ

C. Data Collection

The inspiration phase focuses on collecting user data to identify user needs, problems, and expectations regarding the EPT website. Data collection is conducted using interviews and the User Experience Questionnaire (UEQ).

1) Sampling Technique

This study employs purposive sampling, a non-probability sampling technique in which respondents are selected based on specific criteria relevant to the research objectives. The primary criterion used in this study is that respondents must have prior experience using the EPT website, ensuring that the collected data accurately reflects real user interactions and experiences.

To determine the appropriate sample size, this study applies Slovin's formula, which is commonly used to estimate the required sample size based on a known population and a specified margin of error. The formula is presented in Equation (1).

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

Where:

n = sample size

N = population size

e = margin of error

By applying Slovin's formula with a margin of error of 10%, the required sample size is determined to ensure that the collected data is sufficiently representative of the population. In this study, a total of 100 respondents ($N = 100$) were involved, which satisfies the minimum sample requirement for user experience evaluation. Although purposive sampling is a non-probability sampling technique, the use of Slovin's formula helps to provide a rational basis for determining the sample size, thereby improving the reliability and credibility of the research results.

2) Interviews

The interview questions are designed to capture various aspects of user interaction, including user behavior, navigation patterns, perceived usability, encountered difficulties, and overall satisfaction with the system. In addition, the interviews aim to identify user expectations, preferences, and suggestions for improving the website's interface and functionality. Through this process, repeated patterns across multiple respondents are synthesized into broader user needs and design priorities. These insights are then translated into structured problem statements and user requirements that guide the subsequent ideation and redesign process.

This approach enables the collection of rich qualitative data, providing deeper insights into user needs and supporting the identification of critical UI/UX issues that may not be fully captured through quantitative methods alone. The summary of interview findings, including key pain points and user expectations, is outlined in Table 1.

Table 1. Summary of interview result

Code	Pain Points	User Expectations (Gain)
MW01	Inconsistent font usage on the homepage; confusion during registration due to unclear navigation flow.	Clear and structured registration flow; login prompt before booking; guidance on next steps after booking; payment information displayed after registration.
MW02	Lack of information about test types; inability to register due to missing login prompt; difficulty accessing test scores.	Login popup when selecting registration; clear information about test types; test scores displayed on the homepage; more efficient registration flow.
MW03	Complicated registration process; lack of clear information regarding booking, payment, and test location.	Simpler registration flow; clearer payment instructions; improved readability and interface design.
MW04	Inefficient navigation; lack of information about test procedures; outdated UI design and inconsistent visual identity.	Modern and visually appealing design; alignment with institutional color identity; clear and efficient user flow.
MW05	Lack of clear payment instructions after booking.	Clear payment guidance after registration; consistent use of visual identity (color scheme).
MW06	Users noticed that the website had colors that did not match brand identity and the text was difficult to see because it was too thin,	Match to the brand identity and text can be visualized clearly.

3) User Experience Questionnaire (Before Redesign)

The User Experience Questionnaire (UEQ) is used to evaluate the initial user experience of the EPT website before the redesign process. The questionnaire results provide baseline data representing users' perceptions of the existing system, which are then used as a reference for comparison with the improved design.

The UEQ is distributed to 100 respondents (N = 100) who are selected using purposive sampling, ensuring that all participants have prior experience using the EPT website. The UEQ is employed as a standardized instrument to quantitatively evaluate user experience in a structured and efficient manner. The questionnaire measures six key dimensions of user experience, which are categorized into pragmatic and hedonic qualities:

- Attractiveness (overall impression of the system)
- Perspicuity (ease of understanding and learning)
- Efficiency (ability to complete tasks quickly and effectively)
- Dependability (user control and predictability of the system)
- Stimulation (user motivation and engagement)
- Novelty (creativity and innovation of the design)

Figure 2 represents the evaluation results obtained from the initial UEQ measurement are analyzed to identify strengths and weaknesses across the six UEQ dimensions. These findings serve as the basis for determining design improvements in the subsequent stages.

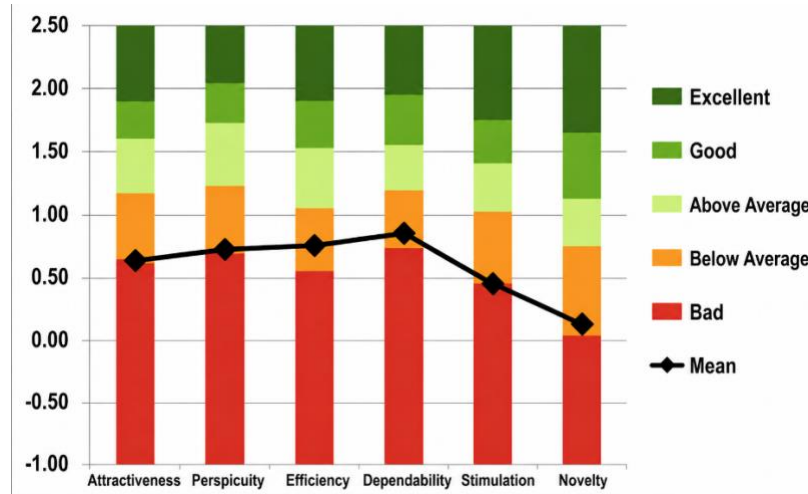


Figure 2. The UEQ (Before Redesign)

D. Ideation Phase

The ideation phase aims to transform the identified user problems into structured and actionable design solutions. This stage plays a critical role in bridging the gap between problem identification and solution development by applying a user-centered design approach.

The process consists of several key steps:

1) User Problems

The issues identified in the previous phase are clearly defined and articulated to ensure a focused and well-directed design process. The problem statement is outlined in Table 2.

Table 2. The Problem Statement

Code	Related Findings	Features	Problem Statement
MP01	MW01	F02, F03	Users experience difficulties in completing the test registration process due to a lengthy and inefficient workflow.
MP02	MW02	F01	Users are confused during registration due to the lack of clear information regarding available test types.
MP03	MW03	F04	Users are unable to access or locate their test scores due to unclear or missing information.
MP04	MW04	F02	Users do not understand the payment procedure due to the absence of clear payment instructions after registration.
MP05	MW05	F01, F02, F03, F04	Users find it difficult to navigate the website due to outdated visual design and poor usability.
MP06	MW06	F01, F02, F03, F04	Users are dissatisfied with the website design, which lacks visual appeal and does not reflect the brand identity.

2) How Might We

The problem statements are reframed into opportunity-oriented questions to encourage creative thinking and exploration of potential solutions. The HMW's statement is outlined in Table 3.

Table 3. The HMW's Statement

Code	Related Findings	HMW's Statement
KP01	MP01	Provide a more efficient and user-friendly test registration workflow.
KP02	MP02	Provide clear and comprehensive information regarding test types and details.

Code	Related Findings	HMW's Statement
KP03	MP03	Enable users to easily access and view their test scores through a clear and intuitive interface.
KP04	MP04	Provide clear payment instructions immediately after registration without requiring users to navigate to additional pages.
KP05	MP05	Design a user interface that follows current design trends while maintaining usability and user-friendliness.
KP06	MP06	Design a user interface that reflects the institutional identity, including appropriate use of logo and color scheme.

3) Mind Mapping

Ideas and possible solutions are systematically explored and visualized to identify relationships between user needs, system features, and design alternatives. This phase ensures that the proposed design solutions are user-oriented, relevant, and aligned with the identified needs and expectations, can be seen in Fig. 3.

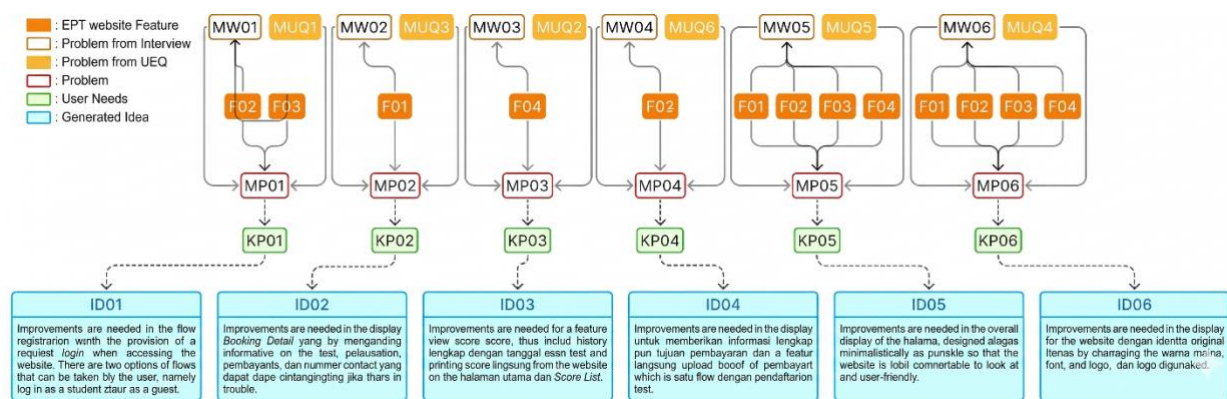


Figure 3. The Mind Map of Ideation

E. Implementation Phase

The implementation phase involves translating the proposed design solutions into visual interface prototypes. This stage focuses on materializing the outcomes of the ideation phase into tangible designs that can be evaluated from a user experience perspective. The design process is carried out iteratively to ensure alignment with user needs and usability principles.

1) Low-Fidelity Design

Low-fidelity designs are initially developed in the form of wireframes to represent the basic layout structure and navigation flow of the system. These prototypes emphasize functionality, content organization, and user flow rather than visual aesthetics. This stage allows for early validation of design concepts before proceeding to more detailed designs.

2) High-Fidelity Design

High-fidelity designs are developed to provide a more detailed and realistic representation of the final interface. These designs incorporate visual elements such as color schemes, typography, spacing, and interactive components. The high-fidelity prototypes closely resemble the final product and are used for user evaluation. Hi-fidelity design can be seen in Fig. 4-a, 4-b, 4-c, and 4-d.

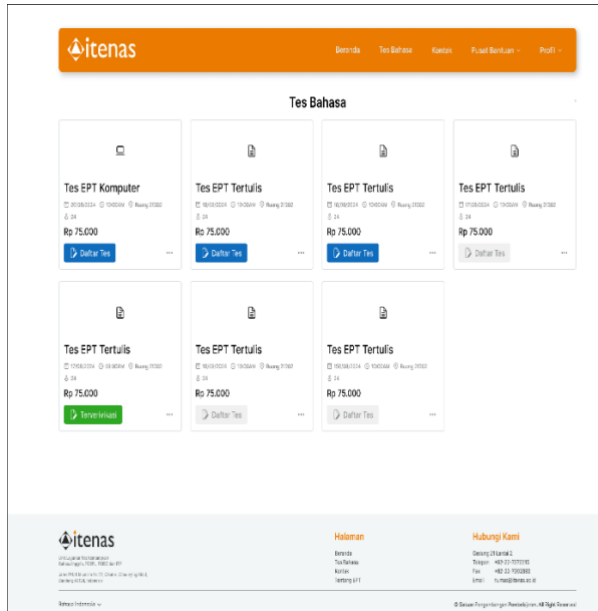


Figure 4-a. Hi-Fi View Schedule

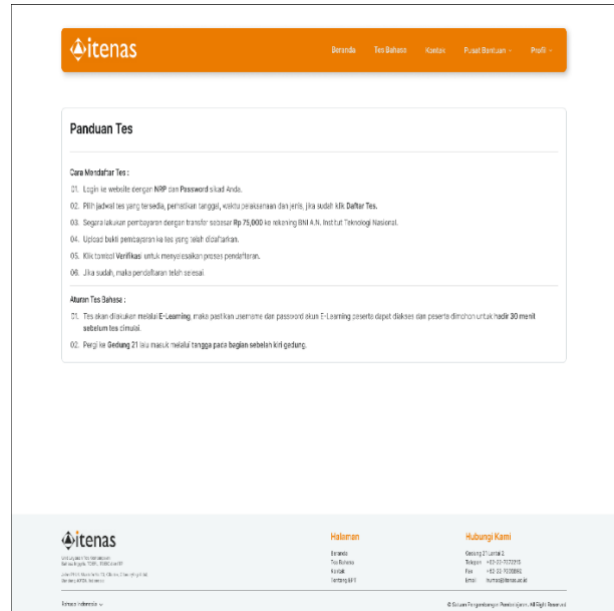


Figure 4-b. Register

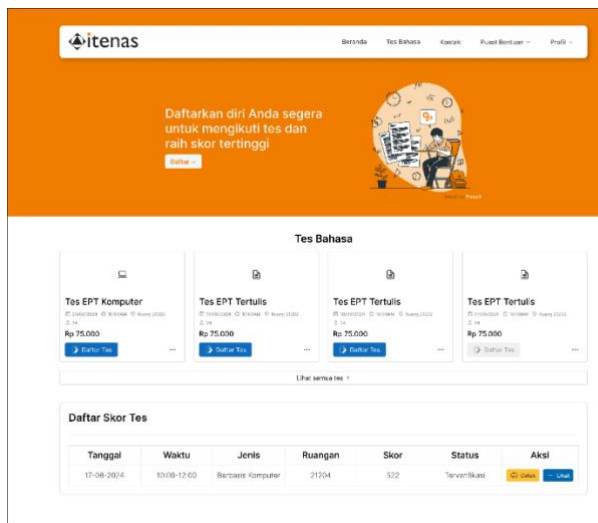


Figure 4-c. Hi-Fi View Score

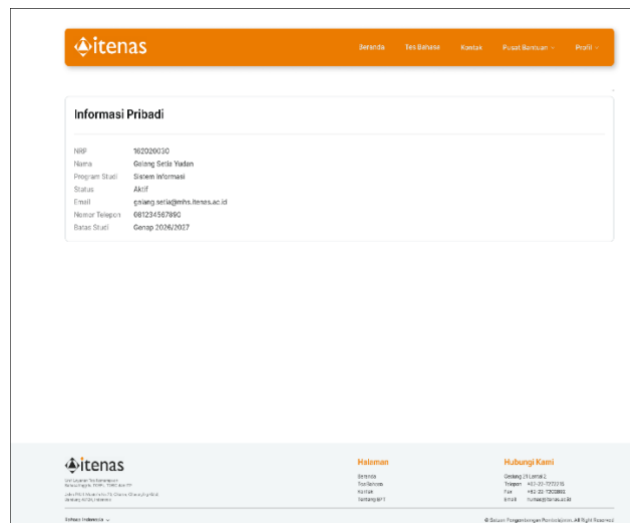


Figure 4-d. Hi-Fi View Profile

Resulting design is subsequently evaluated using the UEQ to measure improvements in user experience compared to the initial system.

RESULT AND DISCUSSION

A. Usability Testing Result

In this stage, usability testing is conducted to evaluate the effectiveness of the redesigned EPT website interface. The testing involves five respondents with diverse academic backgrounds to ensure varied user perspectives. The usability testing is performed using a web-based tool, and several task scenarios are evaluated, including login, viewing schedules, test registration, viewing scores, and logout is outlined in Table 4.

Table 4. Usability Testing Results

Code	Task	Completion Rate (%)	Failure Rate (%)	Avg. Time (s)	User Rating	Emotional Response
SP01	Login	80	20	16,6	Mostly <i>Very Good</i> (3), Good (1), Neutral (1)	Mostly <i>Very Happy</i> (3), Happy (1), Neutral (1)
SP02	View Schedule	100	0	13,9	Very Good (1), Good (3), Neutral (1)	Very Happy (1), Happy (3), Neutral (1)
SP03	Register Test	100	0	42,4	Very Good (2), Good (2), Neutral (1)	Very Happy (2), Happy (2), Neutral (1)
SP04	View Score	100	0	4,9	Very Good (3), Good (2)	Very Happy (3), Happy (2)
SP05	Logout	100	0	11,1	Very Good (1), Good (4)	Very Happy (2), Happy (3)

Based on the results, most task scenarios achieved a 100% completion rate, except for the login scenario, which achieved 80% completion and 20% failure. This indicates that the redesigned system is generally effective, although minor usability issues still exist in the login process.

The average task completion time also shows that users can complete tasks efficiently. The fastest task is viewing test scores (4,9 seconds), while the longest is test registration (42,4 seconds), which is still considered acceptable given the complexity of the process.

In addition, user feedback indicates a positive perception of the redesigned interface, particularly in terms of improved visual appearance, better layout structure, clearer payment information, more practical and user-friendly interaction. Overall, the usability testing results demonstrate that the redesigned interface significantly improves task success rates and user satisfaction compared to the previous system.

B. User Experience Questionnaire (After Redesign)

To further evaluate the user experience, the User Experience Questionnaire (UEQ) is administered after users interact with the redesigned interface. This evaluation aims to measure users' perceptions of the system across multiple dimensions of user experience.

The collected UEQ data are processed by transforming the responses into numerical values, which are then grouped according to the six UEQ dimensions: Attractiveness, Perspicuity, Efficiency, Dependability, Stimulation, and Novelty. Subsequently, statistical analysis is conducted to calculate the mean and variance values for each dimension, providing an overview of user perceptions and the consistency of responses. In addition, a reliability test is performed using Cronbach's Alpha to assess the internal consistency of the questionnaire results. The UEQ result is outlined in Table 5.

Table 5. The Final UEQ Result

UEQ Scale	Mean	Variance	Category	Benchmark Interpretation
Attractiveness	1,60	1,26	Good	10% of results are better, 75% are worse
Perspicuity	1,85	0,96	Good	10% of results are better, 75% are worse
Efficiency	1,65	1,11	Good	10% of results are better, 75% are worse
Dependability	1,75	1,34	Excellent	Within the top 10% of results

UEQ Scale	Mean	Variance	Category	Benchmark Interpretation
Simulation	1,65	1,49	Good	10% of results are better, 75% are worse
Novelty	1,65	0,99	Excellent	Within the top 10% of results

The UEQ results indicate that all evaluated dimensions fall within the Good and Excellent categories, demonstrating a positive user experience after the redesign. Among the six dimensions, Dependability and Novelty achieve the Excellent category, indicating that the system is perceived as reliable, predictable, and innovative by users.

Meanwhile, Attractiveness, Perspicuity, Efficiency, and Stimulation are categorized as Good, suggesting that the system performs above average compared to other products in the UEQ benchmark dataset. The relatively high mean values across all dimensions indicate that users perceive the redesigned interface as easy to use, efficient, and visually appealing.

Furthermore, the benchmark interpretation shows that most results outperform approximately 75% of other evaluated systems, confirming that the proposed design significantly enhances the overall user experience.

C. Comparion of UEQ (Before and After Redesign)

The comparison of UEQ results before and after the redesign demonstrates a substantial improvement across all user experience dimensions, as outlined in Table 6. This comparison highlights the effectiveness of the proposed design improvements in enhancing both pragmatic and hedonic qualities of the system.

Table 6. The Comparison of UEQ Before and After Redesign

UEQ Scale	Before	After	Improvement
Attractiveness	0,64	1,60	Good
Perspicuity	0,77	1,85	Good
Efficiency	0,81	1,65	Good
Dependability	0,86	1,75	Excellent
Simulation	0,43	1,75	Good
Novelty	0,16	1,65	Highly significant increase

Figure 5 presents the comparison of UEQ benchmark results between the initial system (before redesign) and the redesigned interface (after redesign) visually. As shown in the figure, all user experience dimensions exhibit a consistent upward trend after the redesign, indicating a substantial improvement in overall system usability and user satisfaction.

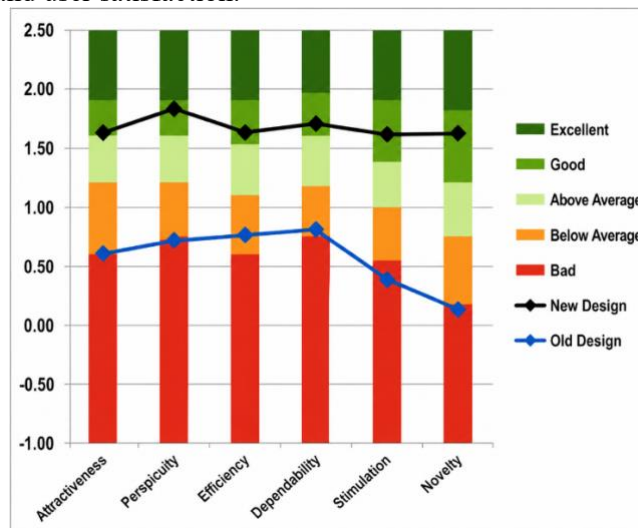


Figure 5. Low Fidelity Design

D. Discussion

The results indicate that all UEQ dimensions show a considerable increase after the redesign, confirming that the application of the Human-Centered Design (HCD) approach effectively improves the overall user experience. This finding is consistent with previous studies stating that user-centered design methods significantly enhance usability and user satisfaction in web-based systems (Chamberlain et al., 2022). In terms of each dimension, Attractiveness shows a significant improvement, indicating that users perceive the redesigned interface as more visually appealing and enjoyable. This aligns with prior research highlighting that visual aesthetics play an important role in shaping users' first impressions and overall satisfaction (Wang et al., 2024). Furthermore, Perspicuity increases notably, suggesting that the system becomes easier to understand and learn. This result supports the principle that clear information architecture and intuitive design improve learnability and reduce cognitive load for users (Mátrai & Kosztyán, 2012). In addition, Efficiency improves as the redesigned workflow reduces unnecessary steps, allowing users to complete tasks more quickly. This finding is in line with usability principles that emphasize minimizing user effort and optimizing task flow (Desideria & Bandung, 2020; Vizcarra et al., 2026). The Dependability dimension also shows a significant increase, reflecting that users feel more in control and perceive the system as more predictable. This is consistent with studies indicating that system reliability and user control are key factors in building user trust (A. P. Y. Putra et al., 2025). Moreover, Stimulation demonstrates strong improvement, indicating that the system becomes more engaging and motivating for users. This supports the notion that interactive elements and meaningful design contribute to a more engaging user experience (Fathurrahman et al., 2025; Pawenrusi et al., 2024). Lastly, Novelty experiences the most substantial increase, demonstrating that the redesigned interface is perceived as more innovative and modern. This finding aligns with research suggesting that innovative design elements enhance user engagement and perceived system quality (Pratama, 2024).

Overall, the consistent improvement across all dimensions confirms that the redesigned interface successfully addresses the previously identified usability issues. These results also demonstrate that integrating HCD with UEQ provides an effective and systematic framework for improving user experience in web-based systems, particularly in academic service environments.

CONCLUSION

This study aims to improve the user interface and user experience of the EPT website by applying the HCD approach and evaluating the results using the UEQ. Based on the findings obtained from usability testing and UEQ evaluation, it can be concluded that the proposed design successfully enhances the overall user experience. The UEQ results demonstrate significant improvements across all dimensions, including Attractiveness, which increased from 0.64 to 1.60; Perspicuity from 0.77 to 1.85; Efficiency from 0.81 to 1.65; Dependability from 0.86 to 1.75; Stimulation from 0.43 to 1.75; and Novelty from 0.16 to 1.65. These results indicate that the redesigned interface substantially improves usability, clarity, efficiency, engagement, and visual innovation compared to the previous system. Overall, the findings confirm that the implementation of the HCD approach effectively addresses previously identified UI/UX issues and significantly improves both pragmatic and hedonic aspects of user experience. Therefore, the integration of HCD and UEQ provides an effective and systematic framework for enhancing web-based academic systems.

In conclusion, the integration of Human-Centered Design and UEQ proves to be an effective approach for improving web-based systems, particularly in enhancing usability, user satisfaction, and overall system quality. For future work, further research can involve a larger number of respondents and the application of additional evaluation methods, such as usability testing with more complex scenarios or statistical analysis, to obtain more comprehensive insights into user experience improvement.

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