

IMPLEMENTATION OF DESIGN THINKING SIAKAD MOBILE DESIGN WITH ADVANCED SUS ANALYSIS

Diva Elydiya Yahya^{1*}, Asfan Muqtadir¹, Alfian Nurlifa¹

¹Informatics Engineering, Universitas PGRI Ronggolawe

*email: *divaelydiya@gmail.com*

Abstract: The development of information technology has begun to enter the world of education, especially universities, one of which is the academic information system because with this system it greatly influences the learning process and also in the delivery of information. A web-based academic information system is very adequate, but there are several obstacles such as in learning that does not require a laptop device, it will be very disruptive if the implementation of attendance and others is done on a mobile phone but with a web view. So this research aims to design a mobile-based UI/UX academic information system application with the hope that it can be an alternative in accessing the use of academic information systems for lecturers and students can also be accessed anytime and anywhere through mobile phones with a comfortable display. This study also tested the UI/UX design prototype to assess its feasibility. This test uses the system usability scale (SUS) method with a confident interval validation of 95% to determine the lower and upper limits of the SUS value. For the final score of SUS obtained was 78.75, and in the 95% CI test a Lower CI of 66.27 was produced, and for the Upper CI of 91.23 so that it was given a grade of B. It can be concluded that the design developed in this study is worthy of further development.

Keywords: academic information systems; design thinking; system usability scale

Abstrak: Perkembangan teknologi informasi sudah mulai masuk kedalam dunia pendidikan terutama perguruan tinggi, salah satunya sistem informasi akademik karena dengan adanya sistem ini sangat mempengaruhi proses pembelajaran dan juga dalam penyampaian informasi. Sistem informasi akademik berbasis web sudah sangat memadai namun ada beberapa kendala seperti dalam pembelajaran yang tidak memerlukan perangkat laptop akan sangat mengganggu jika pelaksanaan absensi dan lainnya dilakukan pada ponsel tapi dengan tampilan web. Sehingga penelitian ini bertujuan untuk merancang UI/UX aplikasi sistem informasi akademik berbasis mobile dengan harapan dapat menjadi alternatif dalam akses penggunaan sistem informasi akademik bagi dosen dan mahasiswa juga dapat diakses kapan saja dan dimana saja melalui ponsel dengan tampilan yang nyaman. Penelitian ini juga melakukan pengujian terhadap prototype desain UI/UX untuk menilai kelayakannya. Pengujian ini menggunakan metode *system usability scale* (SUS) dengan validasi *confident interval* 95% untuk mengetahui batas bawah dan batas atas nilai SUS. Untuk nilai akhir SUS yang didapatkan adalah 78,75, dan dalam pengujian CI 95 % dihasilkan CI Lower 66,27, dan untuk CI Upper 91,23 Sehingga mendapat *grade* B. Dapat disimpulkan bahwa desain yang dikembangkan dalam penelitian ini layak untuk dikembangkan lebih lanjut.

Kata kunci: sistem informasi akademik; desain thinking; system usability scale

INTRODUCTION

The development of Information Technology encourages educational insti-

tutions, especially universities, to implement interconnected Information Systems in each part of their work in order to support the main activities, namely Academ-



ic services [1]. One of the universities in Tuban, namely PGRI Ronggolawe University, has implemented a website-based academic information system that helps process academic data, such as lecture schedules, exam schedules, grades, payment scripts, and other academic information. However, seeing that many students feel uncomfortable using the website display on mobile phones, for mobile-based displays will be easier to use and more efficient, accessible anywhere and anytime.

This research will design an unprecedented mobile-based academic information system. The purpose of this research is to create a mobile-based prototype user interface of academic information systems at Universitas PGRI Ronggolawe Tuban to create user comfort and satisfaction, with an Advanced SUS, design thinking and evaluation approach. Design thinking focuses on a deep understanding of user needs and provides opportunities for designers to generate fresh innovations. This approach is not only aimed at producing attractive designs, but also aims to ensure ease of use for users [2].

The Design Thinking method offers a more in-depth framework through the stages of empathize, define, ideate, prototype, and test, which encourages contextual understanding of users as well as exploration of innovative solutions. The effectiveness of design thinking can be seen in studies [3] that have succeeded in improving the interactivity and navigation of VR-based online classroom systems [3], as well as in studies [4] that show significant improvements in the aspects of learningability, efficiency, and satisfaction in online course applications [5].

For partial testing methods The

study uses the System Usability Scale (SUS) as the main instrument, as in studies [5]-[7]. These results consistently show that the implementation of UI/UX redesign is able to significantly increase SUS scores, even reaching the "excellent" category. However, almost all of these studies only reported the average value of SUS without considering data variability or measurement uncertainty. This weakness is methodologically criticized by [8], who suggests that the use of a conventional confidence interval (CI) based on the distribution of t on SUS scores with n (9 - 10) is sufficient. These findings suggest that SUS-based usability evaluations should not only stop at the average value, but also need to be complemented by standard deviations and 95% confidence intervals in order for the results to be more reliable and statistically accountable [8].

Based on literature studies from previous researches, this study chose the Design Thinking method in designing the user interface of academic information systems (SIKAD) because this approach allows for an in-depth exploration of user needs. In addition, usability testing is performed using advanced SUS by involving the calculation of mean values, standard deviation, and 95% confidence intervals to produce a more scientifically accountable usability evaluation. Thus, this research is expected to not only make a practical contribution in the form of a more usable user interface design, but also a methodological contribution in the application of a more statistically accurate usability evaluation.

METODE

In the process of designing the UI/UX design of the Mobile-Based Academic Information System of PGRI Ronggolawe University, the author uses the Design Thinking method. Design Thinking is an approach that involves collaborating with users to find solutions in the design of a system. Using this method will create a system or product that suits the needs of the user [9].

In this study, we go through several stages which can be seen in image 1.

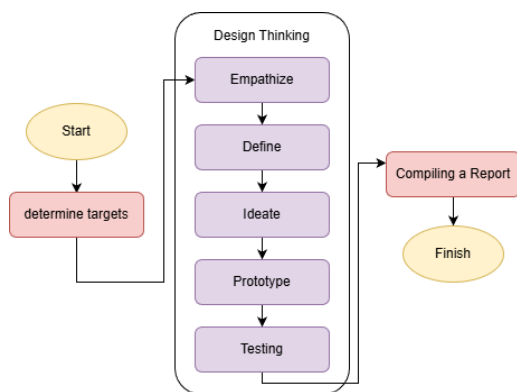


Image 1. Flowchart Desain Thinking

Defining Targets

This study involved 10 respondents consisting of 5 students and 5 lecturers. The relatively limited number of respondents was selected by considering the characteristics of the System Usability Scale (SUS) method which can still provide reliable usability evaluation results even with a small number of respondents. Some studies have shown that usability testing with a number of respondents between 5 –10 people has been able to identify most usability problems in a system [10].

Emphatize

At this stage, observation is carried out by conducting interviews with respondents. Interviews were conducted to obtain information about what users need, problems faced by users and also

users' expectations for the design of this mobile-based academic information system prototype.

Define

After obtaining data through the empathize stage, this stage will involve determining the problems that need to be addressed. The team explained the information obtained from the empathy stage to find the core of the problem to be solved. The goal is to build a uniform understanding of what needs to be achieved and steer design efforts on track.

Ideate

After learning about the perceived problem, the next user will create Solutions and innovations that can be used to solve the previous problem. Various problems can be grouped into an affinity diagram[11].

Prototype

In this stage, the researcher will realize the idea into a prototype design in the form of High-fidelity. In *high-fidelity* wireframes, there are already colors, text, and other features. The apparent structure and design arrangement can be clearly seen on *high-fidelity wireframes* [12].

Testing

At this stage, system usability scale (SUS) testing, . The Usability Scale (SUS) system consists of 10 statements in the form of a questionnaire that is used to measure a system. In the SUS questionnaire, there are positive and negative statements [13].

In this study, the author uses Advanced SUS to strengthen the research results. Clark et al. (2021) stated that the reporting of System Usability Scale (SUS) scores should not only use average scores because they are not scientifically

sufficient, but also accompanied by standard deviation (SD) and a confidence interval (CI) of 95%. SD is needed to describe the level of variation in respondents' assessments and be the basis for calculating standard errors. Meanwhile, a CI of 95% is used to express the uncertainty of the estimated SUS score, so that the researcher can assess how stable and convincing the average value is.

Several stages of the Advanced system usability scale starting from Odd-value answers (1,3,5,7,9) Odd SUS score = odd respondent answer - 1. Answer is even value (2,4,6,8,10) Even SUS score = 5 - even respondent answer. For SUS score = (Total score × 2.5). After each respondent's score is known, the next step is to find the average in equation 1.

$$\mu = \frac{\sum x}{n} \tag{1}$$

μ = Average value

\sum = Total SUS score

n = Number of respondents

Calculating the Standard Deviation (SD) value. Standard deviation, also known as standard deviation, is a statistical measure used to measure the distribution of data in a sample, as well as how exactly the individual data is positioned relative to the average of that sample. A low or near-zero standard deviation value indicates that the data is more consistent and reliable to use [14].

$$SD = \sqrt{\frac{\sum (X_i - \bar{X})^2}{n-1}} \tag{2}$$

$\sum (X_i - \bar{X})^2$ = The sum of the difference in data with red

n = Number of respondents

To validate the Usability of the SUS was carried out the Confidence Interval calculation (CI 95%), using a two-tailed t-table in the calculation of the Confidence Interval because the number

of respondents < 30 so it included a small sample. The formula for Confidence interval can be seen in equation 3.

$$CI = Mean \pm t \times \frac{SD}{\sqrt{n}} = \text{hasil} \tag{3}$$

Mean = average SUS final score

SD = Standard Deviation

n = Number of respondents

t-value (df (n - 1), 95%)

The final stage of the average obtained will be analyzed by referring to the Adjective Ratings, Acceptability Ranges, and Grade Scale in the Rating Scale SUS Score according to Bangor, as shown in Image 2.

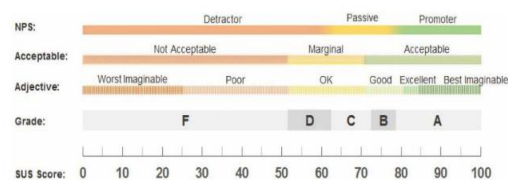


Image 2. Score Rating Scale SUS [15]

RESULTS AND DISCUSSION

From the results of the interview, it is known that users have several different problems, ranging from appearance, security and others. From the problems obtained, the researcher determined the pain point into the affinity diagram as shown in image 3.



Image 3. Affinity Diagram

Prototype Planning

At this stage, the researcher will design a prototype according to the user's problems and desires, for which the stu-

dent user will look as can be seen in Image 4.



Image 4. Student Prototype

In the student prototype, it consists of the first page, namely login accompanied by captcha for security, then directed to the dashboard page which displays semesters and IPK scores, on the page there are also several menus, namely KRS, KHS, finance, schedule, attendance, and also the library.

Furthermore, the design display for lecturer users can be seen in the image 5.



Image 5. Lecturer Prototype

Based on the lecturer's prototype results, several menus are available. Before entering the dashboard after logging in, the lecturer will select the department they wish to access. The dashboard then includes menus for grades, attendance, and schedules. This design includes only menus frequently accessed during learning, as an alternative to having multiple processes.

The usability test stage was carried out using an Advanced Usability Scale (SUS) system, with as many as 10 respondents consisting of 5 lecturers and 5 students. This approach is used to measure the Level uses system, whether it has been understood and acceptable by the user.

System Usability Scale (SUS) Results

Table 1. Convered SUS Score

Respondents	ID	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Score SUS
Lecturer	R1	4	4	4	4	4	3	4	4	4	4	97,5
	R2	4	4	4	4	3	4	4	4	4	3	95
	R3	2	2	2	2	2	2	2	1	2	2	47,5
	R4	3	3	3	4	3	2	3	4	3	4	80
	R5	1	3	1	4	2	3	2	2	1	2	52,5
Students	R6	2	3	3	4	3	2	3	3	2	3	70
	R7	4	4	4	4	3	4	3	4	4	4	95
	R8	3	3	3	3	3	3	3	4	3	3	77,5
	R9	3	4	3	4	2	3	3	4	4	4	85
	R10	4	3	3	4	4	4	3	4	3	3	87,5
Average SUS											78,75	

The results of the respondents' answer conversion obtained are in table 1.

Standard Deviation Calculation

$$SD = \sqrt{\frac{2740.63}{9}}$$

$$SD = \sqrt{304.51}$$

$$SD = 17.45$$

Confidence Interval (95%) Calculation

Because the number of respondents is small <30, the distribution t is used.

Cast $t_{0.025,9} = 2.262$

$$CI = 78.75 \pm 2.262 \times \frac{17.45}{\sqrt{10}}$$

$$CI = 78,75 \pm 2.262 \times 5,518$$

$$CI = 78,75 \pm 12,48$$

$$CI_{Lower} = 66,27$$

$$CI_{Upper} = 91,23$$

Based on the results of Table 1, the average result is 78.75 and a lower CI which means that the actual value is es

timated to be no less than 66.27 and an upper CI which means that the actual value is estimated to be no greater than 91.23. So that a line is drawn on the image of the grade assessment which is included in the grade scale B which means that the grade scale is acceptable. The results of the grade scale of the error assessment are seen in figure 6.

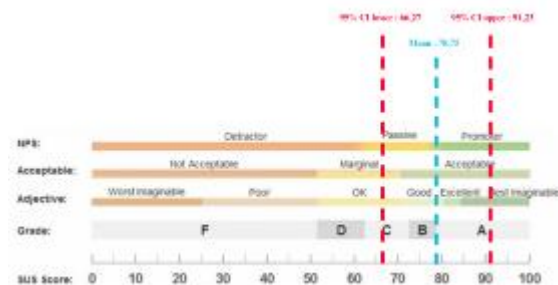


Image 6. SUS Assessment Grade Scale

CONCLUSION

This research is a prototype design of the user interface design of the academic information system of PGRI Ronggolawe Tuban University. Using design thinking research methods, which include interviews, user persona creation, empathy maps, affinity diagrams, and also prototype making according to user

needs. Based on the results of the calculation of the system usability scale (SUS), a score of 78.75 was obtained which was in the "Acceptable" category and received a grade of "Good" in the Adjective category. These results show that the designed system has met the needs of users. However, this research is still limited to the prototype design stage, it is hoped that further research will be suggested to develop the prototype into a system that can be implemented directly.

BIBLIOGRAPHY

- [1] P. Dellia *et al.*, "ANALISIS UI / UX SISTEM INFORMASI AKADEMIK UNIVERSITAS TRUNOJOYO MADURA MENGGUNAKAN HEURISTIC EVALUATION," vol. 9, no. 4, pp. 6223–6230, 2025.
- [2] D. F. Shiddieq and D. Nurhayati, "Perancangan UI / UX Sistem Informasi Akademik berbasis Design Thinking," no. 1, pp. 25–36, 2025.
- [3] B. Perdana, T. Sutabri, and U. B. Darma, "Online Class UI / UX Design Using Design Thinking Method in Virtual Reality Environment," vol. 1, no. 2019, 2024.
- [4] S. M. Dewi, T. Septiana, W. E. Sulistiono, F. Teknik, U. Lampung, and K. B. Lampung, "PERANCANGAN UI / UX APLIKASI KURSUS ONLINE MERCURIUS BERBASIS MOBILE DENGAN METODE," vol. 13, no. 3.
- [5] T. Adhitya, E. Nur, F. Dewi, and M. Albait, "User Experience Analysis On Siliwangi University SIMAK Using Heart Metrics Framework Based On User Background," pp. 34–41.
- [6] I. Kurniyawan Barkah, "Redesign UI / UX dengan Metode SUS dan UCD pada Website Akademik," pp. 329–337, 2025, doi: 10.47002/metik.v9i2.1093.
- [7] R. A. Malik and M. R. Frimadani, "JURNAL RESTI," vol. 5[1] A. B., no. 158, pp. 958–965, 2026.
- [8] N. Clark, M. Dabkowski, P. J. Driscoll, D. Kennedy, and M. E. Jan, "Empirical Decision Rules for Improving the Uncertainty Reporting of Small Sample System Usability Scale Scores Empirical Decision Rules for Improving the Uncertainty Reporting of Small Sample System Usability Scale Scores," 2021.
- [9] S. Ansori, P. Hendradi, and S. Nugroho, "Penerapan Metode Design Thinking dalam Perancangan UI / UX Aplikasi Mobile SIPROPMAWA," vol. 4, no. 4, 2023, doi: 10.47065/josh.v4i4.3648.
- [10] J. Brooke, "SUS - A quick and dirty usability scale Industrial usability evaluation".
- [11] M. R. Anshari, A. P. Kuncoro, P. Subarkah, I. Departement, and U. A. Purwokerto, "Designing ui/ux for elementary school e-learning using design thinking method," vol. X, no. 3, 2024.
- [12] M. Yaasiin and I. F. Hanif, "Desain UI / UX Aplikasi Edukasi FIDEXA-SD Menggunakan Design Thinking dan Figma," pp. 292–301, 2025, doi: 10.47002/metik.v9i2.1080.
- [13] I. K. Wardani, P. Utomo, and A. Budiman, "Pemanfaatan Metode Design Thinking dan Pengujian

- SUS untuk UI / UX Aplikasi Home Care Madiun Berbasis Android,” vol. 4, no. 2, pp. 106–125, 2023.
- [14] S. Putri and C. Astiti, “Penerapan Metode Least Square Dalam Perhitungan Proyeksi Jumlah Penduduk,” vol. 04, no. 02, pp. 147–154, 2023.
- [15] V. P. Sabandar and S. Sintaro, “Evaluasi Usability Ditinjau dari Kepuasan Pengguna terhadap Desain UI / UX Protoype E-Repository Evaluation of Usability Based on User Satisfaction with the UI / UX Design of the E-Repository Prototype,” vol. 13, pp. 1940–1955, 2024.