Enhancing User Interface & User Experience on Digital Learning Platforms Through a Design Thinking Approach

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Abstract

Thinkoguru is an educational platform under development. This study redesigns its user interface and user experience using the Design Thinking framework through five stages: empathize, define, ideate, prototype, and test. User needs were elicited through interviews, synthesized into personas and pain points, and mapped to information architecture, user flows, and a cohesive design system. The outcome is a high-fidelity prototype based on a role-based dual-platform architecture, consisting of a mobile application for learners and a web dashboard for mentors. This paper presents and evaluates the web prototype, which was tested with fifteen participants using the System Usability Scale and achieved an average score of 85.5 (Grade A), indicating excellent perceived usability. The study contributes a clear separation of roles to clarify tasks and reduce cognitive load, together with a traceable linkage from user needs to design decisions that support reuse. These findings provide a structured foundation for the continued development of *Thinkoguru* and for improving the learning experience on similar educational platforms.

Keywords: Design Thinking, Educational Platform, System Usability Scale, UI & UX, *Thinkoguru*.

I. INTRODUCTION

User interface (UI) and user experience (UX) design have evolved alongside technological progress and rising user expectations. Following the command-line interface (CLI) era of the 1960s and the introduction of graphical user interfaces (GUIs) in the 1970s, UX gained prominence in the 1990s through user-centered design [1]. Applications now span banking [2], healthcare [3], and education[4], Empirical evidence shows that improved UI/UX enhances user satisfaction, for example an SUS increase from 52 to 80 in a banking study [2], an SUS score of 83 for a hospital registration service [5], and findings in education linking UI/UX quality to user satisfaction [6].

Thinkoguru is an educational platform under development that aims to provide an accessible and comfortable learning experience. Early interviews revealed challenges when compared with established platforms; therefore, navigation, visual consistency, and system responsiveness were set as design priorities. Benchmarking focused on *Ruangguru*, *Dicoding*, and *Udemy*. Aggregate data place *Ruangguru* at the top with a broad user reach [7], yet a usability study reported an SUS score of 65.6 with visual consistency issues [8]. For *Dicoding*, a User Experience Questionnaire assessment showed several dimensions above average while perspicuity and dependability were below average [9]. In addition, a 2020 case study reported shortcomings in appearance and features, including an unclear search function and hidden input tokens that impeded navigation [10]. *Udemy* remains popular with extensive reviews and positive sentiment, but exhibits impersonal navigation, limited social features, and visual ambiguity [11]. These observations informed the requirements for the *Thinkoguru* design.

Nevertheless, prior work reveals two gaps. First, usability evaluations of existing platforms surface issues such as visual consistency and navigational clarity but do not develop cross role, operational design solutions [8], [9]. Second, design-oriented studies achieve high usability scores yet do not document a traceable linkage from pain points to concrete design decisions in the local digital learning context [5], [6]. Evidence of a role-based dual-platform architecture that systematically differentiates learner needs on mobile from mentor needs on the web dashboard also remains limited within the cited literature[8]-[11].

II. RESEARCH METHODOLOGY

This study employed a hybrid methodology combining exploratory and evaluative approaches. The initial exploratory phase identified key usability issues through a preliminary administration of the System Usability Scale (SUS) and an

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analysis of user-persona insights. Findings from this phase informed the subsequent analysis and the design of the *Thinkoguru* platform.

To implement this approach, the study targeted usability improvements for platforms like *Ruangguru*, *Dicoding*, and *Udemy* through UI and UX design. Design Thinking was selected as the primary methodology and was complemented by a SUS-based usability evaluation. As illustrated in Figure 1, the overall process comprised seven phases: two preliminary steps (initial observation and interviews), followed by the five core stages of the Design Thinking framework—Empathize, Define, Ideate, Prototype, and Test. The preliminary phase consisted of two activities: a literature review of relevant scholarly articles and a benchmarking analysis of educational platforms, specifically *Ruangguru*, *Dicoding*, and *Udemy*.

For this research, the Design Thinking methodology was employed, which is a problem-solving framework that places users at its core. Its primary objective is to foster creative solutions by developing a profound understanding of the user experience [12]. The framework is composed of five sequential phases, beginning with the Empathize stage [13]. The purpose of this initial stage is to gain deep insights into the users' needs, goals, and frustrations. To achieve this, data was gathered using structured interviews, a method chosen to cultivate genuine empathy and to guarantee that the final design would effectively address real-world user conditions [14].

After data were collected, the study proceeded to the Define stage. Information and findings from the Empathize stage were analyzed and synthesized to formulate the core problem. This stage produced artifacts such as User Personas to represent target users [15] and Pain Points that describe the specific difficulties they face [16].

After the core problem was clearly defined, the study proceeded to the Ideate stage. In this stage, structured brainstorming was conducted to generate alternative ideas and creative solutions. The resulting ideas were then organized into the information architecture through a Site Map [17] and into interaction flows through User Flow diagrams [18].

Following the Ideate stage, the Prototype stage translated selected concepts into tangible designs. The process began with low-fidelity wireframes to establish layout and structure, which were then refined into a high-fidelity prototype that reflected the intended visual and interaction design. The final stage, Test, evaluated the prototype using the System Usability Scale (SUS). SUS was originally developed by John Brooke [19], and uses a ten-item questionnaire with a five-point Likert scale [20]. The ten items comprise five positively worded and five negatively worded statements, listed as follows:

1. I think I will use this system frequently
2. I find the system too complicated
3. I find the system easy to use
4. I think I will need technical assistance to use the system
5. I feel the various functions in the system are well integrated
6. I feel there are too many inconsistencies in the system
7. I feel most people will be able to learn the system very quickly
8. I find the system too overwhelming
9. I feel very confident using the system
10. I need to learn a lot before I can get used to the system

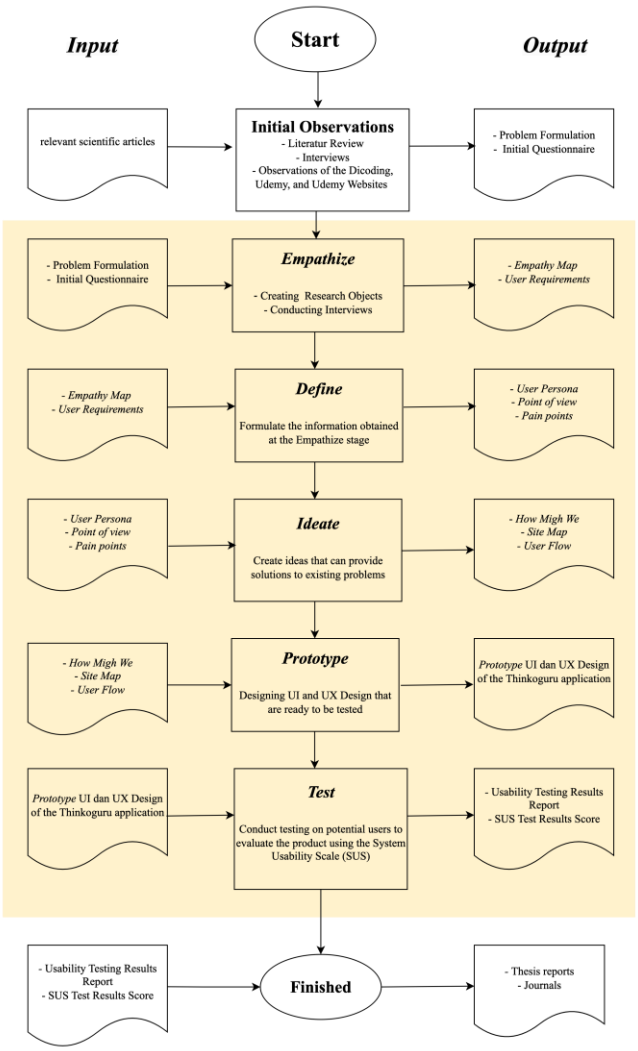

Figure 1. Research Flow for UI and UX Using the Design Thinking Method

Fifteen participants were recruited via purposive sampling to match the predefined user personas (school students, university students, and mentors). This size aligns with established SUS practice, where 12–15 participants commonly yield stable mean scores and percentile interpretations [21]. While five users are often sufficient for qualitative issue discovery [22], a larger sample is appropriate when the goal includes obtaining a quantitative SUS score with better precision; fifteen participants provides this balance. Furthermore, SUS offers a global measure of perceived usability with usability and learnability components [23].

For positively worded items (1, 3, 5, 7, 9), the score contribution is the response minus one. For negatively worded items (2, 4, 6, 8, 10), the contribution is five minus the response. The item scores are summed and multiplied by 2.5 to obtain the final 0–100 SUS score [24].

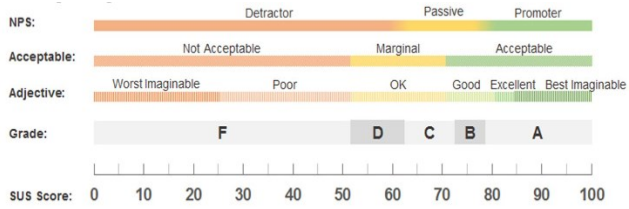

Figure 1. SUS Score Range

The SUS scale used in this study is summarized in Figure 2 and Table 1, which provide letter grades, adjective ratings, acceptability, and Net Promoter Score bands to aid interpretation [25]. These references guide how the final SUS score is mapped to qualitative labels used in reporting.

Table 1. SUS Score Interpretation

SUS Score	Grade	Adjective	Acceptance Rate	NPS
84.1 – 100	A+	Best Imaginable	Acceptable	Promoter
80.8 – 84	A	Excellent	Acceptable	Promoter
78.9 – 80.7	A-	Good	Acceptable	Promoter
77.2 – 78.8	B	Good	Acceptable	Passive
74.1 – 77.1	B	Good	Acceptable	Passive
72.6 – 74	B-	Good	Acceptable	Passive
71.1 – 72.5	C	Good	Acceptable	Passive
65 – 71	C	OK	Marginal	Passive
62.7 – 64.9	C-	OK	Marginal	Passive
51.7 – 62.6	D	OK	Marginal	Detractor
25.1 – 51.6	F	OK	Not Acceptable	Detractor
0 – 25	F	OK	Not Acceptable	Detractor

III. RESULT AND DISCUSSION

A. Result

The first phase of this research focused on crafting a strategic plan that integrated preliminary observations with the definition of the study's primary objectives. To establish a basis for problem identification, data were collected through a literature review and observations of competitor platforms [8], [9]. The process then progressed to the five core stages of the Design Thinking method, which produced a set of design deliverables and evaluation data.

1) Results of the Empathize and Define Stage: User needs and problem formulation

During the Empathize stage, structured interviews were conducted with three primary user groups: school students, university students, and mentors. The synthesized findings in the Define stage yielded three detailed user personas that represent each user segment's goals and frustrations. The student persona is shown in Figure 3, the university student persona is shown in Figure 4, and the mentor persona is shown in Figure 5.

From the persona analysis and interviews, six main pain points were identified as design priorities: (1) confusing menu structure, (2) inconsistent interface display, (3) difficulty finding important information, (4) lack of discussion space or social interaction, (5) limited content personalization, and (6) non-uniform use of design elements. These findings then informed the compilation of the User Requirements.

Figure 3. Student Persona

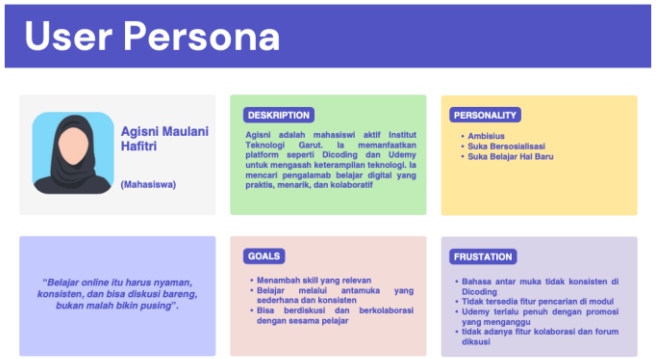

Figure 4. University Student Persona

Figure 2. Mentor Persona

2) Ideate Phase Results: Information Architecture and User Flow

In the Ideate stage, the identified pain points were reframed into "How Might We" questions to guide solution brainstorming. The resulting ideas were organized into a logical information architecture and visualized as site maps. The User Sitemap for the web user experience is presented in Figure 6, while the Mentor Site Map for the web dashboard is presented in Figure 7. Building on these structures, a set of user flows was created to detail key tasks such as course registration, course creation, and assessment.

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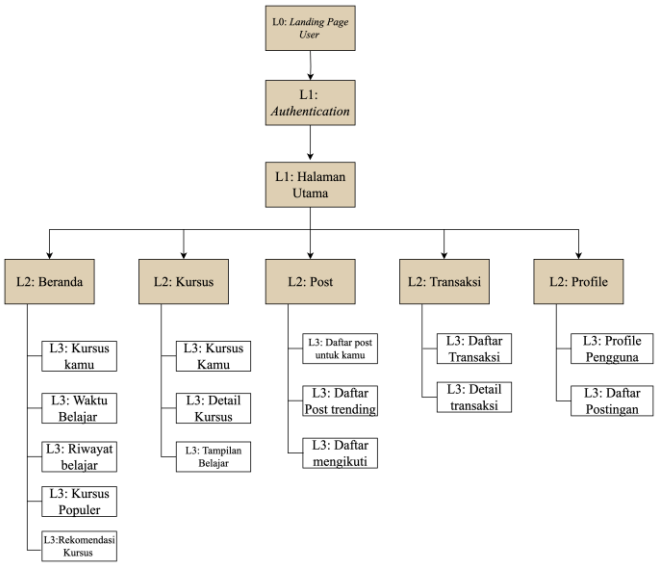

Figure 3. User Site Map

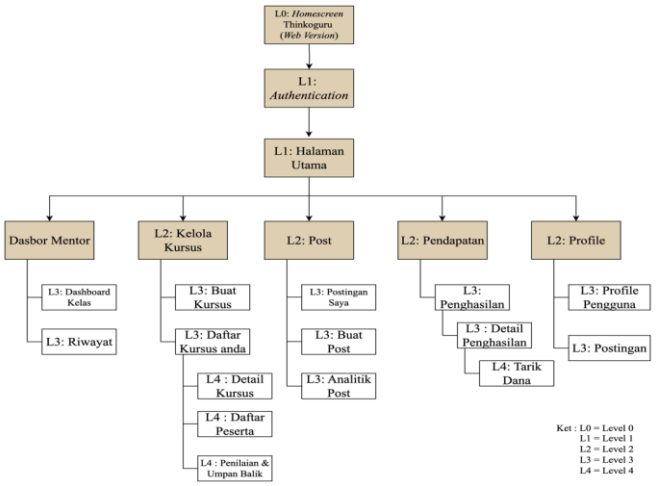

Figure 4. Mentor Site Map

3) Prototype Stage Results: Low-Fidelity and High-Fidelity Designs

In the Prototype stage, the Site Map and User Flow were translated into visual designs. We first produced low-fidelity wireframes to define layout and structure for the web interfaces; the user homepage wireframe is shown in Figure 8 and the mentor dashboard wireframe in Figure 9. Once the structure was validated, we developed high-fidelity designs and a cohesive design system to enforce consistency, including a defined color palette and the Roboto and Inter typefaces (Figure 10). The resulting interactive web prototypes are presented in Figure 11 for the user homepage and Figure 12 for the mentor dashboard.

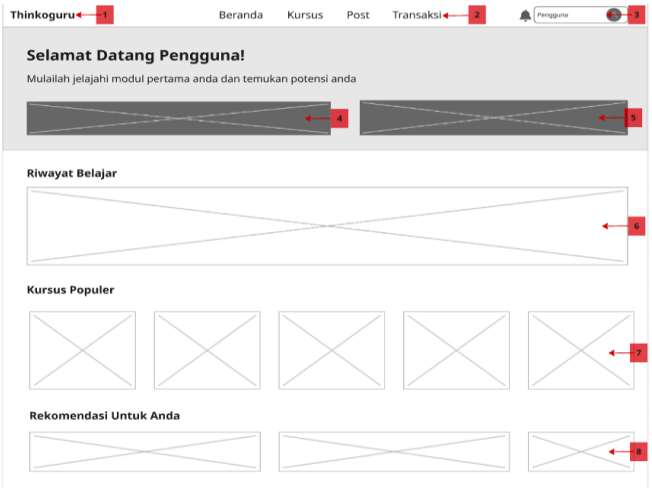

Figure 5. User Homepage Wireframe

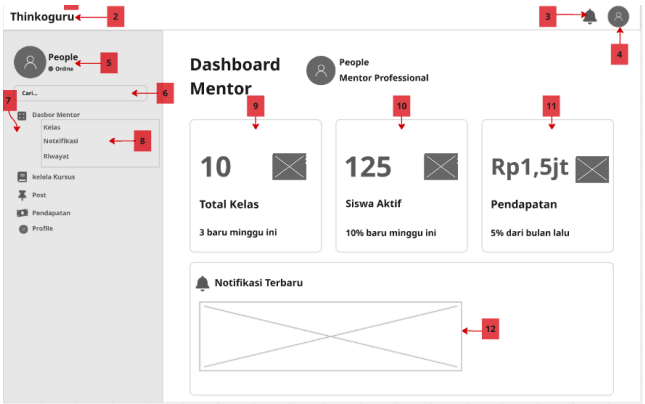

Figure 6. Mentor Dashboard Wireframe

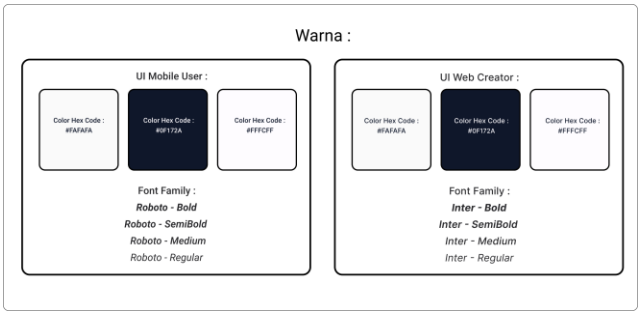

Figure 7. Color Palette and Typography

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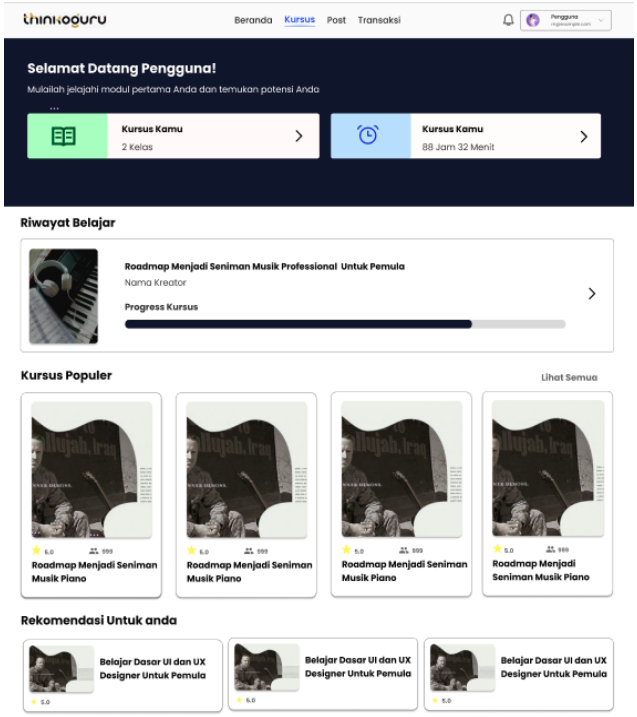

Figure 8. User Homepage Prototype

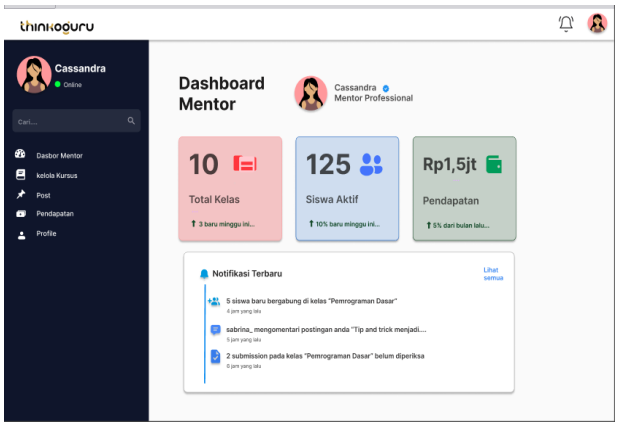

Figure 9. Mentor Dashboard Prototype

4) Test Phase Results: Usability Score

We summarize the sample size (N), mean, standard deviation (SD), median, minimum, maximum, and interquartile range (IQR, from the first to the third quartile). The SUS score averaged 85.5 (SD 2.71; N = 15), with a median of 85, minimum 80, maximum 90, and IQR 83.75–87.5. All participants scored ≥ 80. According to Table 1, the mean corresponds to Grade A, with the adjective "Excellent" and Acceptable status. These statistics in Table 2 summarize the evaluation conducted on the web prototype; the mobile interface remains a design artifact to be evaluated in subsequent work.

Table 2. SUS Summary Statistics

Metric	Value
N (number of participants)	15
Mean SUS score	85.5
Standard deviation (SD)	2.71
Median	85.0
Minimum – Maximum	80.0 – 90.0
Interquartile range (IQR; first–third quartile)	83.75 – 87.50
Proportion ≥ 80	100%

Data availability: Per-item SUS responses (15×10) are available from the authors upon reasonable request.

B. Discussion

This study contributes beyond the use of Design Thinking and the SUS by doing three concrete things. Interfaces for learners and mentors are separated inside one web application, and this separation comes directly from persona pain points that were found in the study. Each pain point is linked to information architecture, user flows, and the color and typography rules in the design system so that decisions can be reviewed and reused. Results are reported as a distribution as well as a single figure, which helps readers see the consistency of outcomes in the local education technology context.

The mean SUS score is 85.5 with a standard deviation of 2.71 and N = 15, which shows high perceived usability. Using the scheme in Table 1 [25], the score corresponds to Grade A with the adjective "Excellent" and Acceptable status. Many participants disagreed with the negative items about complexity and inconsistency, which matches the aim of clearer navigation and consistent use of the design system.

When compared with prior work, the gain becomes clearer. The score is far above the 65.6 reported for *Ruangguru* in the marginal range [8]. For *Dicoding*, a User Experience Questionnaire study showed several dimensions above average but lower perspicuity and dependability [9]. Notes on *Udemy* mention impersonal navigation, limited social features, and unclear visuals [11]. The present design responds to these themes through role separation and a shared design system. The outcome is also consistent with design oriented studies in Indonesia that reported high SUS values, such as *BukuKu* [26].

For web-based learning services that serve different roles, separating learner and mentor surfaces while maintaining one design system can reduce cognitive load, make task flows clearer, and improve perceived consistency. The evaluation used a web prototype and N = 15 participants, so generalization is limited and long term use was not observed. Future work should test the design in production, involve a larger and more diverse sample, and add task based metrics such as completion time and error rates, together with behavioral analytics.

IV. CONCLUSION

This study redesigned the *Thinkoguru* platform by connecting what users need to concrete design choices and validating the outcome with a usability assessment. The work adds three contributions. First, it implements separate interfaces for learners and mentors within one web application, a decision drawn directly from persona pain points so that task boundaries are clearer and cognitive load is reduced. Second, it documents a trace from findings to design

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decisions by mapping each pain point to information architecture, user flows, and the rules in the design system for color and typography. This makes the approach easier to reuse and review in real projects. Third, it reports both the average and the spread of System Usability Scale outcomes to show consistency across participants in a local education technology context.

This evaluation used a web prototype with fifteen participants from a limited area. Measures capture perceived usability rather than task performance and do not reflect long term use. The mobile learner interface was designed but not evaluated. These factors limit generalization beyond the defined personas. Future work should deploy the design in production, involve a larger and more diverse sample, complement the SUS with task-based metrics such as completion time and error rates, and consider features such as social interaction or gamification, including extensions to mobile contexts.

REFERENCES

[1] Abdul Kholik, Asep Soegiarto, and Wina Puspita Sari, "Strategi Komunikasi Visual dalam User Interface (UI) dan User Experience (UX) Untuk Membangun Kepuasan Pengguna," *TUTURAN: Jurnal Ilmu Komunikasi, Sosial dan Humaniora*, vol. 2, no. 4, pp. 335–344, Nov. 2024, doi: 10.47861/tuturan.v2i4.1358.

[2] D. S. Mubiarto, R. R. Isnanto, and I. P. Windasari, "Perancangan User Interface dan User Experience (UI/UX) pada Aplikasi 'BCA Mobile' Menggunakan Metode User Centered Design (UCD)," *Jurnal Teknik Komputer*, vol. 1, no. 4, pp. 209–216, Mar. 2023.

[3] M. Dopades, R. Sumarlin, and T. R. Deanda, "Analisis Ui Dan Ux Aplikasi Halodoc Terhadap Pengguna Layanan Kesehatan," *Desain Komunikasi Visual Manajemen Desain dan Periklanan (Demandia)*, vol. 8, no. 1, p. 1, Mar. 2023, doi: 10.25124/demandia.v8i1.4685.

[4] R. Setiawan, M. Faturrahman, Y. Septiana, D. Tresnawati, and A. Sutedi, "Enhancing the Usability of ITG Virtual Tour Website Through UI/UX Design Using the Five Planes Method," *Teknika*, vol. 14, no. 2, pp. 197–204, Jul. 2025, doi: 10.34148/teknika.v14i2.1227.

[5] M. Trifena, A. Voutama, and A. A. Ridha, "Perancangan UI/UX Aplikasi Sistem Pendaftaran Rumah Sakit Saraswati Berbasis Mobile Dengan Metode Design Thinking," *Information Management for Educators and Professionals : Journal of Information Management*, vol. 7, no. 2, pp. 113–123, Jun. 2023, doi: 10.51211/imbi.v7i2.2279.

[6] F. Firmansyah, "Analisis Pengaruh Desain Antarmuka Pengguna terhadap Adopsi Aplikasi Edukasi: Studi Kasus pada Ruangguru, Skill Academy, dan Belajar dari Rumah (Kemendikbud) di Platform Pembelajaran Daring Indonesia," *Design Journal*, vol. 3, no. 1, pp. 11–20, Jan. 2025, doi: 10.58477/dj.v3i1.197.

[7] F. N. Hidayah, "Ruangguru Tempati Posisi Pertama Startup Teratas di Indonesia," goodstats.id. Accessed: Feb. 23, 2025. [Online]. Available: https://data.goodstats.id/statistic/ruangguru-tempati-posisi-pertama-startup-teratas-di-indonesia-ji1Uw

[8] A. Z. Hakim, F. Fahsya, R. A. Safitri, and A. Prabowo, "Analisis UI/UX menggunakan metode System Usability Scale: Studi pada Aplikasi Ruangguru," in *Seminar Nasional Teknologi Informasi dan Matematika (SEMIOTIKA)*, 2023, pp. 136–145.

[9] D. Danendra, N. Oktadini, P. E. Sevtiyuni, A. Meiriza, and P. Putra, "Analisis User Experience Pada Website Dicoding Menggunakan Metode User Experience Questionnaire (UEQ)," *Indonesian Journal of Computer Science*, vol. 12, no. 5, Oct. 2023, doi: 10.33022/ijcs.v12i5.3456.

[10] Y. Tang *et al.*, "Perception and Navigation in Autonomous Systems in the Era of Learning: A Survey," *IEEE Trans Neural Netw Learn Syst*, vol. 34, no. 12, pp. 9604–9624, Dec. 2023, doi: 10.1109/TNNLS.2022.3167688.

[11] J. Gao and A. K. Dubé, "Comparison of Learning Experience Among Informal Learning APPS," Nov. 2024, pp. 337–341. doi: 10.21125/iceri.2024.0173.

[12] A. R. Ridwansyah, C. Dinata, N. Savitri, N. Rahmawati, N. Herdiana, and A. Rahman, "Perancangan UI/UX Pada Aplikasi Bapakkost Idemopet dengan Menggunakan Metode Design Thinking," in *MDP Student Conference 2022*, 2022, pp. 504–511.

[13] V. Christianto and F. Smarandache, "The Convergence of Ikigai and Design Thinking: Crafting a Purposeful Framework," *Sustainable Machine Intelligence Journal*, vol. 7, Apr. 2024, doi: 10.61356/SMIJ.2024.77101.

[14] P. Y. Pratiwi and N. P. E. Suchahyani, "Implementation Of Design Thinking Method And Usability Testing In The Design Of A Scholarship Information System," *Jurnal Pendidikan Teknologi dan Kejuruan*, vol. 21, no. 2, pp. 133–144, Jul. 2024, doi: 10.23887/jptkundiksha.v21i2.81688.

[15] E. D. Wahyuni, W. A. Kusuma, H. R. Abdillah, and H. Y. Sari, "Perspektif Awam Dalam Implementasi Elisitasi Kebutuhan Menggunakan User Persona," *SISTEMASI*, vol. 9, no. 3, p. 468, Sep. 2020, doi: 10.32520/stmsi.v9i3.854.

[16] R. Fahrudin and R. Ilyasa, "Perancangan Aplikasi 'Nugas' Menggunakan Metode Design Thinking dan Agile Development," *Jurnal Ilmiah Teknologi Infomasi Terapan*, vol. 8, no. 1, pp. 35–44, Dec. 2021, doi: 10.33197/jitter.vol8.iss1.2021.714.

[17] B. H. Pakarti and A. Prapanca, "Perancangan Ulang User Inteface (UI) Dan User Experience (UX) Website Perzela Dengan Metode User Centered Design (UCD)," *Journal of Emerging Information System and Business Intelligence (JEISBI)*, vol. 4, no. 4, pp. 150–162, 2023.

[18] D. L. Santoso, I. Mufidah, and M. Iqbal, "Perancangan User Interface Website Laboratorium Analisis

Perancangan Kerja dan Ergonomi Universitas Telkom Dengan Metode Double Diamond," *INNOVATIVE: Journal Of Social Science Research*, vol. 4, no. 5, pp. 1004–1016, 2024.

[19] J. Brooke, "SUS-A quick and dirty usability scale," *Usability evaluation in industry*, vol. 189, no. 194, pp. 4–7, 1996.

[20] W. Welda, D. M. D. U. Putra, and A. M. Dirgayusari, "Usability Testing Website Dengan Menggunakan Metode System Usability Scale (Sus)s," *International Journal of Natural Science and Engineering*, vol. 4, no. 3, pp. 152–161, Nov. 2020, doi: 10.23887/ijnse.v4i2.28864.

[21] J. Sauro and J. R. Lewis, *Quantifying the user experience: Practical statistics for user research*. Morgan Kaufmann, 2016.

[22] J. Nielsen, "Why You Only Need to Test with 5 Users," Nielsen Norman Group. Accessed: May 01, 2025. [Online]. Available: https://www.nngroup.com/articles/why-you-only-need-to-test-with-5-users/

[23] M. R. Drew, B. Falcone, and W. L. Baccus, "What Does the System Usability Scale (SUS) Measure?," 2018, pp. 356–366. doi: 10.1007/978-3-319-91797-9_25.

[24] D. P. Kesuma, "Using System Usability Scale Method To Measure Usability Aspects On Online Learning Media at XYZ University," *JATISI (Jurnal Teknik Informatika dan Sistem Informasi)*, vol. 8, no. 3, pp. 1615–1626, Sep. 2021, doi: 10.35957/jatisi.v8i3.1356.

[25] G. W. Intyanto, N. A. Ranggianto, and V. Octaviani, "Pengukuran Usability pada Website Kampus Akademi Komunitas Negeri Pacitan Menggunakan System Usability Scale (SUS)," *Walisongo Journal of Information Technology*, vol. 3, no. 2, pp. 59–68, Dec. 2021, doi: 10.21580/wjit.2021.3.2.9549.

[26] A. Nurhasanah and O. Komarudin, "Perancangan User Interface Dan User Experience Pada Aplikasi" Bukuku" Menggunakan Metode Design Thinking," *JATI (Jurnal Mahasiswa Teknik Informatika)*, vol. 8, no. 5, pp. 10401–10409, 2024.

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