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User Interface Evaluation and Design Recommendations for the Tulungagung Portal Website Using the Heuristic Evaluation Method

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ABSTRACT
Government websites serve as essential platforms for delivering information and public services online, yet many still face usability challenges. The present study evaluates the user interface of the Tulungagung Regency Government website and provides interface improvement recommendations. The research utilized a heuristic evaluation method involving three evaluators and applied ten heuristic principles to identify usability issues. Data were collected through direct observation, documentation, and user questionnaires. Interface improvement recommendations were designed as a high-fidelity prototype using Figma. To test the effectiveness of the proposed design, usability testing was conducted using the System Usability Scale (SUS) method involving 25 respondents. The study found key issues including inconsistent visual design, disorganized menu structure, and lack of system feedback. The usability testing results indicated a significant increase in usability scores with the redesigned prototype compared to the original version. The research contributes to the development of more user-friendly government websites and can serve as a reference for similar interface evaluations in the public sector.

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User Interface; Heuristic Evaluation; System Usability Scale; Government Digital Service; Government Website; Usability.

1. Introduction

Digital transformation in public services has driven local governments to optimize web-based platforms as primary channels for information delivery and community interaction. The official website of Tulungagung Regency Government (https://tulungagung.go.id) serves as the main platform for delivering public services and regional information. Websites function not only as information delivery channels but are also designed to provide optimal user experience. User interface acts as a crucial bridge between users and applications, providing visual media that enables direct interaction between users and various available system features (Putra Andreano & Saivul Affandi, 2024).

Based on preliminary surveys involving 15 users and direct observations, several challenges emerged regarding usability and user interface aspects (Pratiwi Widra Bayu *et al*., 2023; Yudha Pratama *et al*., 2022). These challenges include confusing navigation, visual inconsistencies, unfamiliar menu terminology, and poorly organized information structure (Indah Rosita *et al*., 2022; Wisanto *et al*., 2023). Website usability represents a fundamental factor determining how easily and efficiently users can access available services. Navigation through websites depends heavily on design features. Well-designed websites should be intuitive, requiring no special instructions

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for operation. Simple layouts free from irrelevant distractions help users maintain focus on their primary objectives. When these factors are overlooked, user dissatisfaction increases, leading to higher abandonment rates before goals are achieved (Csontos & Heckl, 2025).

Usability evaluation plays a vital role in website development processes, particularly in ensuring ease of use, efficiency, and user satisfaction (Fathurrahman & Sumarsono, 2024). One widely adopted method is Heuristic Evaluation, developed by Nielsen and Molich, which has proven effective in detecting usability problems with relatively low cost and time investment (Hasnanursanti Aisya Rizki *et al*., 2022; Septarina *et al*., 2025). The method evaluates interfaces based on ten heuristic principles, including visibility of system status, consistency and standards, and aesthetic and minimalist design (Syarqim Mahfudz *et al*., 2022). Previous studies demonstrate successful implementation of the method across various government and public websites, including Surakarta City Government, Batu City Education Department, and SatuSehat platforms (Firman Agil Winaldi *et al*., 2024; Hasnanursanti Aisya Rizki *et al*., 2022; Natanael & Ginting, 2024). Evaluation results subsequently inform interface redesign efforts to enhance user comfort and efficiency. System Usability Scale (SUS) serves as a testing tool for measuring redesign effectiveness, providing quantitative insights into user perceptions following improvements (Bahador *et al*., 2023; Hidayat *et al*., 2022; Sidqih *et al*., 2024).

The research aims to evaluate usability of the tulungagung.go.id website interface using heuristic evaluation methods, develop prototype-based interface improvement recommendations, and measure new design effectiveness through SUS. The study seeks to advance government website development toward more efficient, consistent, and user-friendly platforms, particularly within digital public service delivery.

2. Methodology

This research employs a descriptive quantitative approach using Heuristic Evaluation (HE) methods to assess usability of the official Tulungagung Regency Government website interface, followed by testing through System Usability Scale (SUS) on proposed interface design recommendations. HE was selected for its effectiveness in identifying usability problems quickly and systematically (Firman Agil Winaldi *et al*., 2024; Hasnanursanti Aisya Rizki *et al*., 2022), while SUS represents a valid measurement tool widely used in user-based system evaluation (Hidayat *et al*., 2022). Three evaluators with backgrounds in UI/UX and information systems conducted the evaluation process. Evaluators applied Nielsen's ten heuristic principles: visibility of system status, match between system and the real world, user control and freedom, consistency and standards, error prevention, recognition rather than recall, flexibility and efficiency of use, aesthetic and minimalist design, help users recognize, diagnose, and recover from errors, plus help and documentation (Nugraha *et al*., 2025; Syarqim Mahfudz *et al*., 2022). Each identified problem received severity rating scores based on four severity levels: 0 (no problem), 1 (cosmetic), 2 (minor), 3 (major), and 4 (catastrophic) (Fathurrahman & Sumarsono, 2024).

Interface improvements were designed using Figma-based high-fidelity prototyping. The design underwent SUS testing by 25 respondents consisting of students, civil servants, and general citizens who had previously accessed the website. SUS scores were calculated using standard formulas and converted to a 0–100 scale to assess user satisfaction levels with the new interface design (Bahador *et al*., 2023; Sidqih *et al*., 2024). SUS respondent selection criteria included users who had experience accessing the Tulungagung Portal website and came from diverse backgrounds such as students, civil servants, and general public. Informed consent requests were obtained from each

respondent before questionnaire completion. All respondent data remained confidential and was used solely for research purposes.

3. Results

The research conducted a systematic evaluation of usability issues on the Tulungagung Regency Government website (https://tulungagung.go.id) through Heuristic Evaluation (HE) methodology, developed interface improvement prototypes, and conducted usability testing using System Usability Scale (SUS) to assess the effectiveness of proposed enhancements.

3.1 Testing Using Heuristic Evaluation Method

Heuristic Evaluation testing requires 3-5 evaluators to achieve optimal results. Using more than 5 evaluators increases evaluation output but does not provide proportionally relevant findings. Three evaluators participated in the study, each possessing professional expertise in their respective fields. Selecting evaluators with diverse skills enables the identification of more complex problems. The evaluation team consisted of an IT Application Development specialist, a System Analyst, and an IT Staff member. The complete heuristic evaluation results for the Tulungagung Portal website are presented below:

Table 1. Overall Heuristic Evaluation Results

Heuristic	E1	E2	E3	Total
Visibility of System Status	2	2	2	6
Match Between System and Real World	2	2	2	6
User Control and Freedom	1	2	2	5
Consistency and Standards	2	1	2	5
Error Prevention	2	2	2	6
Recognition Rather than Recall	2	2	1	5
Flexibility and Efficiency of Use	1	2	2	5
Aesthetic and Minimalist Design	2	2	2	6
Help User Recognize, Diagnose, and Recover from Error	1	2	2	5
Help and Documentation	1	2	1	4
Total	16	19	18	53

Following the evaluation process, the heuristic assessment of the Tulungagung Portal website identified 27 distinct usability problems discovered by the three evaluators. These findings formed the foundation for developing user interface design improvement recommendations. Table 2 displays the number of findings per heuristic principle alongside average severity ratings that illustrate the criticality level of each problem. Severity rating determination involved evaluation processes and consensus among evaluators to align perceptions regarding the criticality level of each issue. The approach aimed to enhance assessment objectivity and accuracy in usability problem identification.

Table 2. Percentage and Average Severity Rating

Heuristic	Problem Count	Percentage (%)	Average Severity Rating
HE1	2	7.4%	2.50
HE2	2	7.4%	3.50
HE3	2	7.4%	3
HE4	4	14.8%	3
HE5	3	11.1%	3
HE6	4	14.8%	1.75
HE7	1	3.7%	2

HE8	3	11.1%	3
HE9	3	11.1%	2.33
HE10	3	11.1%	2.33

Analysis results demonstrate that Consistency and Standards along with Recognition Rather Than Recall represent the two heuristic principles with the highest number of findings, each accounting for 14.8% of total identified problems. Meanwhile, Match Between System and the Real World achieved the highest average severity rating of 3.50, indicating criticality levels between major and catastrophic categories.

3.2 Development of Interface Improvement Recommendations

Based on heuristic evaluation results, 27 usability problems were identified by three evaluators. These findings became the foundation for developing interface improvement recommendations for the Tulungagung Portal website. Improvements focused on user interface aspects that encompass visual enhancements aligned with problems discovered by evaluators. The problem recapitulation table and improvement suggestions served as references in prototype development to achieve optimal website usability levels as follows:

Table 3. Problems and Interface Improvement Suggestions

Code	Problem Description	Improvement Suggestion	Severity Rating
P1	Menu arrangement and page content lack logical structure	Structure adjustment	4
P2	No back button/breadcrumbs	Add back button or breadcrumbs	4
P3	Initial menu display differs from sub-menu	Establish icons and terminology for each page	4
P4	Main page display too crowded	Remove irrelevant elements and determine design concept	4
P5	Cluttered content, overly contrasting colors, and small text	Adjust layout, colors, and balanced fonts	4
P6	Contrasting and inconsistent color selection	Use consistent colors	3
P7	Several pages have different layouts and fonts	Create standardization for fonts, layouts, and menu placement	3
P8	Not all active menus receive visual indicators	Ensure active menu highlighting and consistency	2
P9	Not all interactions can be closed clearly	Add close buttons	2
P10	Link colors not uniform	Use unified color system	2
P11	No active position/breadcrumb navigation	Add breadcrumbs or active position indicators	2
P12	Menus hidden in dropdowns, not explicit	Display menus consistently	2
P13	Menus not well-grouped	Group menus by category	1
P14	Overlapping elements, not aligned horizontally and vertically	Apply visual hierarchy	1

The first improvement recommendation targets the homepage, where the old design showed unstructured pages, overcrowded layouts, cluttered content with contrasting colors, and overlapping, misaligned visual elements.

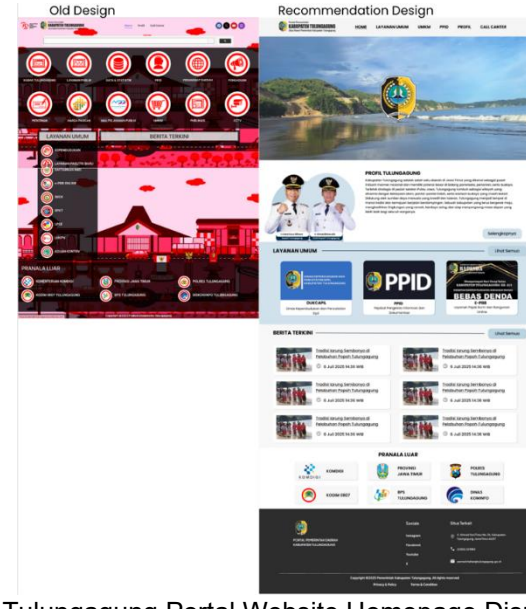

Figure 1. Old Tulungagung Portal Website Homepage Display and Design Recommendation.

Homepage improvement design was developed based on evaluator findings regarding several usability problems. Major issues included: illogical menu structure and excessive dropdown usage (P1), inconsistency between main menus and submenus plus inconsistent icon and terminology usage (P3), crowded page displays due to oversized icons, banners, and excessive animations (P4), plus unstructured content placement, overly contrasting colors, and text that was too small (P5, P6). Additionally, differences in layout and fonts across pages were found (P7), non-uniform link colors (P10), and overlapping visual elements that were irregularly arranged vertically and horizontally (P14). The redesign simplified displays, reorganized menus, and ensured visual element consistency to enhance user comfort.

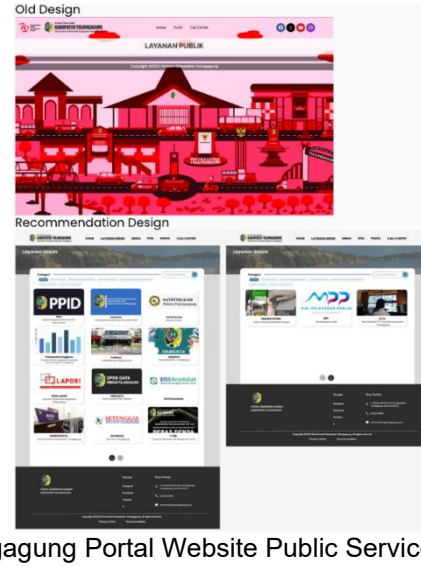

Figure 2. Old Tulungagung Portal Website Public Services Display and Design Recommendation

Public Services tab improvement design was developed based on evaluator suggestions regarding several previous interface weaknesses. Identified problems included absence of visual indicators for active menus (P8), unavailability of active position navigation like breadcrumbs (P11), and menus not explicitly displayed on content pages (P12). Additionally, submenus were excessively displayed and not grouped by clear categories (P13). The redesign focused on menu structure simplification, adding visual indicators for active positions, and grouping submenus by service categories to facilitate user orientation.

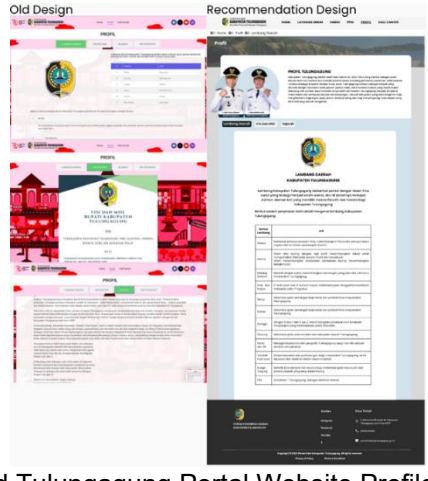

Figure 3. Old Tulungagung Portal Website Profile Display and Design Recommendation

Profile tab improvement design considered evaluator improvement suggestions for the Tulungagung Portal website, such as absence of back buttons/breadcrumbs (P2) and lack of visual indicators for all active menus (P8).

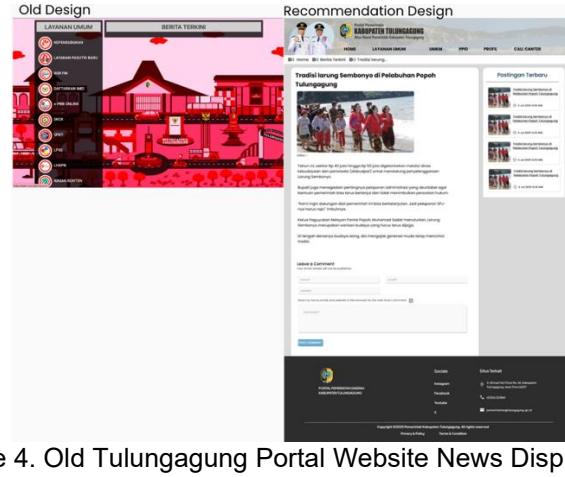

Figure 4. Old Tulungagung Portal Website News Display and Design Recommendation

News tab improvement design considered evaluator improvement suggestions for the Tulungagung Portal website, such as absence of back buttons/breadcrumbs (P2) and lack of active position or breadcrumb navigation (P11).

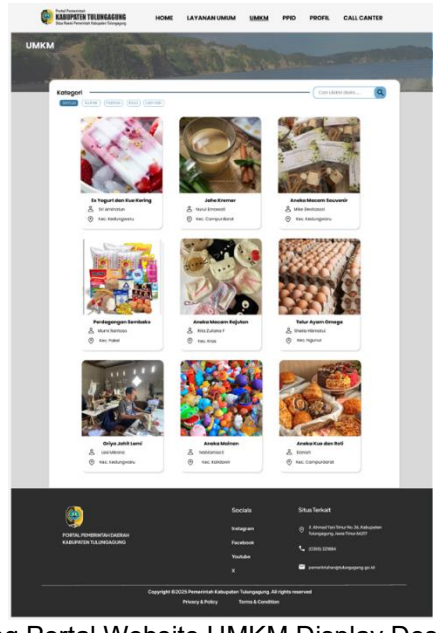

Figure 5. Tulungagung Portal Website UMKM Display Design Recommendation

UMKM tab design considered evaluator improvement suggestions for the Tulungagung Portal website, such as lack of visual indicators for all active menus (P8), unclear interaction closure mechanisms (P9), and excessive submenus that were poorly grouped (P13).

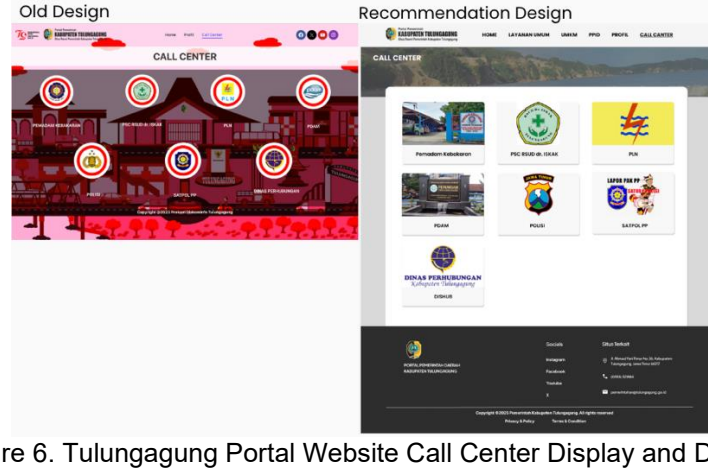

Figure 6. Tulungagung Portal Website Call Center Display and Design Recommendation

Call Center tab improvement design considered evaluator improvement suggestions for the Tulungagung Portal website, such as menu arrangements and page content lacking logical structure with excessive dropdown menus (P1) and overcrowded pages with large icons and animations (P4).

3.3 Usability Testing of Improvement Recommendation Design Using System Usability Scale

The developed improvement recommendation design underwent testing using System Usability Scale (SUS) methodology. Testing was conducted by distributing questionnaires to 25 respondents from Tulungagung Portal website users.

Table 4. System Usability Scale (SUS) Scores and Values for Recommendation Design

No.	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total	Score (Total × 2.5)
1	5	2	5	3	5	2	5	2	4	2	35	82.5
2	3	3	4	3	3	2	3	3	4	3	31	57.5
3	5	1	5	1	5	1	5	1	5	1	30	100
4	4	1	5	1	5	2	5	1	5	2	31	92.5
5	3	2	5	1	5	1	5	1	5	1	31	97.5
6	4	2	4	2	4	3	4	2	4	3	32	70
7	5	1	5	1	5	1	4	1	5	2	30	95
8	5	1	5	1	5	1	5	1	5	1	30	100
9	3	5	2	2	2	5	2	4	4	3	32	25
10	3	5	3	5	4	1	5	2	4	3	37	52.5
11	3	2	4	2	4	1	4	2	4	3	29	72.5
12	4	2	4	1	5	2	4	1	4	3	30	80
13	4	3	5	2	4	2	4	2	4	4	34	70
14	4	3	4	2	4	2	4	2	4	4	33	67.5
15	4	2	5	2	4	2	3	2	4	4	32	70
16	3	2	3	2	4	2	4	2	4	4	30	65
17	4	2	4	2	4	2	4	2	4	3	31	72.5
18	4	1	4	2	4	2	5	2	4	2	30	80
19	5	2	5	2	5	2	5	2	5	2	35	87.5
20	5	3	5	2	5	2	5	1	5	2	35	87.5
21	3	2	5	1	4	3	5	2	4	1	31	77.5
22	4	3	4	5	5	2	5	5	1	1	35	57.5
23	5	1	5	1	5	1	5	1	5	1	30	100
24	4	5	4	1	4	2	4	2	2	3	31	62.5
25	5	1	5	1	5	1	5	1	5	1	30	100
Average Score: 76.9												

Based on 25 users consisting of Tulungagung Regency residents and website users, the average value obtained from System Usability Scale (SUS) score calculations was 76.9, categorized as "Good" in adjective ratings, with grade scale "C", and acceptability ranges "Acceptable". To provide a more complete picture, the following shows SUS scores for the old website version based on initial testing of 15 respondents.

Table 5. System Usability Scale (SUS) Scores and Values for Old Website

No.	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total	Score (Total × 2.5)
1	4	4	4	2	3	4	3	1	3	2	30	60
2	4	3	4	1	4	4	1	1	1	2	25	57.5
3	4	3	3	2	3	3	3	2	2	2	27	57.5
4	3	4	5	2	3	4	1	1	3	2	28	55
5	3	3	4	4	3	4	2	3	2	2	30	45
6	3	1	1	1	1	1	1	1	1	1	12	55
7	1	1	1	1	1	1	1	1	1	1	10	50
8	3	4	4	4	4	4	3	2	3	4	35	47.5
9	4	3	4	1	4	4	4	1	1	2	28	65
10	4	3	4	1	4	5	1	1	3	4	30	55
11	4	4	4	1	4	4	3	1	3	3	31	62.5
12	5	4	4	2	3	3	2	1	3	2	29	62.5
13	4	4	3	1	3	5	3	1	5	3	32	60
14	4	5	4	2	3	3	2	1	4	4	32	55
15	3	3	2	3	3	2	2	2	2	2	24	50
Average Score: 55.83												

SUS scores for the old design showed an average of 55.83 from 15 respondents, categorized as "Marginal" and tending toward "Not Acceptable". After improvements, the new design achieved an average score of 76.9 from 25 respondents, categorized as "Good" and "Acceptable". With a score difference of 21.07 points, results demonstrate significant improvement in user usability perception.

4. Discussion

Evaluation results using the Heuristic Evaluation method on the tulungagung.go.id website revealed that three evaluators identified 27 usability problems. Most issues were discovered within the Consistency and Standards (HE4) and Recognition Rather Than Recall (HE6) principles, each representing 14.8% of total findings. Such problems typically involved display inconsistencies, illogical menu structures, and technical terminology that general users found unfamiliar.

The Match Between System and the Real World (HE2) principle achieved the highest average severity rating of 3.50, indicating problems fell between major and catastrophic levels. The system failed to align with user expectations regarding terminology, information structure, and interaction patterns. These findings demonstrate that the interface lacks user-friendliness and potentially creates confusion during navigation and information comprehension. Following evaluation findings, interface improvement recommendations were developed as high-fidelity prototypes. Improvement recommendations targeted user interface aspects through design adjustments toward more minimalist and consistent appearances.

Prior to SUS testing, evaluator representatives and users reviewed the prototype to gather initial feedback. The process helped identify interface aspects that remained confusing or lacked intuitiveness before quantitative testing commenced. The design underwent testing using the System Usability Scale (SUS) with 25 respondents. Test results showed an average SUS score of 76.9, categorized as "Good," with "Acceptable" acceptability value and grade "C." The score indicates that the new design successfully improved user comfort and satisfaction when accessing the website.

5. Conclusion

Three evaluators identified 27 usability problems distributed across all heuristic principles, with predominant issues in display consistency and information structure aspects. Design improvements were developed based on these findings through high-fidelity prototypes focusing on visual design, navigation, and information enhancements. Usability testing using SUS with 25 respondents showed an average score of 76.9, categorized as "Good" and "Acceptable." These results indicate that the implemented improvements successfully enhanced usability and user experience. The research demonstrates that heuristic evaluation approaches can serve as effective tools for government agencies to systematically improve website quality. Future studies should involve larger respondent samples and employ additional evaluation methods to achieve more thorough results.

References

Andreano, A. P., & Affandi, A. S. (2024, December). Pengembangan User Interface (UI) Aplikasi SISTA Universitas Merdeka Malang Menggunakan User-Centered Design (UCD). In *Seminar Nasional Sistem Informasi (SENASIF)* (Vol. 8, pp. 4845-4852).

Bahador, F., Salehi, F., Esmaeeli, E., Akbari, A., & Sabahi, A. (2023). Evaluation of the usability of the Hamava system using heuristic evaluation. *Frontiers in Health Informatics*, *12*. https://doi.org/10.30699/fhi.v12i0.462

Csontos, B., & Heckl, I. (2025). Five years of changes in the accessibility, usability, and security of Hungarian government websites. *Universal Access in the Information Society*. https://doi.org/10.1007/s10209-025-01223-5

Fathurrahman, M. I., & Sumarsono, S. (2024). Penerapan prinsip desain antarmuka dalam evaluasi user interface dan user experience e-learning. *Jurnal Komtika (Komputasi Dan Informatika)*, *8*(2), 171–181. https://doi.org/10.31603/komtika.v8i2.11689

Firman, A. W., Tolle, H., & Al Huda, F. (2024). Evaluasi dan Perbaikan Pengalaman Pengguna Website Pemerintah Kab. Sidenreng Rappang dengan Metode Evaluasi Heuristic. *Jurnal Pengembangan Teknologi Informasi dan Ilmu Komputer*, *8*(8).

Hidayat, A. D., Nurkhalim, R. F., & Nurhadi, N. (2022). Evaluasi kebermanfaatan aplikasi salve menggunakan metode system usability scale (SUS). *Jurnal Wiyata: Penelitian Sains Dan Kesehatan*, *9*(2), 162. https://doi.org/10.56710/wiyata.v9i2.599

Juliantara, M. S. A., Juardi, D., & Irawan, A. S. Y. (2024). Analisis User Interface dan User Experience pada Website BEM FASILKOM Universitas Singaperbangsa Karawang menggunakan Heuristic Evaluation. *JATI (Jurnal Mahasiswa Teknik Informatika)*, *8*(3), 3668-3677.

Natanael, N., & Ginting, S. (2024). Evaluasi heuristik dalam tur museum virtual: Sebuah studi komparatif. *Aksara*, *10*(1), 397-416. https://doi.org/10.37905/aksara.10.1.397-416.2024

Nugraha, I. G. P. A., Indrawan, G., Asroni, A., & Gunadi, I. G. A. (2025). Evaluation of mobile academic information system with notifications using heuristic evaluation and WCAG-EM. *Sinkron*, *9*(2), 762–775. https://doi.org/10.33395/sinkron.v9i2.14675

Rosita, R. I., Fahana, J., & Dahlan, A. (2022). Analisis dan desain user interface (UI) dan user experience (UX) aplikasi Borneojek menggunakan metode evaluasi heuristik. *Jurnal Sarjana Teknik Informatika*, *10*(1), 1–8. https://doi.org/10.12928/jstie.v8i3.xxx

Septarina, A. A., Arifiyanto, A. A., Usman, U., & Farikhin, M. I. (2025). Usability evaluation Satu Sehat application using heuristic evaluation method. *G-Tech: Jurnal Teknologi Terapan*, *9*(1), 563–569. https://doi.org/10.70609/gtech.v9i1.6332

Wisanto, F., Fajar, M., & Zaman, B. (2023). Penerapan Metode Evaluasi Heuristik Untuk Mengevaluasi Usability Website Medisol. *KHARISMA Tech*, *18*(1), 178-190. https://doi.org/10.55645/kharismatech.v18i1.257.