

Analysis of the JAKLITERA Website Information System Using the PIECES Method to Enhance Library Services at the Library and Archives Office of DKI Jakarta Province

Syahrani Anandita Putri ^{a*}, Agus Tanti Rahayu ^b, Arya Aditiya ^c

^{a,b} Information Systems Study Program, Sekolah Tinggi Ilmu Komputer Cipta Karya Informatika, East Jakarta City, Special Capital Region of Jakarta, Indonesia.

^c Universitas Pradita, Tangerang Regency, Banten Province, Indonesia.

ABSTRACT

The advancement of information technology has shifted libraries from traditional physical services to digital platforms. One example is JAKLITERA, a web-based information system developed by the Provincial Library and Archives Office of DKI Jakarta. This study aims to evaluate the performance and service quality of JAKLITERA using the PIECES framework (Performance, Information, Economics, Control, Efficiency, Service). A mixed approach was applied, combining quantitative data from 100 user questionnaires with qualitative insights from observation and administrator interviews. Validity and reliability testing confirmed that all research instruments were appropriate for analysis. Results showed that the Economics dimension achieved the highest mean score (3.95), while Control received the lowest (3.39). Overall, the average score of 3.62 categorized JAKLITERA as “satisfactory,” yet highlighted the need for improvements in security mechanisms and clarity of information. These findings suggest that JAKLITERA functions effectively as a digital literacy platform but requires continuous evaluation, technical optimization, and user-centered enhancements to ensure sustainable service delivery.

ARTICLE HISTORY

Received 17 July 2025

Accepted 23 August 2025

Published 30 November 2025

KEYWORDS

Jaklitera; Library Information System; Pieces; Service Evaluation; Digital Literacy.

1. Introduction

Libraries play a pivotal role in supporting learning by providing access to information resources and literacy services for the community. Beyond serving as repositories of books, they function as institutions that foster critical literacy skills such as reading, writing, and information analysis. Rodin and Kurnia (2021) describe libraries as structured organizations designed to store and organize collections systematically in order to meet the educational, research, informational, and recreational needs of their users. Over time, the role of libraries has expanded beyond physical spaces to include digital platforms such as e-libraries, online repositories, and web-based services. This transition is aligned with broader trends in information systems and digital transformation, where technology integration improves accessibility and efficiency in organizational services (Anjeli, Faulina, & Fakhri, 2022; Alviano, Trimarsiah, & Suryanto, 2023). In Jakarta, the Provincial Library and Archives Office has responded to these developments by introducing JAKLITERA (Jaringan Koleksi Lintas Area), a web-based and mobile-accessible platform that integrates services across six libraries: five city libraries (West, East, Central, North, and South Jakarta) and the provincial library (Jakarta-PDS HB Jassin). Through a single portal, JAKLITERA enables users to

reserve books, access literacy activities, and locate nearby service points. The platform reflects the growing need for information systems that reduce administrative complexity and enhance service delivery (Jonathan, 2019; Setyaningrum, Setyawati, & Setyawan, 2025). However, challenges remain, particularly in technical aspects such as one-time password (OTP) functionality and delays in database queries, which affect user experience and system reliability. These issues highlight the necessity for systematic evaluation to ensure that the platform effectively meets the needs of its users (Riana, Ismail, & Irawan, 2025).

To address such challenges, the PIECES framework—encompassing Performance, Information, Economics, Control, Efficiency, and Service—has been widely applied to assess and improve information systems (Dewi & Silva, 2023; Muflihanto & Hartomo, 2024; Fatoni, Adi, & Widodo, 2020). Prior studies demonstrate its usefulness in identifying operational weaknesses and guiding targeted recommendations, including in the domains of digital accounting systems (Situmeang *et al.*, 2025) and web-based student platforms (Muflihanto & Hartomo, 2024). Applying this framework to JAKLITERA provides a structured approach to evaluate its strengths and shortcomings, while also offering practical directions for enhancing both system design and service quality. The present study therefore examines the JAKLITERA website using the PIECES framework to evaluate its functionality and to provide recommendations for improvement. By combining survey-based user feedback with technical analysis, the study seeks to inform the ongoing development of JAKLITERA as a reliable digital library platform that supports literacy access across Jakarta.

2. Methodology

This research adopted a descriptive quantitative approach combined with qualitative support to provide a comprehensive analysis of the JAKLITERA website. Qualitative data were obtained through direct observation and structured interviews with system administrators to understand the technical and managerial processes of the platform, while quantitative data were collected through a structured questionnaire distributed to users. The research object was the JAKLITERA web-based information service managed by the Provincial Library and Archives Office of DKI Jakarta, accessible through <https://perpustakaan.jakarta.go.id/>, as shown in Figure 1.

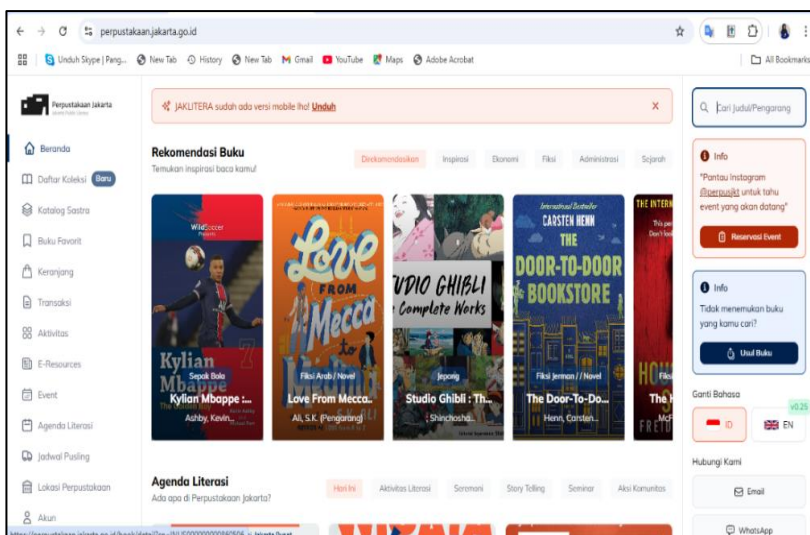


Figure 1. Research Object: JAKLITERA Website

The research population consisted of approximately 6,000 active users of the JAKLITERA platform. Sampling was conducted using purposive sampling, which specifically included users who had accessed the website at least once to ensure relevance of responses. The minimum sample size was calculated using Slovin's formula: $n = \frac{N}{1+N\epsilon^2}$ Where n = sample size N = total population e = error tolerance (10% or 0.1) With a population size of 6,000, the calculation was as follows $n = \frac{6000}{1+6000(0.1)^2} = \frac{6000}{61} = 98,36$. Thus, the sample size was rounded to 100 respondents to simplify data collection. Data collection was carried out through four techniques: (1) literature review, used to gather theoretical and empirical references from journals, books, and prior studies; (2) observation, conducted directly at the Jakarta Provincial Library and Archives Office to study the system operation and obtain technical records; (3) interviews, conducted with the JAKLITERA administrator to gain insight into background, operations, and technical challenges; and (4) questionnaires, designed to measure user satisfaction using 18 questions across the six PIECES dimensions. The interview guideline is summarized in Table 1.

Table 1. Interview Guideline

No	Subcomponent	Questions
1	Performance	What technical steps were implemented to ensure system stability? Is there a monitoring mechanism to address system failures?
2	Information	How is the information structure designed to be accessible and understandable? What technical measures maintain responsiveness across devices?
3	Economics	Does the system reduce physical documentation costs? What efforts ensure cost efficiency in system management?
4	Control	Does JAKLITERA include mechanisms to prevent unauthorized access? What data protection strategies are in place?
5	Efficiency	Does the system support fast and efficient workflows? What techniques optimize user access speed?
6	Service	What technical support is provided after deployment? How are user feedback and feature requests handled?

The questionnaire structure is detailed in Table 2, where each question corresponds to one of the PIECES indicators.

Table 2. User Questionnaire

Respondent Questionnaire		
Component/Sub	No	Question/Statement
Respondent Characteristics	1	Your Name
	2	Your Education Level: • Junior High School • Senior High School/Vocational School • Diploma (D3/D4) • Bachelor's Degree (S1) • Master's Degree (S2) • Doctoral Degree (S3)
	3	Employment Status: • Student • Employee • Unemployed • Civil Servant
Questionnaire Items Based on PIECES Indicators		
Component/Sub	Question/Statement	
Performance	1. The JAKLITERA website is very easy to access during use. 2. Do you often experience login or search failures on the website?	

	3. The available menu options make it easier to use the JAKLITERA website.
Information	4. The information provided by the website is complete and meets my needs. 5. I find it difficult to understand the latest (up-to-date) information. 6. The website helps me save time and costs in finding literature.
Economics	7. The website helps me save time and costs in finding literature. 8. The borrowing/return process on the website still requires direct contact. 9. Users are not charged any fees when using the JAKLITERA website.
Control	10. I feel that my personal data is safe when accessing and using the website's features. 11. I have never experienced errors while using the JAKLITERA website. 12. I do not receive notifications during important activities (e.g., password change, reminders).
Efficiency	13. The JAKLITERA website layout is easy to understand and navigate. 14. The website can be accessed by all users, including iOS and Android devices. 15. I often have to try multiple times to find the features I need.
Service	16. The website provides a satisfying overall experience. 17. The website administrator responds quickly and is helpful when issues occur. 18. The service features provided do not fully match my needs as a library user.

Responses were collected using a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5), as shown in Table 3.

Table 3. Likert Scale

Response	Code	Score
Strongly Disagree	STS	1
Disagree	TS	2
Neutral	N	3
Agree	S	4
Strongly Agree	SS	5

The average satisfaction score was calculated with the following equation: $RK \frac{JSK}{JK}$ where RK = mean satisfaction score, JSK = total score from all questionnaires, JK = total number of items. User satisfaction levels were categorized using the Kaplan and Norton model (Table 4).

Table 4. Satisfaction Categories

Score Range	Category
1.00–1.79	Very Dissatisfied
1.80–2.59	Dissatisfied
2.60–3.39	Fairly Satisfied
3.40–4.19	Satisfied
4.20–5.00	Very Satisfied

Before distribution, the questionnaire was tested for clarity and comprehensibility with 30 trial respondents, who reported that the wording was understandable and required only minor adjustments. Average completion time ranged from 5 to 10 minutes, confirming feasibility. For the validity test, item-total correlations were calculated using SPSS 27.0.1 at a 5% significance level; items were declared valid if the correlation coefficient exceeded the critical *r* value from the *r* table distribution (see Table 5).

Table 5. Distribution of *r*-table Values

N	The Level of Significance		N	The Level of Significance	
	5%	1%		5%	1%
3	0.997	0.999	28	0.374	0.478
4	0.950	0.990	29	0.367	0.470
5	0.878	0.959	30	0.361	0.463
6	0.811	0.917	26	0.388	0.496
7	0.754	0.874	27	0.381	0.487
8	0.707	0.834	28	0.374	0.478
9	0.666	0.798	29	0.367	0.470
10	0.632	0.765	30	0.361	0.463
11	0.602	0.735	31	0.355	0.456
12	0.576	0.708	32	0.349	0.449
13	0.553	0.684	35	0.334	0.430
14	0.532	0.661	40	0.312	0.403
15	0.514	0.641	41	0.308	0.398
16	0.497	0.623	45	0.294	0.380
17	0.482	0.606	50	0.279	0.361
18	0.468	0.590	55	0.266	0.345
19	0.456	0.575	60	0.254	0.330
20	0.444	0.561	65	0.244	0.317
21	0.433	0.549	70	0.235	0.306
22	0.432	0.537	75	0.227	0.296
23	0.413	0.526	80	0.220	0.286
24	0.404	0.515	85	0.213	0.278
25	0.396	0.505	90	0.207	0.267
26	0.388	0.496	95	0.202	0.263
27	0.381	0.487	100	0.195	0.256

Reliability testing was then conducted using Cronbach’s Alpha, where a coefficient greater than 0.60 was considered reliable (Rosita *et al.*, 2021). The reliability coefficient was computed using the following formula: $r_{ac} = \left(\frac{k}{k-1}\right) \left[1 - \frac{\sum \sigma b^2}{\sigma t^2}\right]$ Where: r_{ac} =

Cronbach's Alpha coefficient, k = Number of items, $\sum \sigma b^2$ = sum of variances of each item, σt^2 = total variance. Finally, data analysis was conducted using the PIECES framework. Each dimension played a specific role: performance, measuring stability and speed of the system; information, evaluating the completeness and clarity of provided content; economics, analyzing cost-effectiveness in implementation and maintenance; control, assessing data security and protection against unauthorized access; efficiency, measuring the optimization of resources and process productivity; and service, examining accuracy, responsiveness, and long-term user satisfaction.

3. Results

From the 100 respondents surveyed, the majority were students (70%) and most held a bachelor's degree (51%). Validity testing confirmed that all questionnaire items were valid (r -count > 0.195), and reliability testing using Cronbach's Alpha showed values above 0.60, confirming instrument consistency. Analysis using the PIECES framework revealed that the Economics dimension scored the highest (RK = 3.95), followed by Efficiency (RK = 3.71), Performance (RK = 3.67), Service (RK = 3.56), and Information (RK = 3.49), all categorized as satisfactory. Meanwhile, Control scored the lowest (RK = 3.39) and was categorized as fairly satisfactory. These results suggest that JAKLITERA is perceived as an effective digital library platform, although improvements are required in security and notification systems.

Table 5. Respondents by Education Level

Education Level	Frequency	Percentage
Junior High School	6	6%
Senior High/Vocational	36	36%
Diploma (D3/D4)	4	4%
Bachelor's Degree	51	51%
Master's Degree	3	3%

Table 5 presents the characteristics of respondents based on their education level. Out of 100 respondents, the majority held a Bachelor's degree (51%), followed by Senior High/Vocational School graduates (36%), while Junior High (6%), Diploma (4%), and Master's degree holders (3%) accounted for smaller proportions. This indicates that most JAKLITERA users come from educated backgrounds who actively utilize the digital library services to support academic needs.

Table 6. Respondents by Occupation

Occupation	Frequency	Percentage
Student	70	70%
Employee	21	21%
Unemployed	3	3%
Civil Servant	6	6%

Table 6 illustrates respondents' distribution by occupation. The majority were students (70%), followed by employees (21%), civil servants (6%), and unemployed individuals (3%). The dominance of students highlights that JAKLITERA primarily serves the needs of young, productive-age users engaged in formal education.

Table 7. Validity Test Results

No	Variable	Item	r-count	r-table	Remark
1	Performance	P1	0.633	0.195	Valid
		P2	0.419	0.195	Valid
		P3	0.693	0.195	Valid
2	Information	P4	0.677	0.195	Valid
		P5	0.383	0.195	Valid
		P6	0.616	0.195	Valid
3	Economics	P7	0.586	0.195	Valid
		P8	0.536	0.195	Valid
		P9	0.561	0.195	Valid
4	Control	P10	0.594	0.195	Valid
		P11	0.551	0.195	Valid
		P12	0.270	0.195	Valid
5	Efficiency	P13	0.632	0.195	Valid
		P14	0.612	0.195	Valid
		P15	0.633	0.195	Valid
6	Service	P16	0.638	0.195	Valid
		P17	0.636	0.195	Valid
		P18	0.388	0.195	Valid

Table 7 displays the results of the validity test for 18 questionnaire items. All items had r-count values greater than the r-table (0.195), confirming their validity. This demonstrates that the questions were able to measure the intended variables accurately according to the PIECES framework (Performance, Information, Economics, Control, Efficiency, Service).

Table 8. Reliability Test Results

No	Variable	Item	Cronbach's Alpha	Remark
1	Performance	P1	0.838	Reliable
		P2	0.849	Reliable
		P3	0.836	Reliable
2	Information	P4	0.834	Reliable
		P5	0.853	Reliable
		P6	0.837	Reliable
3	Economics	P7	0.839	Reliable
		P8	0.842	Reliable
		P9	0.840	Reliable
4	Control	P10	0.838	Reliable
		P11	0.841	Reliable
		P12	0.859	Reliable
5	Efficiency	P13	0.837	Reliable
		P14	0.838	Reliable
		P15	0.836	Reliable
6	Service	P16	0.836	Reliable
		P17	0.836	Reliable
		P18	0.853	Reliable

Table 8 shows the results of the reliability test using Cronbach's Alpha. All items scored above 0.60, indicating that the questionnaire was reliable and consistent for measuring users' perceptions of JAKLITERA's service quality.

Table 9. Summary of PIECES Scores

Dimension	RK Formula	Mean Score	Category
Performance	1102/300	3.67	Satisfied
Information	1048/300	3.49	Satisfied
Economics	1186/300	3.95	Satisfied
Control	1017/300	3.39	Fairly Satisfied
Efficiency	1114/300	3.71	Satisfied
Service	1068/300	3.56	Satisfied

Table 9 summarizes the average PIECES scores. The Economics dimension scored the highest (3.95), reflecting the system's effectiveness in saving time and costs. Efficiency (3.71), Performance (3.67), Service (3.56), and Information (3.49) were categorized as satisfactory, while Control (3.39) was rated as fairly satisfactory, showing that further improvements are needed in security and notification features.

4. Discussion

The findings indicate that overall, users are satisfied with the JAKLITERA website, as reflected in the PIECES framework. Most dimensions achieved scores above 3.40, categorized as *Satisfied*. The only exception was Control, with a score of 3.39, which falls into the *Fairly Satisfied* category. This highlights that system security and notification features are the weakest points that need improvement. The Performance and Efficiency dimensions show that JAKLITERA is generally stable and efficient, although occasional OTP and login errors still occur. On the Information side, while respondents agree that the information is complete, some still find it difficult to interpret the most recent updates. This is consistent with the observation findings, suggesting that although the interface is responsive, content needs clearer structuring. The Economics dimension received the highest score (3.95), proving that digitalization significantly reduces time and cost for users. Meanwhile, Service scored 3.56, indicating that although most users are satisfied with admin responses, service features still need better alignment with users' actual needs. In conclusion, applying the PIECES framework successfully identifies both the strengths and weaknesses of JAKLITERA. Future improvements should focus on enhancing system security (Control) and improving content clarity (Information) to ensure a better user experience and long-term sustainability of the digital library system.

5. Conclusion

Based on the analysis of questionnaires and interviews using the PIECES framework, the overall average score of 3.62 indicates that the JAKLITERA website generally provides adequate and satisfactory services, with Economics (3.95) as the highest-rated dimension and Control (3.39) identified as the area requiring improvement. Therefore, it is recommended that users continue utilizing and providing feedback on the available features, DISPUSIP Jakarta conduct continuous evaluations, and the technical team enhance system performance by optimizing loading speed, usability, security, and website responsiveness. Future studies are encouraged to apply different or combined analytical methods and involve more diverse respondents, including librarians and system managers, to obtain a more comprehensive evaluation. Through continuous improvements and strengthening both technical and service aspects, JAKLITERA is expected to become an optimal, secure, and user-friendly digital literacy platform.

References

- Akmal, A. N., Maelasari, N., & Lusiana, L. (2025). Pemahaman Deep Learning dalam pendidikan: Analisis literatur melalui metode Systematic Literature Review (SLR). *JIIP: Jurnal Ilmiah Ilmu Pendidikan*, 8(3), 3229–3236. <https://doi.org/10.54371/jiip.v8i3.7442>
- Alviano, M., Trimarsiah, Y., & Suryanto. (2023). Perancangan aplikasi penjualan berbasis web pada perusahaan dagang Dendis Production menggunakan PHP dan MySQL. *Jurnal Informatika dan Komputer*, 14(1), 37–44.
- Anjeli, D., Faulina, S. T., & Fakhri, A. (2022). Sistem informasi perpustakaan Sekolah Dasar Negeri 49 OKU menggunakan Embarcadero XE2 berbasis client server. *Jurnal Informatika dan Komputer*, 13(2), 57–66.
- Angelo, D., & Ridho, R. (2022). Rancang bangun penjualan license key berbasis web pada PT. GFSOFT Indonesia. *Jurnal Comasie*, 2(1).
- Dewi, T. S., & Silva, A. A. (2023). Hambatan implementasi rekam medis elektronik dari perspektif perekam medis dengan metode PIECES. *Jurnal Manajemen Informasi Kesehatan Indonesia*, 11(2). <https://doi.org/10.33560/jmiki.v11i2.597>
- Fatoni, A., Adi, K., & Widodo, A. P. (2020). PIECES framework and importance performance analysis method to evaluate the implementation of information systems. *E3S Web of Conferences*, 202, 15007. <https://doi.org/10.1051/e3sconf/202020215007>
- Jonathan, L. W. (2019). Sistem informasi UKM berbasis website pada Desa Sumber Jaya. *Jurnal Pengabdian Kepada Masyarakat*, 1(2), 78–87.
- Janna, N. M., & Herianto. (2021). Artikel statistik yang benar. *Jurnal Darul Dakwah Wal-Irsyad*, (18210047), 1–12.
- Muflihanto, E. J., & Hartomo, K. D. (2024). Implementation of the PIECES framework as an evaluation of student satisfaction levels with the use of STARS UKSW. *Journal of Information Systems and Informatics*, 6(2), 797–809. <https://doi.org/10.51519/journalisi.v6i2.726>
- Riana, M. A., Ismail, I., & Irawan, D. (2025). Analisis sistem absensi berbasis web untuk peningkatan efisiensi operasional di PT Sumber Naungan Global (Sunago). *JATI (Jurnal Mahasiswa Teknik Informatika)*, 9(2), 3231–3236. <https://doi.org/10.36040/jati.v9i2.13302>
- Rodin, R., & Kurnia, K. (2021). Perkembangan katalog di Perpustakaan Pascasarjana UIN Raden Fatah Palembang. *UNILIB: Jurnal Perpustakaan*, 12(1), 76–84. <https://doi.org/10.20885/unilib.vol12.iss1.art8>
- Rosita, E., Hidayat, W., & Yuliani, W. (2021). Uji validitas dan reliabilitas kuesioner perilaku prososial. *FOKUS: Kajian Bimbingan Konseling dalam Pendidikan*, 4(4), 279–289. <https://doi.org/10.22460/fokus.v4i4.7413>

- Setyaningrum, M., Setyawati, E., & Setyawan, A. A. (2025). Sistem informasi penjualan berbasis website menggunakan framework CodeIgniter (Studi kasus: MsGlow Banyumas). *JOTIKA: Jurnal Manajemen dan Entrepreneurship*, 4(2), 99–112. <https://doi.org/10.56445/jme.v4i2.177>
- Situmeang, M. F., Patty, M., Usemahu, R. H., & Sandanafu, S. (2025). Analisa kelemahan sistem informasi akuntansi digital dengan menggunakan metode PIECES pada BUMDes Rajunohitipori Desa Rutong. *Jurnal Maneksi*, 14(1), 177–186. <http://www.rutong.id>