

The Analysis of User Satisfaction of SMAIT Raudhatul Jannah Cilegon Website Using PIECES Method

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Abstract

Technological advancement in the education sector has transformed how institutions communicate and deliver services, particularly through digital platforms such as websites. SMAIT Raudhatul Jannah Cilegon developed its official website to facilitate access to information for teachers, students, and prospective students. However, user satisfaction remains a crucial benchmark for evaluating the effectiveness and quality of such platforms. This study aims to analyze the level of user satisfaction with the SMAIT Raudhatul Jannah website using the PIECES method, which includes six dimensions: Performance, Information, Economy, Control (Security), Efficiency, and Service. The research employs a quantitative approach with 100 respondents, using a questionnaire distributed via Google Form. The data were analyzed through validity and reliability testing, Likert scale assessment, and descriptive statistics using SPSS. The results indicate that overall user satisfaction falls into the “satisfied” category across all PIECES dimensions, with the highest scores in Service (4.19) and Performance (4.14), while Control (Security) scored the lowest (3.89). Some respondents expressed concerns about the website’s visual appeal and data security features. The findings suggest that while the website generally meets user expectations, further improvements are recommended in terms of content presentation, interface design, and security enhancement. This study provides useful insights for school administrators and website developers to optimize website functionality and user experience in educational settings.

Keywords: User Satisfaction; School Website; PIECES Method; Information System

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1. Introduction

The rapid advancement of technology in the era of globalization has transformed nearly every aspect of human life, including education. Technology plays a crucial role in enhancing learning effectiveness, broadening students’ perspectives, and improving communication between educational institutions and their communities (F. B. Larasati & L. Pujiastuti S., 2021). During the learning process, technology not only accelerates understanding but also strengthens digital competence through technology-based learning environments and interactive media (M. Muslih et al., 2021). Schools as formal educational institutions play an important role in integrating technology into the learning ecosystem. One important innovation in this context is the development of school websites that serve as information centers for students, teachers, and parents. Well-managed school websites can facilitate communication, provide real-time academic information, and support administrative efficiency, such as online registration for new students (A. Setiawan & D. Pasha, 2020).

In the digital age, websites have become a commonly used medium of information by various institutions, ranging from companies, universities, schools, to public organizations to achieve specific objectives, such as business communication, research, promotion, and public services (B. E. Tuflasa & J. J. C. Tambotoh, 2022). Therefore, website quality is a very important aspect so that information systems can function effectively and meet user needs (Z. Hanifi et al., 2023). SMAIT Raudhatul Jannah Cilegon, as an Integrated Islamic High School located in Banten, has developed an official website, <https://web.smaitrjcilegon.sch.id/>, as part of its digital transformation. This website serves to facilitate access to academic and institutional information. However, there are still challenges in ensuring that the

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services provided through the website are truly secure, reliable, and user-oriented. A quality educational website must not only present accurate and relevant information, but also have easy-to-understand navigation and a strong data security system (I. Suryani & N. N. Pusparini, 2024).

Previous studies have highlighted the use of the PIECES framework, which covers six main dimensions: Performance, Information, Economy, Control (Security), Efficiency, and Service, to evaluate the quality of information systems and user satisfaction (I. Indrawati et al., 2019; I. Suryani & N. N. Pusparini, 2024). Similar results were also shown by Fardela et al. (2023), who explained that systems with good performance still faced problems in user navigation (R. Fardela & A. H. A. Aziz, 2023). However, most of these studies focused on the context of business and government organizations, while similar studies in the educational environment, especially Islamic-based secondary schools, were still limited. This condition indicates a research gap that needs to be bridged.

Therefore, this study aims to analyze user satisfaction levels with the SMAIT Raudhatul Jannah Cilegon website using the PIECES method. Through the evaluation of six dimensions, namely Performance, Information, Economy, Control, Efficiency, and Service, this study aims to identify aspects that have been running well and aspects that still need improvement in order to increase the overall effectiveness of the website. The results of this study are expected to provide practical contributions to school developers and administrators in improving the quality of digital services. In addition, these findings are also expected to provide theoretical contributions to the development of information system evaluation studies in the field of education, particularly in the context of Islamic-based institutions.

2. Literature Review

2.1. Relevance of the PIECES Framework in the Evaluation of Education Information Systems

User satisfaction evaluation is a key indicator of the success of an information system implementation because it shows the extent to which the system is able to meet the needs of its users (Rachmawati et al., 2024). The PIECES (Performance, Information, Economy, Control, Efficiency, Service) framework was developed to analyze the overall quality of information systems from a technical and organizational perspective (Muflihanto & Hartomo, 2024). In the world of education, PIECES helps institutions identify factors that influence the effectiveness of academic systems and user experience (Nafiisa et al., 2024). The application of this model enables institutions to systematically assess information systems and determine the direction of improvements in digital education services. (Pangentasan & Maria, 2023).

2.2. Performance Dimension as a Determinant of System Effectiveness

The Performance aspect assesses the extent to which the system is able to provide fast, stable, and responsive services to users (Sari et al., 2023). Optimal system performance greatly affects user satisfaction because it determines time efficiency and comfort when using the academic platform (Aini & Sihombing, 2022). Research shows that improvements in the performance of academic web systems have a significant impact on users' interest in using digital services on an ongoing basis (Wahyuni et al., 2023). Thus, performance becomes a dominant factor in determining the success of an educational information system.

2.3. Information Quality and Control as Determinants of User Trust

Dimensi Information assesses the quality of data provided by the system, including accuracy, completeness, and relevance to user needs (Pangentasan & Maria, 2023). The Control aspect relates to system security and the ability to protect user privacy and data integrity (Suwito et al., 2022). Good security increases user trust in the system, which ultimately impacts user satisfaction and loyalty to the academic digital platform (Nurhasanah et al., 2023). Thus, the quality of information and strong control play an important role in building the credibility of education information systems.

2.4. Efficiency and Economy in the Optimization of Digital Education Systems

The Economy aspect measures the extent to which the system can reduce costs and improve resource efficiency in academic processes (Saputra & Rahmayani, 2023). Meanwhile, Efficiency assesses the ease of use in navigating the

system and the time required to complete academic tasks (Lattu & Rahayu, 2023). Research indicates that a well-designed system promotes increased productivity and user satisfaction in digital education environments (Yuliana et al., 2024). Both are important benchmarks in assessing the effectiveness of implementing web-based education information systems.

2.5. Service as the Dominant Dimension of User Satisfaction

The Service dimension covers the level of ease of access, quality of technical support, and responsiveness of information system services to users (Bangun & Sihotang, 2023). Research has found that the quality of responsive and interactive digital services has a direct influence on users' positive perceptions of online academic systems (Hidayat et al., 2022). User-friendly services also increase loyalty and encourage continued use of educational information systems (Rachmawati et al., 2024). Thus, improving service aspects is a top priority in the development of digital academic systems.

2.6. Relevance and Contribution of the PIECES Framework in the Era of Digital Education

Recent research confirms that the PIECES framework is still relevant for evaluating user satisfaction with modern education systems (Muflihanto & Hartomo, 2024). The Performance and Service dimensions consistently show the greatest influence on user satisfaction with online academic systems (Lattu & Rahayu, 2023). This framework also provides conceptual guidance for developers to improve the quality of digital education systems through a measurable and data-driven approach (Nafiisa et al., 2024). Thus, PIECES not only serves as a technical evaluation tool, but also as a strategic framework for digital education innovation.

3. Research Method and Materials

Quantitative research method is the research method used in this study. In this study, quantitative methods are used to analyze and measure the level of user satisfaction of the SMAIT Raudhatul Jannah website based on the dimensions contained in the PIECES method. The PIECES method has six dimensions, namely Performance, Information, Economy, Control (Control and Security), Efficiency, and Service (I. Indrawati et al., 2019; Wahyu et al., 2021). The object of this study is users of the SMAIT Raudhatul Jannah Cilegon website, with a total of 100 respondents. Data collection was carried out using the Google Form online media (Mulyana & Rahmawati, 2024). The analysis was carried out through several variables, namely Validity Test, Reliability Test, Descriptive Analysis based on Kaplan & Norton's theory, and Likert Scale.

In compiling the research, the flow used is as follows. The initial stage in the analysis is to formulate a research problem that contains theoretical data to support the research based on books and journals. Continued by the second stage with the determination of samples or respondents, designing or compiling research questionnaires based on PIECES aspects, collecting data by distributing online to respondents using Google Form. After the data is collected, the validity and reliability tests are carried out for data testing. The last stage is data processing, namely the data that has been obtained will be processed with the elements of the PIECES method, namely Performance, Information, Economy, Control (Control and Security), Efficiency, and Service. Furthermore, it ends by analyzing and viewing the results of the analysis that explain the level of user satisfaction of the SMAIT Raudhatul Jannah Cilegon website.

The data in this study were collected through a survey using a questionnaire that had been prepared based on the indicators in PIECES. The questionnaire consists of statements designed to measure the level of user satisfaction with each dimension in the PIECES method.

Table 1. PIECES Method Indicator Detail Table

Aspect	Indicator	Statement
Performance	Throughput	SMAIT Raudhatul Jannah website is easily accessible to users
	Audibilitas	The SMAIT Raudhatul Jannah website is very good at adapting to different devices (desktop, tablet, smartphone)
	Respon Time	The SMAIT Raudhatul Jannah website can load content in a short time, without any obstacles

Aspect	Indicator	Statement
Information	Information Presentation	The information displayed on the SMAIT Raudhatul Jannah website is very detailed.
	Accurate	The SMAIT Raudhatul Jannah website provides relevant and useful information.
	Data Flexibility	The menu and feature options on the SMAIT Raudhatul Jannah website display appropriate information.
Economic	Time Efficiency	SMAIT Raudhatul Jannah Website can speed up problem solving
	Cost Efficiency	The new student registration feature on the SMAIT Raudhatul Jannah Website can save operational costs
Control	Integrity	When using the SMAT Raudhatul Jannah Website, there has never been an error
	Security	The security and use of the SMAIT Raudhatul Jannah Website can be trusted
Efficiency	Flexible	SMAIT Raudhatul Jannah website can be used anywhere and anytime
	Accurate	SMAIT Raudhatul Jannah website produces appropriate output in a relatively short time
Service	Information Presentation	The process of registering new students through the SMAIT Raudhatul Jannah website is simple
	Reliability	The SMAIT Raudhatul Jannah website provides services that are in accordance with what is presented
	Flexibility	The use of the SMAIT Raudhatul Jannah website is easy to learn and understand
	Integrity	The services provided by the SMAIT Raudhatul Jannah website are satisfactory

In this study, testing was carried out through several variables, namely Validity Test, Reliability Test, Likert Scale, and questionnaire analysis using SPSS. Validity testing was carried out as a form of the author knowing the extent to which the measurement instrument (questionnaire) can measure what is to be measured. In this study, validity testing was carried out on each statement item in the questionnaire that had been compiled based on the PIECES method. The results of the validity test showed that all statement items had significant correlation values, which means that each question in the questionnaire was able to measure the intended dimension correctly.

According to (Sugiyono, 2018) it is declared valid or not based on the calculated r value and r table, as follows:

- a. If the calculated r value > r table then the questionnaire is declared valid
- b. If the calculated r value < r table then the questionnaire is declared invalid

The formula used by the questionnaire is as follows:

$$r_{xy} = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{(N \sum X^2 - (\sum X)^2)(N \sum Y^2 - (\sum Y)^2)}}$$

Information:

- R_{xy} : Correlation Coefficient Of Variables X
- N : Number Of Test Subjects
- $\sum Y$: Total Score
- $\sum X$: Sum Of Scores For Each Item
- $\sum X^2$: Sum Of Squares Of Item Scores
- $\sum Y^2$: Sum Of Squares Of Total Scores
- $\sum XY$: Sum Of Multiplications Of Item Scores By Total Scores

Reliability testing aims to determine the consistency of the results obtained if the measurement is carried out repeatedly. Reliability testing is carried out using the Cronbach's Alpha approach to measure the internal consistency of the research instrument, where a value above 0.7 indicates that the questionnaire has a good level of reliability (Arbeni et al., 2025). The results of the reliability test obtained in this study showed a Cronbach's Alpha value above 0.7 for all dimensions in PIECES, which indicates that this questionnaire is consistent in measuring the level of user satisfaction with the SMAIT Raudhatul Jannah website.

Table 2. Case Processing Summary

		N	%
Cases	Valid	99	99.0
	Excluded ^a	1	1.0
	Total	100	100.0

a. Listwise deletion based on all variables in the procedure.

Based on Table 2, out of 100 total cases, 99 cases (99%) were valid and 1 case (1%) was excluded from the analysis due to incomplete data. This indicates that the data used in this study have a high level of completeness, meaning the majority of respondents provided complete responses for all variables analyzed. The exclusion of one case through listwise deletion does not significantly affect the reliability or generalization of the research findings.

Table 3. Reliability Statistics

Cronbach's Alpha	N of Items
.975	25

Table 3 shows that the Cronbach's Alpha value is 0.975 for 25 items, indicating excellent internal consistency among the questionnaire items. A reliability coefficient above 0.70 is generally considered acceptable, and values above 0.90 are categorized as very high. Thus, the instruments used in this study are highly reliable and capable of consistently measuring user satisfaction variables related to the SMAIT Raudhatul Jannah Cilegon website. This suggests that respondents provided stable and dependable responses across all question items.

This study shows the reliability coefficient with Cronbach's Alpha using SPSS, where the value of the question variable regarding the quality of the SMAIT Raudhatul Jannah Cilegon website is 0.975, so it can be categorized as a very reliable level of reliability. The Likert Scale was used to measure the attitudes, opinions, and perceptions of respondents toward the research object. In this study, the Likert Scale measured user satisfaction for each dimension of the PIECES method, namely Performance, Information, Economy, Control and Security, Efficiency, and Service. Each questionnaire item was scored on a 1-5 scale, where 1 represents "Strongly Disagree" and 5 represents "Strongly Agree." The results of the Likert Scale analysis show that most respondents gave high scores across all dimensions, indicating that the SMAIT Raudhatul Jannah Cilegon website generally provides a good level of user satisfaction.

After the questionnaire data was collected, the analysis was carried out using SPSS (Statistical Package for the Social Sciences) software. This analysis includes descriptive data processing to identify respondent characteristics, as well as inferential analysis to test the research hypothesis. The results of the analysis with SPSS show that each dimension in the PIECES method has a significant impact on website user satisfaction, with the Performance and Service dimensions as the most determining dimensions.

Based on the results of validity, reliability, Likert Scale, and questionnaire analysis using SPSS, it can be concluded that the SMAIT Raudhatul Jannah website as a whole has met user expectations. However, there are several aspects that still need improvement, especially in the Control and Security dimensions, where the values obtained are slightly lower than other dimensions. Therefore, to improve the quality of the website in these aspects, further development is needed.

4. Results and Discussion

This study uses the PIECES (Performance, Information, Economy, Control, Efficiency, and Service) method to analyze user satisfaction levels with the SMAIT Raudhatul Jannah Cilegon website. Data was obtained from 100 respondents who are active users of the website, consisting of teachers, students, and prospective students, through an online questionnaire distributed using Google Forms. The analysis was conducted using SPSS with a descriptive approach to

obtain the average score for each PIECES dimension. The results of data processing show that all dimensions are in the “Agree” category, which means that users are generally satisfied with the performance and services of the SMAIT Raudhatul Jannah Cilegon website. Details of the results of the analysis of user satisfaction levels for each PIECES dimension can be seen in Table 4.

Table 4. Analysis Results Summary Table

No	PIECES Aspect	Evaluation	Indicator
1	Performance	4.14	Agree
2	Information	4.10	Agree
3	Economics	4.10	Agree
4	Control	3.89	Agree
5	Efficiency	4.13	Agree
6	Service	4.19	Agree

Based on the Table 4, the Service aspect received the highest score of 4.19, while the Control aspect received the lowest score of 3.89. Overall, the average score obtained from the six PIECES dimensions shows that the website has met user expectations with a satisfaction level in the “Satisfied” category. In the Performance aspect, the website obtained an average score of 4.14 with an Agree category. This score indicates that most respondents were satisfied with the access speed, system stability, and the website's ability to display information quickly and smoothly. However, a small number of users stated that the user interface was still visually unattractive. Previous research supports these results, in which evaluations of educational website performance show that access speed and system stability are dominant factors in user satisfaction (Pandya et al., 2024). In addition, visual and user experience improvements are also important for enhancing the perceived quality of websites (Safitri et al., 2024), and are supported by performance and usability test results that show a close relationship between design and system efficiency (Puspito, 2024). This shows that even though the technical performance of the website is already good, improvements are needed in terms of aesthetics and user experience so that user interaction becomes more comfortable and optimal.

Furthermore, in terms of Information, the website received a score of 4.10 in the Agree category. The majority of respondents considered the information presented to be relevant, accurate, and easy to understand, especially regarding activity schedules, school announcements, and academic content that was easily accessible. However, a small number of users considered the information presented to be incomplete or too concise, particularly in terms of highly detailed information. This is in line with research stating that the completeness and clarity of information on educational websites has a significant influence on user satisfaction (A'yun et al., 2023). Other studies confirm that good information quality, including relevance and data currency, strengthens the credibility of public websites (Ernungtyas et al., 2024) and has a positive impact on academic user satisfaction (Sitorus et al., 2025). Therefore, website administrators need to consider adding more in-depth and structured content so that the information needs of all parties can be adequately met.

The Economy aspect also received a score of 4.10 in the Agree category. This result indicates that the management and maintenance of the website have been carried out efficiently and cost-effectively without reducing the effectiveness of information services. In other words, the website is considered to have provided benefits commensurate with the resources used, so that from an economic point of view, this system is considered efficient, effective, and does not burden the institution financially. This condition is consistent with research that found that the efficiency of digital resource management is a major factor in improving the sustainability of educational websites (A'yun et al., 2023). In addition, resource-limited website management can remain effective if supported by good technology management (Jaya et al., 2024).

In terms of Control (Control and Security), the score obtained was 3.89, which is still in the Agree category, but is the lowest score among the six PIECES dimensions. This shows that the website security mechanism is quite good, but there are still some users who doubt the protection of personal data and the reliability of the security system. Several respondents also suggested improvements in control and security, such as the implementation of data encryption, user access rights management, and protection against cyber threats. Previous studies emphasize the importance of cybersecurity practices and personal data protection in educational institutions as a means of maintaining user trust (Saeed, 2023). Another study mentions that improving digital literacy and implementing privacy protocols can also strengthen website security controls (Salsabisa Hakim et al., 2024). Therefore, strengthening security systems and conducting regular audits are important steps to increase user trust in school websites.

Meanwhile, in terms of Efficiency, the website scored 4.13 in the Agree category. This result shows that user interaction with the website is efficient, both in terms of access time and ease of use. The simple navigation structure, page loading speed, and clarity of information presentation are the main factors supporting this efficiency. From the administrator's perspective, the website is also considered easy to update and maintain, thereby supporting work effectiveness and minimizing technical obstacles in its operation. This result is in line with research showing that system efficiency and intuitive navigation are the main factors in user satisfaction with university websites (Safitri et al., 2024). Other studies also confirm that ease of navigation and access speed significantly increase user satisfaction (Putra & Wulandari, 2020).

The Service aspect was the highest-rated dimension, with a score of 4.19 in the Agree category. This finding indicates that the services provided through the website are very helpful to users, both in obtaining information and interacting directly with the school. Features such as online forms, direct contact with the school, and clear usage guidelines are the main strengths in terms of service. This result is reinforced by research stating that service quality plays a major role in building user satisfaction on open university websites (Sahusilawane & Hiariey, 2023). Another study adds that the quality of integrated systems, information, and services is the most effective combination for increasing digital user satisfaction in educational institutions (Satyadarma & Syamsudin, 2024). This shows that the SMAIT Raudhatul Jannah Cilegon website has succeeded in providing responsive, user-friendly, and relevant services to users.

Overall, the results of the study show that the level of user satisfaction with the SMAIT Raudhatul Jannah Cilegon website is in the “Satisfied” category. The values obtained describe a high level of satisfaction with aspects of performance, efficiency, and service, although there is still room for improvement in terms of visual appearance, depth of information, and security systems. The limitation of the PIECES method in this study is the absence of technical performance measurements such as web speed score, load time score, and event timing score, which can be generated by modern web performance testing tools. Therefore, in future studies, it is recommended to combine the PIECES method with technical analysis based on system performance metrics so that website evaluation becomes more comprehensive and objective.

5. Conclusion

This study concludes that most users of the SMAIT Raudhatul Jannah Cilegon website are satisfied with its content, usability, and visual design. From 100 respondents, 49 strongly agreed, 32 agreed, 15 quite agreed, 3 disagreed, and 1 expressed dissatisfaction with the website's content, indicating that the information provided is generally complete, relevant, and aligned with user needs. Regarding usability, 42 respondents strongly agreed, 38 agreed, and 19 quite agreed, with only one dissatisfied, showing that the website's navigation and user experience are effective and easy to use. In terms of appearance, 34 respondents strongly agreed, 44 agreed, 17 quite agreed, and 5 were less agreeable, suggesting that while users appreciate the visual design, further improvement in aesthetics and interactivity remains necessary.

The analysis using the PIECES framework revealed that all six dimensions, Performance, Information, Economy, Control, Efficiency, and Service fall within the “Satisfied” category. The Service (4.19) and Performance (4.14) dimensions achieved the highest mean scores, while Control (3.89) was the lowest, reflecting user concerns about data protection and security reliability. Overall, the website meets user expectations, but improvements are still needed in content presentation, interface design, and security mechanisms. Practically, these findings offer guidance for school administrators and developers to enhance website functionality, ensure stronger data protection, and create a more engaging user interface. Theoretically, this study reaffirms the PIECES framework's applicability as a reliable model for evaluating user satisfaction in educational information systems.

For future research, it is recommended to integrate the PIECES framework with other evaluation models such as the DeLone and McLean IS Success Model or ISO/IEC 9126 to capture both subjective satisfaction and technical performance dimensions. Incorporating objective web analytics data (e.g., response time, bounce rate, and usability testing) could provide a more comprehensive assessment of website quality. Additionally, conducting comparative studies across various educational institutions may yield broader insights into how digital service quality influences user satisfaction and engagement in the educational context.

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