



The Use of the PIECES Method to Measure User Satisfaction with Higher Education Academic Portals in South Tangerang City

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ARTICLE INFO

Received: September 27, 2024

Revised: November 16, 2024

Accepted: December 17, 2024

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Keywords:

PIECES, Satisfaction, User, Academic Portal, Higher Education.

ABSTRACT

This study aims to explore the use of the PIECES Method in measuring user satisfaction with academic portals at higher education institutions in South Tangerang City. User satisfaction with academic portals is crucial in enhancing efficiency, service quality, and learning experiences in a higher education environment. The study was conducted over eight months, from February to September 2024, across four higher education institutions in South Tangerang City. Data collection techniques included literature review, interviews, observations, and Focus Group Discussions (FGD). The findings of this research are expected to serve as a guide for higher education institutions in improving the quality of their academic portal services, thereby enhancing user satisfaction and learning experiences. The results indicate that the academic portals have met user expectations based on the PIECES framework. In terms of performance, the portal was rated as fast and stable, although it encountered challenges during high traffic periods, and e-learning features require further development. The information provided is accurate and up-to-date, while cost and time efficiency are considered good. Users feel they have adequate control over their data, and support services are viewed as responsive. These findings have significant implications for the management and development of academic portals, encouraging service quality improvements and ensuring the effective use of portals in higher education institutions.

Introduction

The academic portal has become a highly effective solution in addressing various issues faced by educational institutions by disseminating information quickly and efficiently (Indrawati et al., 2019). Managing an information system requires an integrated approach, encompassing several key aspects such as planning, maintenance, performance evaluation, as well as the involvement of software, hardware, and human operators (Lalujan, 2023). Good planning is a crucial initial step in managing an information system, involving the determination of objectives, strategies, and resources needed to achieve the desired outcomes. The maintenance of the information system is equally important, as it

ensures that the system remains functional and reliable. Performance evaluation is conducted periodically to assess the effectiveness and efficiency of the system and to identify areas that require improvement (Cahya et al., 2021).

The involvement of appropriate software and hardware is crucial in supporting the operational functions of an information system. The software must be capable of accommodating user needs and processing data quickly and accurately. Meanwhile, the hardware should have adequate capacity and reliability to support system performance. Equally important is the role of human operators responsible for managing and operating the information system. They must possess sufficient skills and knowledge to ensure the smooth operation of the system. Technological advancements have brought significant changes in how society functions, including in the field of education. Technology plays a vital role in enhancing the quality of education by providing broader and faster access to information and resources (Dewi et al., 2023).

Technological advancements have had a significant impact on various aspects of public services, including the education sector (Asih et al., 2022; Fu et al., 2023). One important innovation in education is the academic information system, which plays a crucial role in managing academic data and enhancing user satisfaction, particularly for students (Husaini et al., 2022). This system enables educational institutions to manage academic information efficiently, from course registration to assessment and reporting of learning outcomes.

According to (Kinanti et al., 2021), evaluating usability and user comfort is essential for maintaining a positive application image. This evaluation involves measuring how easy and comfortable users find it to interact with the system. Feedback from users is valuable for developers as it provides insights into system performance and areas for improvement. User satisfaction not only affects their perception of the system but also fosters loyalty and continuous use. Evaluating system quality is a crucial step in improving information system performance (Tafsiruddin et al., 2024). The academic information system also plays a vital role in enhancing the effectiveness and efficiency of the teaching process. It makes academic administration more structured and organized, facilitating access to necessary information for students and faculty. Evaluating user satisfaction serves as a key tool to assess system performance. Research shows that when user needs are met, their satisfaction with the system increases (Erika, 2023). Educational institutions should utilize information systems as academic service infrastructure to support better teaching and learning processes (Lestari et al., 2021). With proper technology integration, institutions can improve academic service quality and provide a better learning experience for students, while also managing resources more efficiently and effectively.

The success of an academic information system largely depends on how effectively it contributes to the organization (Kustina et al., 2022). A good academic information system not only assists in managing academic data but also enhances operational efficiency and user satisfaction, especially for students and teaching staff. To achieve this success, evaluating the information system becomes crucial. The purpose of this evaluation is to ensure the system is used optimally, particularly given the significant investment made in its development (Darwi et al., 2023). This evaluation covers various aspects, including the

system's usability, reliability, and efficiency. Regular evaluations allow organizations to identify potential issues and take corrective measures to improve system performance.

The academic information system functions to provide relevant information for management (Yunianto et al., 2021). This information is vital for accurate and strategic decision-making. Therefore, evaluating the information needs desired by management is a crucial step. This evaluation ensures that the information system can provide timely, accurate, and relevant information that meets management's requirements (Pangri et al., 2021).

Additionally, the evaluation of information systems also involves assessing user satisfaction. Feedback from users is invaluable as it provides insights into system performance and areas that need improvement. User satisfaction not only influences their perception of the system but also enhances loyalty and continued usage. Therefore, evaluating user satisfaction is an essential tool for assessing system performance and ensuring that user needs are adequately met.

An effective academic information system can offer various benefits to educational institutions. Besides improving operational efficiency, it also aids in more effective resource management. A well-designed information system makes academic administration more structured and organized, facilitating easier access to necessary information for students and teaching staff (Fuad & Harisun, 2019).

The success of an academic information system largely depends on how well it contributes to the organization. Comprehensive and ongoing evaluations are crucial to ensure the system is used optimally and meets the needs of both users and management. As a result, educational institutions can enhance the quality of academic services and provide a better learning experience for students. The use of academic portals has become an integral part of information management and educational services in higher education. In South Tangerang City, 23 higher education institutions utilize academic portals as the main medium for students, lecturers, and administrative staff to access academic, administrative, and other services.

Table 1. Higher Education Data in South Tangerang City

Public Univesities	Official Univesities	Private Universities
2	2	19
Total		
23		

Source : (kabartangsel.com, 2024)

This study focuses on the use of the PIECES Method (Performance, Information, Economic, Control, Efficiency, Service) in measuring user satisfaction with the Higher Education academic portal across four universities in South Tangerang City, namely STIE Ganesha, Muhammadiyah University of Jakarta, UIN Jakarta, and Pamulang University. This research is important because the academic portal plays a strategic role in supporting academic and administrative activities in higher education institutions. By understanding the dimensions of PIECES, educational institutions can: (a) Identify areas for improvement to enhance academic portal services and efficiency, (b) Adapt the academic portal

development strategy according to user needs, (c) Improve user experience and strengthen relationships with students, lecturers, and administrative staff, and (d) Serve as a reference for other educational institutions in enhancing service quality and user satisfaction with academic portals.

Previous studies have been conducted, including a lecturer performance evaluation information system (Darmawan, 2023). Variables within the PIECES framework significantly influence user satisfaction levels in the plagiarism checking system (Rizki et al., 2022). The Student Portal offers numerous benefits and advantages in supporting students' informational needs (Tazkiya et al., 2021). Development improvements were focused on the control variable with the lowest score of 450.67, which indicated issues related to account access on the academic portal (Halwa & Marwati, 2021).

Furthermore, a review by (Senen et al., 2021), categorized academic information systems as good. Five characteristics fell into the good category, indicating that students were satisfied with the system's performance (Immanuel & Setiawan, 2020)(Meha, 2018). System quality, information quality, service quality, and ease of use directly positively impact user satisfaction (McCarthy & Bogers, 2023). The design of a web-based academic assessment, usable by administrators, teachers, and school principals, allows for student evaluation data entry into the database (Asyifa, 2020).

The research gap between previous studies and the current study lies in the focus and methodology used. This study aims to fill this gap by analyzing PIECES (Performance, Information, Economic, Control, Efficiency, Service) to measure user satisfaction with academic portals in six universities. This study proposes a more structured and comprehensive PIECES framework evaluation technique for assessing academic portal user satisfaction. This research is essential to (a) improve the quality of higher education academic portal services in South Tangerang City, (b) enhance efficiency, (c) remain highly relevant to the local educational environment, and (d) contribute to academic literature.

Research Methods

This study uses a participatory approach with a descriptive qualitative method, involving stakeholders from five universities managing academic portals in South Tangerang City (Abdussamad, 2021). The research was conducted over eight months, from February to September 2024. Data collection techniques included several stages: first, a literature review by examining books and nationally and internationally accredited articles published in the last six years. Second, interviews with relevant parties, including lecturers, students, educational staff, and information technology managers (Saady, 2020).

Third, observations were carried out to obtain direct information and understand and measure user satisfaction levels. Fourth, a Focus Group Discussion (FGD) was conducted with relevant stakeholders. The FGD aimed to identify challenges in using the PIECES Method to Measure User Satisfaction of Academic Portals in Higher Education in South Tangerang City. Data were analyzed and processed using triangulation to ensure valid and high-quality data (Sugiyono, 2020).

Findings

This study has both positive and negative impacts on various stakeholders within higher education institutions. On the positive side, it provides guidance for educational institutions to enhance the quality of their academic portals, directly benefiting the learning experience of students, lecturers, and administrative staff. Students experience easier access to academic information, time savings, and increased efficiency in administrative processes, allowing them to focus more on their studies. Lecturers and administrative staff also benefit from reduced workloads, easier data management, and more effective communication through a more responsive academic portal.

However, there are some negative impacts that need attention. Limitations in e-learning features and portal stability issues during high traffic can hinder the teaching-learning process, especially during peak academic activity periods. This affects the user experience, particularly for students and lecturers who rely on the portal for accessing materials and data entry. This research offers benefits for enhancing educational services but also highlights areas that require improvement. By understanding these impacts, higher education institutions can optimize their academic portals to ensure they remain relevant, efficient, and supportive of all user needs.

This study surveyed 100 participants, consisting of academic portal users in South Tangerang City. The informants included lecturers, students, educational staff, and IT managers from the Ganesha School of Economics (STIE Ganesha), Universitas Muhammadiyah Jakarta, UIN Syarif Hidayatullah Jakarta, and Pamulang University, whom the researchers met during the study. The identities of the 100 research participants were kept confidential to respect their privacy. Data from interviews, observations, and Focus Group Discussions (FGDs) were collected, analyzed, and processed in more detail. Subsequently, data validation was conducted to ensure the collection of high-quality data.

Table 2. Respondent Informan

Number	Respondent Status	Gender		Total
		Male	Female	
1	Lecturer	19	11	30
2	Student	25	10	35
3	Education Officer	11	9	20
4	IT Administrator	10	5	15
		65	35	100

The researcher presents the analysis of user satisfaction with the academic portal using the PIECES framework (Performance, Information, Control, Efficiency, and Service) as follows:

1. Performance

The majority of respondents rated the performance of academic portals in higher education institutions in South Tangerang City as good to very good, with fast and stable access supporting teaching, task uploads, and materials. However, some respondents noted issues during simultaneous usage, especially during peak academic activities like KRS (Course Registration) or payment periods, which led to decreased stability. Respondents

also felt that e-learning features were still limited, indicating the need for further development to be more effective. Additionally, portal speed is influenced by internet connectivity, so attention is needed to maintain accessibility. While the academic portal is viewed positively, there is room for improvement in terms of stability during high traffic, feature enhancement, and internet quality to more optimally support academic activities.

2. Information

The majority of respondents rated the information on the academic portal as accurate and up-to-date, with terms such as "always up-to-date," "accuracy," and "well-managed" frequently mentioned, indicating user satisfaction. About 80% described the information as accurate, stable, and relevant to their academic needs. However, some respondents identified shortcomings, such as occasionally outdated or inaccurate data, especially concerning inactive students still listed on the portal. There were also complaints about accessibility, like the need to extend access for inputting attendance or documents that couldn't be accessed online, requiring direct meetings with academic staff. Respondents suggested regular monitoring to maintain accurate and consistent information. Overall, while most users were satisfied, there is room for improvement in consistency, monitoring, and accessibility.

The majority of respondents were also satisfied with the ease of accessing information through the academic portal. Eighteen respondents rated access as "Fairly Easy," 40 as "Very Easy," and 39 as "Easy," indicating that the portal is efficient and user-friendly. Approximately 80% of respondents found information access to be easy to very easy, reflecting the portal's effectiveness. However, 11 respondents gave "Moderate/Neutral" responses, indicating some obstacles, and 10 others experienced technical issues, such as signal problems. In summary, the findings indicate that the academic portal effectively supports information access, though there is still some room for improvement.

3. Economic

The majority of respondents found the academic portal to be time-saving, with 30 respondents stating that the portal "Helps" and 29 saying it "Greatly Helps." This indicates the portal's effectiveness in supporting administrative and teaching tasks, enhancing work efficiency. However, 6 respondents noted issues such as difficulties in uploading offline materials or slow access during high traffic. Additionally, 4 respondents felt the portal was only moderately helpful and did not have a significant impact, while 3 others provided unclear responses. Most respondents rated the portal as "Highly Efficient" in terms of cost efficiency, particularly in reducing operational expenses. However, 11 respondents considered it "Fairly Efficient," 8 rated it as "Standard/Average," and 6 described it as "Relative/Comparable." Some (5) were uncertain, and 4 felt the portal needed optimization. Overall, the portal is considered efficient, but improvements are still necessary for more optimal cost-effectiveness.

4. Control

The majority of respondents (26 individuals) felt they had control over their data on the academic portal, indicating sufficient access and data management. Sixteen respondents rated their control as "Adequate/Good," but noted that there was still room for improvement in clarity. Five respondents felt their control was "Limited/Not Fully," while

4 were highly satisfied with the level of control provided. Two respondents gave unclear responses. Overall, most users felt they had good control over their data, though some areas require improvement to provide more effective and transparent control.

Regarding data security and privacy policies, the majority of respondents (26 individuals) rated them as "Very Good/Secure," indicating that they felt their data was well-protected. Twelve respondents rated them as "Fairly Good/Secure," suggesting adequate security but room for improvement. Three respondents felt the policy "Needs Improvement," indicating potential risks. Seven respondents gave unclear responses, reflecting uncertainty about the security policies. Overall, the data security and privacy policy was viewed positively, but there is still room for enhancement to ensure all users feel more secure and protected.

5. Efficiency

The majority of respondents (40 individuals) rated the academic portal as "Very Efficient/Supportive," indicating significant benefits in supporting teaching and administration, especially in reducing paper usage and enhancing efficiency. Fifteen respondents considered it "Quite Efficient," suggesting effectiveness, but with room for improvement. 50 respondents felt the portal was "Effective/Efficient," though not exceptional, and five rated it as "Standard/Needs Improvement," indicating the need for enhancements. Five respondents gave unclear responses. Overall, the portal is deemed efficient, but further improvements are necessary to achieve optimal efficiency in the future.

Most respondents (58 individuals) found the portal's features very helpful in boosting productivity, demonstrating that the portal effectively supports academic activities. Twenty two respondents described the features as "Quite Helpful," indicating they are adequate but could be improved. Only two respondents viewed the features as "Comprehensive/Beneficial" but suggested visual improvements. Ten respondents felt the features were only "Slightly Helpful/Didn't Know," indicating mismatch or lack of understanding. Other respondents gave unclear responses. In conclusion, the academic portal's features are seen as highly supportive of productivity, though some improvements and adjustments are still needed for optimal performance.

6. Service

The majority of respondents rated the technical support and assistance services of the academic portal as "Very Good" or "Good," indicating that these services are supportive and beneficial. Many felt that the technical support was "Very Helpful" and "Quick to Respond," aiding them in overcoming issues. The service is available 24/7 or during campus hours, providing convenience. However, some respondents noted shortcomings, such as outdated course schedules or slow response times. Some felt the service was helpful but not exceptional. Overall, the service is considered effective and responsive, though improvements in consistency, information updates, and response speed would further enhance user satisfaction.

Most respondents expressed satisfaction with the technical support and assistance services. Nineteen respondents rated the service as "Quite Satisfied," and 15 as "Very Satisfied," indicating that the service met user expectations. Seven respondents rated it as

"Satisfied," reflecting high satisfaction, while others rated it "Very Good," "Good," or "Average," with suggestions for more communication and outreach to lecturers. Two respondents rated the service as "Poor," indicating room for improvement. An average rating of 8/10 confirms user satisfaction. Overall, the service is deemed helpful and adequate, but improvements in communication and outreach are needed to ensure the service remains relevant and effective.

Discussion

The researcher explored the significance of the study results based on the analysis using the PIECES Method (Performance, Information, Economy, Control, Efficiency, Services) to assess user satisfaction with the academic portal. Regarding performance, the findings indicate that the academic portal generally functions well in providing accurate and up-to-date information. However, accessibility issues during high traffic suggest that, although its primary function has been met, further optimization is needed. These findings align with the perspective of (Malioy et al., 2024) emphasizing the importance of enhancing stability to handle high access loads and ensure a smooth user experience.

The accuracy and relevance of the information on the portal demonstrate its effectiveness in meeting academic information needs. However, instances of inactive student data still being listed highlight the need for more accurate data management. According to (Nurmawati & Ismartoyo, 2024), regular monitoring and updates are essential to ensure that the information provided is always valid and user-supportive.

In terms of the economy (Cost Efficiency), the finding that the portal significantly saves costs, particularly through reducing paper usage and administrative time, underscores the positive impact of digitalization in higher education. This is reinforced by (Purba & Sihotang, 2023) (Azizah & Wahono, 2021) who argue that academic portals can be an efficient solution in administrative management, emphasizing the importance of further development to maximize economic benefits.

Concerning Control, most respondents felt they had control over their data on the portal, though some found their access limited. This emphasizes the need to enhance control features or provide user training to ensure optimal understanding and access to personal data, thereby strengthening user trust in data management.

In terms of efficiency, the academic portal's role in saving time and simplifying administration highlights its importance in improving the work efficiency of lecturers and students. Although most rated the portal as efficient, the need for improved stability and service availability remains a concern. This aligns with (Aditya & Jaya, 2022) review that customer satisfaction is the level of feeling someone experiences after comparing perceived performance or results with expectations. (Kinanti et al., 2021) note that user satisfaction is a response or feedback from users regarding the system, serving as a reference or benchmark for system developers to improve the performance of the information system built.

Finally, regarding services, such as Data Security and Privacy, the portal's security and privacy policies were rated positively by most respondents, indicating user trust. However,

some mentioned potential future risks. (Prayogi et al., 2021) emphasized the importance of continuous monitoring to maintain data protection.

These findings indicate that the academic portal has met user needs in various aspects, with performance, information, cost efficiency, and security being rated positively. However, emphasizing the optimization of stability, improved data control, and awareness of security policies can further enhance the user experience. This suggests that although the portal is effective, there are opportunities for innovation to achieve higher satisfaction levels and maintain the portal's relevance in the future.

The development of an effective academic portal system can increase student satisfaction and engagement. Online assessment systems allow students to provide constructive feedback, which universities can then use to improve faculty performance and enhance the overall learning experience (Bervell et al., 2024). Indeed, according to (Almourad et al., 2023), many students struggle to find appropriate links or are even reluctant to use online services, which reduces the effectiveness of the portal.

In addition, in the design of academic portals, the application of Fogg Behavior Model (FBM)-based persuasive features, such as visual previews and information alignment, has been shown to increase user satisfaction and intention to continue accessing the portal (Lee et al., 2025). In light of these findings, the development of academic portals that are more focused on user experience and supported by persuasive features will help increase student participation and satisfaction, and support the improvement of more effective educational services. The above literature reinforces the relevance of the study in a global context and provides a stronger foundation for placing this study within the broader academic conversation regarding the role of technology in higher education.

Conclusion

The results of this study indicate that the academic portal in higher education institutions in South Tangerang City generally meets user expectations based on the PIECES framework. In terms of Performance, the portal is rated as fast and stable, though there are issues with high traffic, and the e-learning features require further development. The Information provided is accurate and up-to-date, although there is room for improvement in consistency and accessibility. For Economic Efficiency, the portal proves helpful, but enhancements are still needed for optimal performance. Users feel they have sufficient Control over their data, although certain aspects of control and privacy could be improved. In terms of Efficiency, the portal helps save time and facilitates administration, but improvements are necessary to achieve maximum efficiency. The Support/Service is rated positively, providing effective and responsive technical support, though better communication and information updates would further increase user satisfaction. Generally, the academic portal effectively supports academic and administrative activities, but further optimization is needed to achieve higher satisfaction and ensure the portal remains effective and relevant in the future. We suggest more targeted solutions for each PIECES component, including the Performance aspect, the need to improve the stability of

the portal during high traffic, as well as further development of e-learning features. As for the Control component, an update to the user data access control system is required. Every solution is focused on providing practical guidance that is more applicable and specific to the future development of academic portals. Other researchers can explore the impact of portals on student learning outcomes, the effectiveness of online learning, and strategies to optimize digital service delivery.

Acknowledgment

This research was funded by a grant from the Directorate General of Research, Technology, and Community Service, Ministry of Education and Culture of the Republic of Indonesia, under the Beginner Lecturer Research (PDP) scheme for the year 2024. The researcher expresses gratitude to all parties who contributed to the successful completion of this study. We extend our sincere thanks to the Directorate General of Research, Technology, and Community Service, Ministry of Education and Culture of the Republic of Indonesia, LPPM STIE Ganesha, lecturers, students, educational staff, and IT administrators at STIE Ganesha, Universitas Muhammadiyah Jakarta, UIN Syarif Hidayatullah Jakarta, and Universitas Pamulang for their valuable contributions to the smooth conduct of this research.

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