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Analysis of UBSI Students' Satisfaction with the SIAKAD Student Website Using the PIECES Method

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Abstract

Universitas Bina Sarana Informatika (UBSI) has developed an Academic Information System (SIAKAD) as a tool to support academic activities. Students use this system to update personal information, access course registration (KRS), academic transcripts (KHS), and other academic-related information. Although the system offers fairly comprehensive functionality and facilitates accurate information access for both students and lecturers, SIAKAD still faces several issues such as bugs, an unintuitive user interface, and performance degradation during peak usage. For instance, during grade announcements when many users access the system simultaneously, it often slows down, experiences long page loading times, or even crashes due to server overload. This study aims to evaluate the UBSI Student SIAKAD website using the PIECES analysis method, which includes aspects of Performance, Information, Economics, Control, Efficiency, and Service. Through this approach, a comprehensive overview of the system's strengths and weaknesses can be obtained. The analysis results indicate that, overall, students are satisfied with the performance, ease of use, and reliability of the SIAKAD website. This conclusion is expected to serve as a foundation for future system development and improvements to better support academic activities within UBSI.

INTRODUCTION

The academic information system student website is a platform that contains information about all activities and information within higher education institutions, such as course registration, academic transcripts, class schedules, and others. In addition, the academic information system serves as an information provision medium that allows students, the public, and related parties (stakeholders) to access data regarding higher education activities. Through this system, the information needs required by higher education institutions and other parties can be fulfilled more effectively (Winantu & Viony, 2023).

Universitas Bina Sarana Informatika (UBSI) has utilized this information system for academic purposes through the implementation of the Academic Information System (SIAKAD). Students of Universitas Bina Sarana Informatika (UBSI) use the SIAKAD website to update personal information to avoid errors

in diploma or transcript printing, complete academic data, and view KRS (Study Plan Cards) or KHS (Study Result Cards). The existence of SIAKAD facilitates students and lecturers in obtaining accurate and timely academic information.

In terms of functionality, the system is quite comprehensive. However, SIAKAD occasionally experiences system bugs, an unintuitive interface, and performance issues during periods of high workload, such as during grade announcements, when many users access the system simultaneously, causing system slowdowns, long page loading times, or even system freezes due to server overload.

Given these various issues, an evaluation of the website is required to identify which parts of the student web need improvement so that its quality can be enhanced in the future, thereby increasing user satisfaction with the website's overall quality. Evaluating the service quality of an application is necessary to determine the level of user satisfaction with the services provided by the application, so that it can be identified which dimensions need to be improved and enhanced. A determining factor in the progress or decline of an electronic-based business is the quality of the electronic service itself (Angelina et al., 2023).

Based on a review of previous studies, evaluations of the quality of academic information system websites have been widely conducted to measure user satisfaction levels and the effectiveness of the services provided. Various evaluation approaches and methods have been employed, one of which is the PIECES method (Performance, Information, Economy, Control, Efficiency, and Service), which is considered capable of providing a comprehensive analysis of the quality of an information system. The PIECES method is an analytical method used as a foundation to identify more specific core problems. In analyzing a system, the aspects commonly examined include performance, information, economic factors, application security/control, efficiency, and customer service (Natalia et al., 2024).

Although the PIECES method has been widely used in information system evaluation studies, to date there has been no research that specifically and comprehensively analyzes student satisfaction with the SIAKAD Student website of Universitas Bina Sarana Informatika (UBSI) based on all PIECES dimensions. Therefore, this study is conducted to address this research gap by evaluating the quality of the UBSI SIAKAD Student website using the PIECES method, with the aim of providing a comprehensive overview of student satisfaction and serving as a basis for system improvement recommendations in the future.

METHOD

1. Research Stages

   This study was conducted through several systematic stages in order to obtain valid and relevant results. The research methodology stages are explained comprehensively as follows:

   a. Determining the research object

      The initial step is selecting the topic that will be the focus of the study. In this research, the object under investigation is the UBSI SIAKAD Student website.

   b. Problem identification

      Identifying problems related to student satisfaction in using the SIAKAD website system, including performance, usability, reliability, and other related aspects.

   c. Questionnaire development and distribution

      The questionnaire was developed based on indicators from the PIECES method and distributed via Google Forms to UBSI students using purposive sampling. The total number of respondents in this study was 122 active UBSI students.

   d. Data collection and processing

The next stage involves collecting and processing the data obtained from the distributed questionnaire. The data were then processed using Microsoft Excel and SPSS to support the research analysis.

e. Discussion of results using the PIECES framework

The final stage involves discussing the research results based on the variables in the PIECES framework, which include (Malioy et al., 2024) :

1) Performance, used to assess the performance and reliability of the information system, whether the system is operating properly or not;
2) Information & Data, used to evaluate the system's outputs, inputs, and data storage;
3) Economics, used to assess the costs and benefits of using the system;
4) Control & Security, used to examine the extent to which control and monitoring have been implemented to ensure that the system operates properly, accurately, and securely;
5) Efficiency, used to evaluate the efficiency of the system in providing advantages and added value when implemented and compared to conventional systems;
6) Service, used to determine how the information system serves its users and to assess whether system development or improvement is necessary.

2. Research Instrument

A research instrument is a data collection technique that involves the steps of developing the research instrument and determining the validity, reliability, level of difficulty, discriminating power, and distractors of the data in the study (Ramanda & Abadi, 2024).

The research instrument was developed based on six main indicators of the PIECES method, namely Performance, Information, Economy, Control, Efficiency, and Service, as well as one dependent variable, User Satisfaction. Each PIECES variable is elaborated into several relevant indicators, which are then used as the basis for constructing the questionnaire items or statements. The Likert scale is used as the measurement tool to assign weights to respondents' answers, with the aim of obtaining measurable and structured data (Huda & Megawaty, 2021).

STS: Strongly Disagree = Score 1
TS: Disagree = Score 2
KS: Somewhat Disagree = Score 3
S: Agree = Score 4
SS: Strongly Agree = Score 5 (Mulyono, Syafei, & Kusumaningrum, 2020)

Table 1. Questionnaire Question Items

No.	Pertanyaan
Performance	
1	Website SIAKAD Student mudah diakses kapan saja.
2	Waktu respon sistem saat berpindah halaman cukup cepat.
3	Fitur-fitur pada SIAKAD Student berjalan dengan lancar tanpa error.
4	Website jarang mengalami gangguan atau down
Information and Data	
5	Informasi yang ditampilkan di website SIAKAD Student mudah dipahami.
6	Data yang ditampilkan akurat dan sesuai dengan kondisi aktual.
7	Informasi akademik seperti KRS, KHS, dan Jadwal selalu diperbarui.
8	Informasi yang ditampilkan sesuai dengan kebutuhan akademik mahasiswa.
Economy	
9	Website SIAKAD Student dapat diakses tanpa harus menggunakan perangkat berspesifikasi tinggi.
10	Penggunaan website tidak memerlukan banyak kuota internet.
11	Sistem ini mempermudah urusan akademik tanpa harus datang langsung ke kampus.

Control	
12	Data pribadi mahasiswa aman dalam sistem SIAKAD Student.
13	Hanya pengguna yang berhak yang dapat mengakses informasi akademik masing-masing.
14	Sistem memberikan batasan akses yang sesuai untuk tiap pengguna.
Efficiency	
15	Pencarian informasi di dalam sistem mudah dan cepat dilakukan.
16	Tata letak menu dan fitur mudah dimengerti.
17	Website SIAKAD Student mempermudah dalam melakukan pengisian KRS atau melihat KHS.
Service	
18	Jika terdapat kendala, ada informasi atau kontak bantuan yang tersedia.
19	Sistem memberikan pemberitahuan jika ada perubahan informasi penting
20	Pelayanan admin atau helpdesk cepat tanggap jika dihubungi terkait masalah SIAKAD.
User Satisfaction	
21	Saya puas secara keseluruhan dengan layanan/aplikasi ini.
22	Pengalaman saya menggunakan website SIAKAD UBSI ini menyenangkan.

The table presents the questionnaire items used to measure student satisfaction with the SIAKAD Student website based on the PIECES method. Each question is grouped into six main aspects, namely Performance, Information and Data, Economy, Control, Efficiency, and Service, as well as an additional variable, User Satisfaction. The questions are designed to evaluate system performance, information quality, usage efficiency, data security, service convenience, and overall user satisfaction. This table serves as the primary research instrument for collecting data on students' perceptions of the quality of the SIAKAD Student website.

According to Asbar and Saptari, the results of questionnaire assessments of application users in measuring service quality toward customer satisfaction use a Likert scale. To obtain the average level of satisfaction, the following formula is used (Prayogi et al., 2021):

$$RK = \frac{JSK}{JK}$$

RK = Average satisfaction
JSK = Total questionnaire score
JK = Number of questionnaires

To determine the level of student satisfaction with the SIAKAD Student website, this study uses Likert scale categories that are converted into assessment intervals. The criteria used are as follows :

Table 2. Assessment Categories

Scale	Assessment Category
4.92 – 5.00	Very Satisfied
3.40 – 4.91	Satisfied
2.60 – 3.39	Neutral
1.80 – 2.59	Dissatisfied
1.00 – 1.79	Very Dissatisfied

Source: (Prayogi et al., 2021)

3. Data Collection Methods

Data collection in this study was carried out using three main techniques, namely:

a. Observation

Observation was conducted directly on the use of the SIAKAD Student UBSI website. The researcher observed the user interface, the flow of feature usage such as KRS, KHS, and the management of students' academic data. Observations were also made on student testimonials

conveyed through social media. The purpose of this observation was to obtain a real picture of user experiences and to identify constraints or weaknesses frequently encountered in the system.

b. Questionnaire

The questionnaire was used as the primary instrument for collecting primary data. It was designed based on six indicators of the PIECES method, namely Performance, Information, Economy, Control, Efficiency, and Service, as well as User Satisfaction. Each indicator was elaborated into several statements, with a total of 20 question items, and the measurement scale used was a Likert scale. The questionnaire was distributed online using Google Forms.

The population of this study was limited to final-year students of Universitas Bina Sarana Informatika (UBSI) who were actively using the UBSI SIAKAD Student website for academic purposes, such as KRS submission, KHS access, and class schedule checking. The sampling technique used was purposive sampling, namely selecting samples from the population that met specific criteria: active UBSI students who routinely use the SIAKAD Student website.

The number of respondents in this study was 122 UBSI students. Questionnaire data were analyzed using Microsoft Excel to obtain an overview of satisfaction levels for each aspect of the PIECES method.

The sample size was determined using the Slovin formula with a 5% margin of error (Muliansah & Budihartanti, 2020) :

$$n = \frac{N}{1 + Ne^2}$$

Where:

n = Sample size / number of respondents

N = Population size

e = Tolerated sampling error rate (5%)

Based on the calculation:

N = 122

e = 0.05 (5%)

$$n = \frac{122}{1 + 122(0.05)^2}$$

$$n = \frac{122}{1 + 122(0.0025)}$$

$$n = \frac{122}{1 + 0.305}$$

$$n = \frac{122}{1.305}$$

$n =$ 93.48659, rounded to 93

From the calculation above, the number of samples used in this study was 93 respondents.

c. Literature Review

A literature review was conducted to collect secondary data as a theoretical foundation and as references for comparing the research results. The sources used included books, scientific journals, research articles, and relevant online sources related to academic information systems and the PIECES method.

RESULT

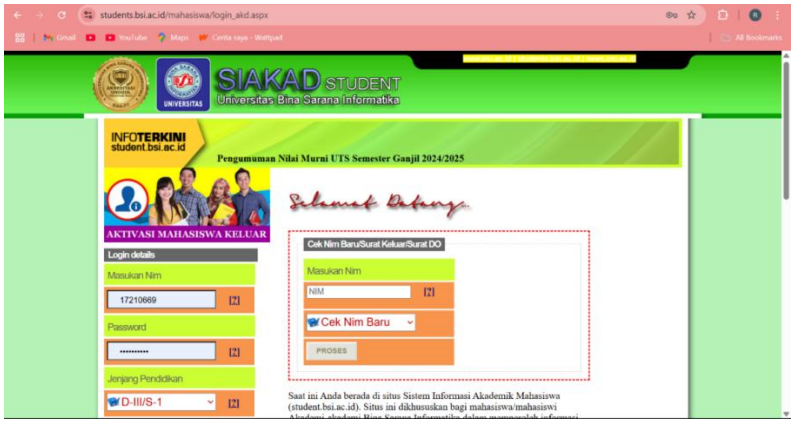

Figure 1. SIAKAD Website Overview

The image shows the main page (login page) of the SIAKAD Student website of Universitas Bina Sarana Informatika (UBSI). In general, this page functions as the main gateway for students to access the academic information system.

This study utilized 93 samples of users of the SIAKAD UBSI Student website, consisting of active students of Universitas Bina Sarana Informatika, who were randomly selected to test the data using validity and reliability tests. These tests were conducted prior to data analysis to determine whether the measurement instrument met the standards of a high-quality measurement tool. In the questionnaire, a Likert scale was used as the measurement scale to facilitate data calculation.

Validity testing is a test that functions to determine whether a measuring instrument is valid (accurate) or invalid. The measuring instrument referred to here consists of the questions contained in the questionnaire. The validity testing criteria are based on correlating each indicator item score with the total construct score. The significance level used is 0.05 (Janna & Herianto, 2021).

The testing criteria are as follows:

H_0 is accepted if r calculated > r table (the measuring instrument is valid).

H_0 is rejected if r calculated ≤ r table (the measuring instrument is invalid).

The method for determining the r table value is:

r table = df (N − 2), with a two-tailed significance level.

For example, r table = df (13 − 2, 0.05). To obtain the r table value, it must be referenced from the r table.

It is known that the degrees of freedom $db = n - 2 = 93 - 2 = 91$, and with a significance level of 5%, the critical value of $r(\alpha, n-2)$ is 0,205. The results of the validity test from the questionnaire data processing can be seen in Table 2 below:

Table 3. Validity Test Results

Statement	*r* Calculated	*r* table 5%	Remarks
P1	0.901	0,205	Valid
P2	0.888	0,205	Valid
P3	0.756	0,205	Valid
P4	0.845	0,205	Valid
P5	0.813	0,205	Valid
P6	0.828	0,205	Valid
P7	0.887	0,205	Valid
P8	0.880	0,205	Valid
P9	0.874	0,205	Valid
P10	0.840	0,205	Valid
P11	0.837	0,205	Valid
P12	0.807	0,205	Valid

P13	0.911	0,205	Valid
P14	0.869	0,205	Valid
P15	0.928	0,205	Valid
P16	0.851	0,205	Valid
P17	0.862	0,205	Valid
P18	0.881	0,205	Valid
P19	0.886	0,205	Valid
P20	0.885	0,205	Valid
P21	0.911	0,205	Valid
P22	0.862	0,205	Valid

The r table value of 0.205 was used for comparison with the calculated r values. All selected instruments or statement items had calculated r values greater than the r table value. Based on the results shown in Table 2, all statements in the questionnaire have correlation values (r calculated) that are higher than the r table value (0,205). This means that each question is considered valid because it truly measures what is intended to be examined. Therefore, the questionnaire used in this study can be regarded as valid and reliable for measuring students' satisfaction with the use of the SIAKAD Student website.

The most commonly used reliability test is the Cronbach's Alpha coefficient. A good reliability test is recommended to have a Cronbach's Alpha value greater than or equal to 0.6. Instrument reliability can be assessed from the Cronbach's Alpha value, where values < 0.5 indicate low reliability, values between 0.5–0.7 indicate moderate reliability, values between 0.7–0.9 indicate high reliability, and values above 0.9 indicate very high reliability (Amalia et al., 2022).

Table 4. Reliability Test Results

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.984	.984	22

The results of the reliability test, as shown in Table 3, indicate that the questionnaire used in this study has a very high level of consistency, with a Cronbach's Alpha value of 0.984 and a total of 22 question items. This value is far above the minimum threshold of 0,70. In other words, the research instrument is considered reliable, meaning that the measurement results are stable and trustworthy, and therefore can be used to assess students' satisfaction with the SIAKAD Student website.

To analyze the data obtained from the distribution of questionnaires to users of the SIAKAD UBSI Student website, consisting of active UBSI students, the PIECES Framework technique was applied. The questionnaire content covered six variable components, namely Performance, Information, Economy, Control, Efficiency, and Service.

1. Performance

Table 5. Performance

Statement	Respondents' Answers					
	1	2	3	4	5	Total
Website SIAKAD Student mudah diakses kapan saja.	1	12	28	32	20	93
Waktu respon sistem saat berpindah halaman cukup cepat.	1	11	35	23	23	93
Fitur-fitur pada SIAKAD Student berjalan dengan lancar tanpa error.	2	0	45	24	22	93

Website jarang mengalami gangguan atau down	3	12	34	30	14	93
Total	**7**	**35**	**142**	**109**	**79**	**372**

$$RK = \frac{(5*79)+(4*109)+(3*142)+(2*35)+(1*7)}{79+109+142+35+7}$$

$$RK = \frac{1334}{372} = 3.58$$

2. Information and Data

Table 6. Information and Data

Statement	Respondents' Answers					
	1	2	3	4	5	Total
Informasi yang ditampilkan di website SIAKAD Student mudah dipahami.	0	2	45	29	17	93
Data yang ditampilkan akurat dan sesuai dengan kondisi aktual.	0	13	27	27	26	93
Informasi akademik seperti KRS, KHS, dan Jadwal selalu diperbarui.	1	13	27	34	18	93
Informasi yang ditampilkan sesuai dengan kebutuhan akademik mahasiswa.	0	12	28	22	31	93
Total	**1**	**40**	**127**	**112**	**92**	**372**

$$RK = \frac{(5*92)+(4*112)+(3*127)+(2*40)+(1*1)}{92+112+127+40+1}$$

$$RK = \frac{1370}{372} = 3.68$$

3. Economics

Table 7. Economics

Statement	Respondents' Answers					
	1	2	3	4	5	Total
Website SIAKAD Student dapat diakses tanpa harus menggunakan perangkat berspesifikasi tinggi.	0	2	40	26	25	93
Penggunaan website tidak memerlukan banyak kuota internet.	0	12	30	29	22	93
Sistem ini mempermudah urusan akademik tanpa harus datang langsung ke kampus.	0	2	40	32	19	93
Total	**0**	**16**	**110**	**87**	**66**	**279**

$$RK = \frac{(5*66)+(4*87)+(3*110)+(2*16)+(1*0)}{66+87+110+16+0}$$

$$RK = \frac{1040}{279} = 3.72$$

4. Control and Security

Table 8. Control and Security

Statement	Respondents' Answers					
	1	2	3	4	5	total
Data pribadi mahasiswa aman dalam sistem SIAKAD Student.	0	12	29	27	25	93
Hanya pengguna yang berhak yang dapat mengakses informasi akademik masing-masing.	1	14	28	23	27	93
Sistem memberikan batasan akses yang sesuai untuk tiap pengguna.	0	12	27	36	18	93
Total	**1**	**38**	**84**	**86**	**70**	**279**

$$RK = \frac{(5*70)+(4*86)+(3*84)+(2*38)+(1*1)}{70+86+84+38+1}$$

$$RK = \frac{1023}{279} = 3.66$$

5. Efficiency

Table 9. Efficiency

Statement	Respondents' Answers					
	1	2	3	4	5	total
Pencarian informasi di dalam sistem mudah dan cepat dilakukan.	0	2	41	25	25	93
Tata letak menu dan fitur mudah dimengerti.	0	2	41	25	25	93
Website SIAKAD Student mempermudah dalam melakukan pengisian KRS atau melihat KHS.	1	14	29	31	18	93
Total	**1**	**18**	**111**	**81**	**68**	**279**

$$RK = \frac{(5*68)+(4*81)+(3*111)+(2*18)+(1*1)}{68+81+111+18+1}$$

$$RK = \frac{1034}{279} = 3.70$$

6. Service

Table 10. Service

Statement	Respondents' Answers					
	1	2	3	4	5	total
Jika terdapat kendala, ada informasi atau kontak bantuan yang tersedia.	1	1	44	27	20	93
Sistem memberikan pemberitahuan jika ada perubahan informasi penting	0	13	36	20	24	93
Pelayanan admin atau helpdesk cepat tanggap jika dihubungi terkait masalah SIAKAD.	1	11	33	29	19	93
Total	**2**	**25**	**113**	**76**	**63**	**279**

$$RK = \frac{(5*63)+(4*76)+(3*113)+(2*25)+(1*2)}{63+76+63+25+2}$$

$$RK = \frac{1010}{279} = 3.62$$

Table 11. PIECES Analysis

No	Variable	Average Satisfaction	Category
1	Perfomance	3.58	Satisfied
2	Information	3.68	Satisfied
3	Economics	3.72	Satisfied
4	Control & Security	3.66	Satisfied
5	Efficiency	3.70	Satisfied
6	Service	3.62	Satisfied

The PIECES Analysis table presents the results of the analysis of students' satisfaction levels with the SIAKAD Student UBSI website based on the six variables of the PIECES framework. The explanation is as follows:

a. Performance has an average satisfaction score of 3.58 and falls into the Satisfied category. This indicates that the system's performance, such as speed and reliability, is considered adequate by users, although it is the variable with the lowest score among all dimensions.
b. Information has an average score of 3.68 and is categorized as Satisfied, meaning that the information provided by the system is considered sufficiently accurate, relevant, and easy to understand by students.
c. Economics obtained the highest average score of 3.72 and is included in the Satisfied category. This shows that in terms of benefits compared to the costs or effort incurred, the SIAKAD Student website provides good value to its users.
d. Control & Security received an average score of 3.66 and is categorized as Satisfied, indicating that system control and data security aspects are perceived as adequate by students.
e. Efficiency achieved an average score of 3.70 and falls into the Satisfied category, which means that the system is considered efficient in helping students complete their academic needs with relatively minimal time and effort.
f. Service has an average score of 3.62 and is also categorized as Satisfied, showing that the services provided by the system, including support and accessibility, have met users' expectations.

Overall, all variables in the PIECES framework are in the "Satisfied" category, indicating that students are generally satisfied with the use of the SIAKAD Student UBSI website, although there is still room for improvement, particularly in the Performance aspect.

CONCLUSION

Based on the results of the PIECES framework analysis, it can be concluded that the level of student satisfaction with the SIAKAD Student UBSI website is generally in the "Satisfied" category across all evaluated dimensions. The average satisfaction scores for Performance, Information, Economics, Control & Security, Efficiency, and Service all fall within the satisfied range, indicating that the system has been able to meet students' academic needs effectively. Among the six dimensions, Economics achieved the highest score, suggesting that students perceive the benefits of the system to outweigh the costs or efforts required to use it. Conversely, Performance received the lowest score, although it remains within the satisfied category, indicating that aspects such as system speed and reliability could be further improved. Overall, these findings show that the SIAKAD Student UBSI website is considered useful, reliable, and supportive of academic activities. However, continuous system enhancement—particularly in terms of performance—would be beneficial to further increase user satisfaction and improve the overall quality of the system.

Based on the findings and analysis, the researcher proposes the following recommendations:

1. Improving performance aspects
   Enhance system response speed, minimize bugs/errors, and optimize the server to remain stable when many users access the system simultaneously.
2. Strengthening control and security aspects
   Add additional security features such as two-factor authentication and security notifications when suspicious activities are detected.
3. Optimizing efficiency and service
   Simplify the menu layout to make it more intuitive and ensure that support services (helpdesk) are responsive and easily accessible.
4. Regular system maintenance
   Conduct routine maintenance of the SIAKAD Student system to maintain service quality, update information, and ensure data accuracy.
5. Development of additional features
   Add features such as automatic announcement integration with email or mobile applications to help students receive important information in real time.

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