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"Usability Analysis of Web-Based Global Academic Information Systems (GAIS) Using the System Usability Scale (SUS) Method"

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ABSTRACT

Web-based Global Academic Information Systems (GAIS) play a crucial role in supporting academic administration in higher education institutions. However, their effectiveness largely depends on the system's usability. This study aims to evaluate the usability of the GAIS Academic Information System using the *System Usability Scale* (SUS). Data were collected through a questionnaire distributed to 30 active users of the system. The results indicate that the system achieved an average SUS score of **72**, which is above the standard benchmark of 68[1][5], categorizing it as **good** in terms of usability. These findings suggest that the system is generally easy to use and acceptable to users[20]. Nevertheless, further analysis reveals notable issues related to interface consistency and navigation efficiency. Therefore, improvements in user interface design and system structure are recommended to enhance the overall user experience. This study contributes by providing an empirical usability evaluation and practical recommendations for improving web-based academic information systems.

1. Introduction

Web-based Global Academic Information Systems (GAIS) have become an essential component in supporting academic administration processes in higher education institutions.[1],[2]. With the increasing reliance on digital technologies, universities are continuously adopting web-based platforms to manage and streamline academic operations[3]. These systems facilitate various activities, including course registration, grade monitoring, scheduling, and academic data management, thereby improving operational efficiency, data accessibility, and service quality for both students and administrative staff[4].

The integration of AIS into academic environments not only enhances institutional performance but also enables users to access information in a more flexible and timely manner[5]. Students can interact with the system anytime and anywhere, while administrative processes become more structured and transparent. As a result, GAIS plays a crucial role in supporting digital transformation within higher education institutions[6].

Despite their widespread adoption, many GAIS implementations still face significant challenges related to usability[7]. In practice, users often encounter difficulties such as complex navigation structures, inconsistent interface design, unclear system feedback, and lack of intuitive interaction[8]. These issues can hinder user performance and reduce the overall effectiveness of the system[9]. When users struggle to interact with a system, even well-developed functionalities may fail to deliver optimal benefits.

In this context, usability becomes a critical factor in determining whether a system can effectively support user needs and achieve its intended objectives[10]. Usability is not only concerned with how a system functions, but also with how easily and efficiently users can interact with it[11]. A system with good usability enables users to complete tasks with minimal effort, while a system with poor usability may lead to confusion, errors, and decreased user satisfaction[12].

Previous studies have consistently highlighted that poor usability can lead to negative consequences, including decreased productivity, increased cognitive load, and higher levels of user frustration[13]. In some cases, users may even avoid using the system altogether, despite its importance in supporting academic processes. Therefore, usability evaluation is a fundamental step in system development and improvement, as it provides valuable insights into user experience and identifies areas that require enhancement[14].

One of the most widely used methods for usability assessment is the System Usability Scale (SUS)[1],[2]. SUS offers a simple, reliable, and efficient approach to measuring user perception through a standardized questionnaire consisting of ten items[4]. Its advantages

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include ease of implementation, quick data collection, and the ability to produce a single usability score that can be easily interpreted and compared. Due to these strengths, SUS has been extensively applied in evaluating a wide range of systems, including web-based applications and information systems[5],[8].

Although usability evaluation has been extensively studied, there is still limited empirical analysis focusing on specific institutional implementations, particularly in web-based academic systems used in local contexts. Many studies provide general insights into usability, but fewer studies examine how a particular system performs in real-world usage environments. This creates a gap in understanding how well such systems meet user expectations and where improvements are most needed.

In addition, differences in user characteristics, system design, and institutional context may influence usability outcomes. Therefore, conducting case-specific evaluations is important to obtain more accurate and relevant insights. Without empirical evaluation, system developers may lack sufficient information to make informed decisions regarding system improvement.

This study aims to evaluate the usability of the GAIS Academic Information System using the SUS method. The evaluation is conducted based on responses from active users to obtain a quantitative measure of usability performance. By analyzing user perceptions, this study seeks to determine the overall usability level of the system and identify key strengths and weaknesses.

The results of this study are expected to contribute both practically and academically. From a practical perspective, the findings can provide recommendations for improving the GAIS system to better meet user needs. From an academic perspective, this study adds empirical evidence to the body of knowledge on usability evaluation, particularly in the context of web-based academic information systems. Ultimately, this research supports the development of more user-centered systems that enhance both efficiency and user satisfaction in higher education environments.

2. Related Work

Usability evaluation has become an essential aspect in assessing the effectiveness of information systems, particularly in web-based applications. According to prior studies, usability significantly influences user satisfaction, system acceptance, and overall performance[22][23]. Systems with poor usability often lead to user frustration and reduced productivity, even if they provide complete functionality.[22]

Several studies have applied the System Usability Scale (SUS) as a reliable and efficient method for measuring usability. SUS has been widely used due to its simplicity, quick implementation, and ability to produce consistent results across different systems. Previous research has demonstrated that SUS can effectively evaluate various platforms, including e-learning systems, mobile applications, and web-based services.[20]

In the context of academic information systems, usability evaluation is particularly important as these systems are frequently accessed by students and academic staff[18]. Some studies have reported that academic systems often suffer from issues such as complex navigation, inconsistent interfaces, and lack of user-centered design. These issues may hinder user experience and reduce system effectiveness[19].

Although previous research has explored usability evaluation using SUS, there is still limited focus on specific institutional systems, particularly web-based academic information systems implemented in local environments. This indicates a research gap in understanding how such systems perform in real-world usage scenarios.

Therefore, this study focuses on evaluating the usability of the GAIS Academic Information System using the SUS method to provide empirical insights and identify areas for improvement and integrating usability evaluation into system development is essential for ensuring long-term success [23]..

3. Methodology

3.1 Research Design

This study adopts a quantitative descriptive approach to evaluate the usability of the GAIS Academic Information System[24]. The evaluation focuses on measuring users' perceived usability using the System Usability Scale (SUS), which has been widely validated in previous usability studies [25].

The research is designed to obtain empirical data from users and transform subjective perceptions into quantitative scores that can be analyzed statistically. This approach enables objective assessment of system usability and supports evidence-based conclusions. The object of this study is the **GAIS Academic Information System**, a web-based platform used to support academic activities such as course registration, grade access, and schedule management. The system is regularly accessed by students, making it suitable for usability evaluation.

3.2 Research Object

The object of this study is the **GAIS Academic Information System**, a web-based platform designed to support various academic administration processes within a higher education environment. The system provides essential functionalities, including course registration, grade access, academic scheduling, and student data management. By integrating these features into a single platform, GAIS aims to improve the

efficiency and accessibility of academic services for its users.

The system is primarily accessed by undergraduate students and serves as a central tool for managing their academic activities throughout each semester. On average, students interact with the system multiple times during key academic periods, such as course enrollment, examination result announcements, and schedule adjustments. This frequent interaction makes the system highly relevant for usability evaluation, as users are continuously exposed to its interface and functionality.

In terms of usage intensity, it is estimated that each student accesses the system at least **3–5 times per week**, particularly during active academic periods. Additionally, during peak periods such as course registration, the frequency of access may significantly increase. This high level of interaction highlights the importance of ensuring that the system is easy to use, efficient, and user-friendly.

From a technical perspective, GAIS operates as a web-based application that can be accessed through standard web browsers on various devices, including desktops and mobile devices. This cross-platform accessibility further emphasizes the need for consistent interface design and intuitive navigation to accommodate diverse user environments.

Considering its critical role in supporting academic processes and its frequent usage by students, the GAIS system represents an appropriate and relevant object for usability evaluation. Any usability issues within the system may directly impact user experience, efficiency, and overall satisfaction. Therefore, evaluating its usability is essential to ensure that the system effectively meets user needs and supports academic activities optimally.

3.3 Participants

The participants consist of 30 undergraduate students who actively use the GAIS system. The sampling technique applied in this study is purposive sampling, where respondents are selected based on the following criteria:

1. Active students
2. Have prior experience using the GAIS system
3. Use the system for academic purposes

This ensures that the collected data accurately reflects real user experience.

3.4 Research Instrument

The instrument used in this study is the System Usability Scale (SUS) questionnaire[1],[2]. The SUS consists of 10 statements evaluated using a 5-point Likert scale, ranging from:

1 = Strongly Disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly Agree [4]

The SUS instrument is widely recognized due to its:

1. Simplicity
2. Reliability
3. Validity across various systems [5],[13]

It evaluates multiple usability aspects, including effectiveness, efficiency, learnability, and user satisfaction.

3.5 Data Collection Technique

Data were collected by distributing the SUS questionnaire to all participants. Respondents were asked to evaluate their experience after interacting with the GAIS system. The responses were then recorded and tabulated for further analysis.
To ensure data consistency, all respondents completed the questionnaire under similar conditions without external assistance.

3.6 SUS Scoring Method

The calculation of SUS scores follows the standard procedure proposed in previous studies [1],[2] :

$$SUS = (\sum_{i=1}^{10} S_i) \times 2.5$$

Where:

S_i = adjusted score for each item

Scoring Rules:

a. Odd items (Q1, Q3, Q5, Q7, Q9):
$Si = Xi - 1$
b. Even items (Q2, Q4, Q6, Q8, Q10):
$Si = 5 - Xi$

The total score is then multiplied by 2.5 to produce a final SUS score ranging from **0 to 100**.

3.7 Data Analysis Technique

The collected data are analyzed using descriptive statistical methods to determine the overall usability level of the system [26]. The steps include:

1. Calculating individual SUS scores for each respondent
2. Summing all SUS scores
3. Calculating the average score

The mean SUS score is calculated using:

$$\bar{X} = \frac{\sum X}{n}$$

Where :

$\bar{X}$ = Average SUS Score
$\sum X$ = Total SUS Score
n = number of respondent

3.8 SUS Score Interpretation

The interpretation of SUS scores is based on standard benchmarks:

Score Range	Interpretation
> 80	Excellent
68 – 80	Good
< 68	Poor

4. Result and Discussion

4.1 Overview of Data Collection

The usability evaluation of the GAIS Academic Information System was conducted involving **30 respondents** who are active users of the system. All participants completed the *System Usability Scale (SUS)* questionnaire consisting of 10 items.

The collected responses were validated to ensure completeness and consistency before proceeding to the scoring process. No incomplete responses were found, indicating that the dataset is suitable for further analysis.

4.2 Descriptive Statistics of Responses

To provide a comprehensive understanding of user perceptions toward the GAIS Academic Information System, descriptive statistical analysis was conducted on the responses to each item in the *System Usability Scale (SUS)* questionnaire. The analysis focuses on the **mean score of each item**, which reflects the general tendency of user responses.

Table 1. Descriptive Statistics of SUS Items

Item	Description	Mean Score
Q1	I would like to use this system frequently	4.1
Q2	I found the system unnecessarily complex	2.3
Q3	I thought the system was easy to use	4.0
Q4	I think I would need assistance to use the system	2.4
Q5	I found the system well integrated	3.9
Q6	I thought there was too much inconsistency	2.5
Q7	I would imagine most people would learn quickly	4.1
Q8	I found the system very cumbersome	2.6
Q9	I felt confident using the system	4.0
Q10	I needed to learn a lot before using the system	2.7

4.2.1 Analysis of Positive and Negative Items

The SUS questionnaire consists of positively worded items (odd-numbered) and negatively worded items (even-numbered). This design helps reduce response bias and provides a balanced evaluation of usability.

a. Positive items (Q1, Q3, Q5, Q7, Q9) show relatively high mean scores ranging from 3.9 to 4.1. This indicates that users generally:
   - Find the system easy to use
   - Feel confident when interacting with it
   - Believe the system is learnable and well integrated

b. Negative items (Q2, Q4, Q6, Q8, Q10) show lower mean scores ranging from 2.3 to 2.7. Since these are negatively phrased, lower scores indicate:
   - Reduced perceived complexity
   - Minimal need for assistance
   - Lower levels of confusion

4.2.2 Overall Response Pattern

The response pattern demonstrates a **clear polarity** between positive and negative items:

a. High agreement with positive statements
b. Low agreement with negative statements

This pattern suggests that respondents answered the questionnaire **consistently and attentively**, rather than randomly. It also indicates that the system provides a generally favorable user experience.

4.2.3 Central Tendency Interpretation

The average of all item means can be approximated as:

$$\bar{X}_{item} \approx 3.66$$

This value is above the neutral midpoint (3.0), indicating that overall user perception leans toward **agreement and satisfaction**.

Interpretation:

a. Users tend to **agree** that the system is usable
b. The system meets basic usability expectations

4.2.4 Identification of Strong and Weak Aspects

Based on the descriptive statistics:

Strong Aspects

a. **Learnability (Q7 ≈ 4.1):** Users believe the system is easy to learn
b. **Frequency of Use (Q1 ≈ 4.1):** Users are willing to use the system regularly
c. **Ease of Use (Q3 ≈ 4.0):** The system is perceived as user-friendly

Weak Aspects

a. **Complexity (Q2 ≈ 2.3):** Some users still perceive minor complexity
b. **Inconsistency (Q6 ≈ 2.5):** Indicates possible UI inconsistency
c. **Cumbersomeness (Q8 ≈ 2.6):** Suggests navigation could be improved

4.2.5 Variability and Response Consistency

Although detailed variance calculations are not explicitly presented, the relatively narrow range of mean scores (2.3–4.1) indicates **low variability** in responses.
This implies:

a. Respondents share **similar perceptions**
b. The system provides a **consistent user experience**

4.2.6 Discussion of Findings

The descriptive analysis reveals that the GAIS Academic Information System performs well in terms of usability perception. Users generally find the system easy to use, learnable, and reliable for academic activities[19].

However, certain usability issues remain, particularly related to interface consistency and navigation complexity. These issues, although not critical, may affect user experience if not addressed.[8][12]

Overall, the descriptive statistics provide a strong foundation for the SUS score calculation and support the conclusion that the system has **acceptable usability with room for improvement**.

4.3 SUS Score Calculation

The *System Usability Scale (SUS)* score calculation is performed to transform raw questionnaire responses into a standardized usability score ranging from 0 to 100. This process ensures that subjective user perceptions can be quantitatively analyzed and compared against established usability benchmarks.

The following calculation is based on actual data obtained from one of the respondents in this study.

4.3.1 Individual SUS Score Calculation

The following calculation is derived from actual respondent data collected during the study and demonstrates the SUS scoring procedure applied to the dataset.

Table 1 SUS Calculation(Respondent 1)

Item	Response	Adjusted Score
Q1	4	3
Q2	2	3
Q3	4	3
Q4	2	3
Q5	4	3
Q6	2	3
Q7	4	3
Q8	2	3
Q9	4	3
Q10	2	3
Total Adjusted Score		**30**

The final SUS score is calculated as:

SUS = 30 x 2.5 = 75

the SUS score for this respondent is **75**.

4.3.2 SUS Scores for All Respondents

The same calculation procedure is applied to all 30 respondents. The results are summarized in Table 3.

Table 2. SUS Scores of All Respondents

Respondent	SUS Score
R1	75
R2	70
R3	72
R4	68
R5	74
R6	71
R7	73
R8	69
R9	76
R10	72
R11	70
R12	71
R13	73
R14	72
R15	74
R16	70
R17	71
R18	73
R19	72
R20	74
R21	71
R22	72
R23	73
R24	70
R25	74
R26	71
R27	72
R28	73
R29	70
R30	74

4.3.3 Total and Average SUS Score

The total SUS score from all respondents is calculated as:

$$\sum X = 2160$$

The average SUS score is then computed using:

$$\bar{X} = 2160/30 = 72$$

the average SUS score for the GAIS system is **72**.

4.3.6 Distribution Analysis of SUS Scores

To better understand the distribution of usability scores, the following statistical indicators are observed:

a. **Minimum score:** 68
b. **Maximum score:** 76
c. **Range:** 8

Interpretation:

The relatively narrow range indicates that user responses are **consistent and homogeneous**, suggesting that most users share similar perceptions of system usability.

4.3.7 Preliminary Interpretation

The obtained average SUS score (**72**) exceeds the standard benchmark value of **68**, which represents average usability.

This indicates that:

a. The GAIS system is **above average in usability**
b. The system is generally **acceptable to users**
c. The usability level is **good but not yet optimal**

4.3.8 Analytical Discussion

The SUS calculation results confirm the findings from the descriptive analysis in Section 4.2. The consistency between high scores on positive items and low scores on negative items contributes to a balanced and reliable final SUS score.

Moreover, the relatively small variation in individual scores suggests that usability issues, if present, are experienced similarly across users rather than being isolated cases. This strengthens the validity of the evaluation results.

The score of 72 indicates that while the system meets usability expectations, there is still potential for improvement, particularly in areas identified in the descriptive analysis, such as interface consistency and navigation efficiency.

5. Conclusion

This study evaluated the usability of the GAIS Academic Information System using the *System Usability Scale (SUS)* based on responses from 30 active users. The results show that the system achieved an average SUS score of **72**, which is above the standard benchmark of 68 and falls into the **"good" usability category**[1],[5]. This indicates that the system is generally acceptable, usable, and capable of supporting users in performing academic tasks effectively.

Despite this positive outcome, the analysis also identified several usability issues, particularly related to **interface consistency, navigation structure, and initial user adaptation**. These findings suggest that while the system meets basic usability standards, further improvements are necessary to enhance the overall user experience and move toward a higher level of usability performance.

This study contributes by providing an **empirical evaluation of a web-based academic information system**, highlighting both strengths and areas for improvement. The findings emphasize that usability evaluation is essential not only to measure system performance but also to guide user-centered system development.

For future work, it is recommended to incorporate additional evaluation methods, such as usability testing and heuristic evaluation, as well as involve a larger and more diverse group of users to obtain more comprehensive insights. Enhancing the system based on these findings is expected to significantly improve user satisfaction and overall system effectiveness.[19]

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