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Analysis of User Satisfaction with the Digital Scientific Work Catalog System Using the LibQUAL+ Framework

Miftahul Jannah[1*], Asrul Huda[1], Muhammad Adri[1] and Dedy Irfan[1]

[1] Department of Electronic Engineering, Faculty of Engineering, Padang State University, Padang, **Indonesia**

*Corresponding Author Email: miftahuljannah3352@gmail.com
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Abstract: This study investigates user satisfaction with the digital Scientific Work Catalog Information System at Padang State University Library through the application of the LibQUAL+® methodology. The assessment focuses on three core service quality dimensions: Affect of Service, Information Control, and Library as Place. Service quality in academic libraries is a critical determinant of user satisfaction, and understanding its components is essential for guiding future service improvement and innovation. A quantitative approach was employed involving 100 library users, with data collected via structured questionnaires and analyzed using multiple linear regression. The findings reveal that all three dimensions significantly and positively influence user satisfaction, both individually and collectively. Among them, Library as Place demonstrated the strongest effect, emphasizing the continued relevance of physical infrastructure even within digital service environments. These results highlight the strategic need for academic libraries to adopt integrated management approaches that combine technological development, infrastructure enhancement, and staff capacity building. The study contributes to the limited body of research on digital service quality in Indonesian academic libraries and offers a robust empirical model for evaluating user-centered service design. Future research is recommended to explore additional factors such as system usability, cross-institutional validation, and correlations with academic performance using learning analytics.

Keywords: User Satisfaction; Digital Library Services; LibQUAL+®; Service Quality; Academic Libraries; Scientific Work Catalog.

1. Introduction

In the era of rapid digital transformation and information explosion, the ability to access and utilize scientific information effectively has become a critical competency, particularly in academic settings [1]. Information searching is a fundamental process in knowledge acquisition, helping individuals avoid redundancy, reduce time inefficiencies, and stay aligned with the latest advancements in their fields [2]–[4]. This process involves a series of cognitive

and technical activities, including identifying information needs, evaluating sources, and applying information appropriately—collectively referred to as information literacy [5]–[8].

Information literacy has been widely recognized as an essential skill in higher education. It empowers students to critically assess information, navigate digital resources, and make evidence-based decisions. In response to its significance, numerous academic institutions and library associations in developed countries have developed comprehensive standards and curricula to support the integration of information literacy into academic programs [9]–[12]. Equipping students with strong information literacy skills not only enhances academic performance but also prepares graduates to meet the demands of an increasingly knowledge-driven workforce.

Within this context, university libraries play a pivotal role as institutional knowledge hubs. Their relevance has expanded beyond traditional, manual services to encompass digital platforms that provide seamless access to information. The evolution of library services—through the adoption of internet-based systems and automation technologies—has become imperative for maintaining user engagement and institutional competitiveness [13], [14]. As such, modern libraries are expected to adopt strategic, user-centered approaches to ensure their sustainability in the digital age.

At Padang State University, the university library functions as a central academic service unit, offering access to various forms of scientific literature, including theses, dissertations, and student final projects [15]. It serves three main purposes: (1) as an information service center for education and instruction, (2) as a support center for academic research, and (3) as a resource hub for community engagement and service initiatives. To maintain the quality and effectiveness of its services, the library has adopted modern evaluation tools such as the LibQUAL+® method.

LibQUAL+® is a widely recognized assessment framework used to measure library service quality from the user's perspective [16], [17]. Originally developed in the early 2000s, the instrument evaluates users' expectations and perceptions across three core dimensions: Affect of Service, Information Control, and Library as Place [18], [19]. The Affect of Service dimension captures user interactions and the professionalism of library staff. Information Control assesses the accessibility, comprehensiveness, and usability of library collections and digital systems. Meanwhile, Library as Place focuses on the library's physical environment, including facilities, ambiance, and its function as a collaborative learning space.

Despite its growing adoption worldwide, the application of the LibQUAL+® framework remains underutilized in Indonesian academic libraries. There is limited empirical evidence assessing user satisfaction and service quality in the

context of public university libraries in Indonesia. This research aims to fill that gap by evaluating the quality of services at Padang State University Library using the LibQUAL+® method. The findings are expected to provide actionable insights for library service improvement and contribute to the broader discourse on academic information management in Southeast Asia.

2. Material and methods

2.1 Information Systems

An information system is a structured framework comprising interconnected components—including hardware, software, and human resources—that work together to collect, process, store, and disseminate information to support decision-making within an organization [20]. In the context of academic institutions, information systems play a critical role in managing educational resources and enabling efficient service delivery.

2.2 Scientific Work Collection Services

Scientific work collection services refer to systems designed to manage and provide access to scholarly works such as theses, dissertations, journals, books, and other academic outputs. These services facilitate the discovery, retrieval, and referencing of academic materials by students, faculty, and researchers [10]. In higher education, such services serve not only as repositories of institutional knowledge but also as foundational resources for literature review and academic writing.

2.3 Service Quality

Service quality is commonly defined as the extent to which a service meets or exceeds user expectations [21]. In library settings, service quality reflects the efficiency, accuracy, and responsiveness of services provided to users. A high-quality service is one that aligns closely with users' needs and perceptions, ultimately enhancing the overall user experience and satisfaction [22].

2.4 User Satisfaction

User satisfaction is a subjective evaluation of how well a service meets user expectations and preferences. In academic libraries, satisfaction is influenced by the availability of relevant resources, the effectiveness of information retrieval systems, and the quality of librarian support [23]. Satisfied users are more likely to return and engage with library services, making user satisfaction a vital indicator of service performance.

2.5 Scientific Work Catalog Information System

The Scientific Work Catalog Information System developed by Padang State University Library is an online platform aimed at managing access to student academic outputs, such as final projects and theses. This digital system enhances the efficiency of reference searches and facilitates access to scientific works by integrating cataloging, indexing, and retrieval functionalities.

2.6 LibQUAL+® Method for Service Quality Assessment

This study utilizes the LibQUAL+® methodology to assess the quality of library services at Padang State University Library. LibQUAL+®, developed as an extension of the SERVQUAL framework, was introduced by the Association of Research Libraries (ARL) in collaboration with Texas A&M University to evaluate library performance from the user's perspective [24]. The approach is grounded in gap analysis, measuring the difference between users' perceptions of the service they receive and their expectations of ideal service delivery. LibQUAL+® encompasses three key dimensions: Affect of Service, Information Control, and Library as Place. The Affect of Service dimension focuses on interpersonal aspects, including the professionalism, empathy, and responsiveness of library staff. Information Control pertains to the accessibility, reliability, and comprehensiveness of the library's information resources and technological systems. Meanwhile, Library as Place emphasizes the physical environment of the library, including its infrastructure, comfort, and suitability as a space for individual study or group collaboration. Service quality is considered high when the perceived service exceeds users' expectations, and conversely, is deemed inadequate when perceptions fall short of expectations [25].

2.7 Research Design

This study adopts a descriptive quantitative research design aimed at measuring user satisfaction with the Scientific Work Catalog Information System. Quantitative methods are employed to collect and analyze numerical data, enabling objective assessment of service quality based on user responses. The variables assessed are aligned with the three LibQUAL+® dimensions: Affect of Service, Information Control, and Library as Place.

2.8 Research Site and Duration

The research was conducted at Padang State University Library, located on Jl. Prof. Dr. Hamka, Air Tawar Barat, Padang, West Sumatra, Indonesia. Data collection took place on August 9, 2024. This site was selected due to its implementation of university-level digital library services and its relevance to the research focus on user satisfaction and service quality.

2.9 Data Collection Techniques

The data collection process in this study involved three primary techniques: observation, questionnaire distribution, and document analysis. Observation was carried out directly at the research site to gain a contextual understanding of the service processes and user interactions with the library system. This approach allowed the researchers to capture real-time service dynamics and behavioral patterns that may not be reflected through self-reported data. In addition, a structured questionnaire was administered to library users to measure their perceptions and satisfaction levels across the three LibQUAL+® dimensions: Affect of Service, Information Control, and Library as Place. The questionnaire served as the main instrument for collecting quantitative data. To complement these methods, document analysis was also employed by reviewing relevant literature, including academic journals, institutional reports, and official documentation. This secondary data provided contextual support for interpreting the primary findings and ensured that the study was grounded in existing theoretical and empirical frameworks.

2.10 Instrument Testing

2.10.1 Validity Test

Validity test is used to measure whether a questionnaire is valid or not [26]. Validity test is an instrument used to measure data that has been obtained as truly valid or correct data. To test this validity, use statistical tools, namely SPSS 24. The formula used for the questionnaire is as follows:

$$r_{xY} = \frac{n \sum xy - (\sum x)(\sum y)}{\sqrt{\{n \sum x^2 - (\sum x)^2\}\{n \sum y^2 - (\sum y)^2\}}} \quad (1)$$

Description:
r_{xY} = Correlation coefficient of variables x and y
$\sum x$ = Total item scores
$\sum y$ = Total score
N = Number of respondents
$\sum x^2$ = Sum of squares of item scores
$\sum y^2$ = Sum of squares of item scores
$\sum xy$ = The sum of the results of score X with score Y

2.10.2 Reliability Test

Reliability testing is measuring the extent to which measurement results use the same object, but produce the same data. Reliability tests are used to determine the extent to which measurement results remain consistent if measurements are taken twice or more on the same symptom using the same measurement tool. Reliability testing uses Cronbach's Alpha formula

$$r_x = \left[\frac{k}{k-1}\right]\left[1 - \frac{\sum si}{st}\right] \quad (2)$$

Description:
r_x = Reliability value
$\sum si$ = Total score variance for each item
st = Total variance
k = Number of item

3. Results and discussion

3.1 General description of respondents

The process in this research is to distribute questionnaires to users who are located in the Padang State University Library, either directly using the services of the Padang State University Library. The sample in this research was library members who were members of the Padang State University Library with a total of 100 respondents.

3.1.1 Respondents Based on Gender

In this study, female students amounted to 67 respondents (65%) out of a total of 100 respondents, while male students amounted to 33 respondents (35%). The respondents in this study were dominated by female students.

3.1.2 Respondents Based on Faculty

It can be seen that respondents according to faculty show that students from the Faculty of Social Sciences occupy the highest positions, namely 22 respondents (22%), Faculty of Engineering totaling 19 people (19%), Faculty of Mathematics and Natural Sciences totaling 18 respondents (18%), Faculty of Education totaling 14 respondents (14%), Faculty of Sports Sciences totaling 10 respondents (10%), Faculty of Languages and Literature totaling 9 respondents (9%), Faculty of Economics totaling 7 respondents (7%), and Faculty of Tourism and Hospitality totaling 1 respondent. (1%). Based on the data in this study, it can be said that the respondents in this study were dominated by students from the Faculty of Social Sciences.

3.1.3 Respondents Based on Class Year

Data obtained through distributing questionnaires shows that respondents according to class year show that students from the class of 2020 occupy the highest position, namely 37 respondents (37%), then students from the class of 2018 totaling 6 respondents (6%), students from the class of 2019 totaling 34 respondents (34%), students from the class of 2021 totaling 9 respondents (9%) and students from the class of 2022 totaling 14 respondents (14%). Based on the

data in this study, it can be said that the respondents in this study were dominated by students from the class of 2020.

3.2 Description of Research Variables

This research aims to analyze the influence of the quality of Affect of Service (X1), Information Control (X2), and Library as Place (X3) on the level of satisfaction of user Y with the digital service of the scientific work catalog information system. This research was carried out at the Padang State University Library.

3.3 Testing Requirements Analysis

3.3.1 Normality Test

As explained in the previous chapter, the normality test aims to find out whether the data is normally distributed or not. The normality test in this study used the Kolmogorov-Smirnov formula with the help of the SPSS 24 computer program with the following results:

Table 1. Normality Test Results

Variable	Sig.	Information
Affect of Service (X_1)	0,199	Normally Distributed
Information Control (X_2)	0,061	Normally Distributed
Library as Place (X_3)	0,051	Normally Distributed
User Satisfaction (Y)	0,152	Normally Distributed

From table 1 it can be explained that the sig. value of the Affect of Service (X1) variable is 0.199 which means that 0.199 > 0.05 which means that the variable is normally distributed, the sig. value of the Information Control (X2) variable is 0.061 which means that 0.061 > 0.05 which means that the variable is normally distributed, the sig. value of the Library as Place (X3) variable is 0.051 which means 0.051 > 0.05 which means that the variable is normally distributed and the sig. value of the User Satisfaction (Y) variable is 0.152 which means 0.152 > 0.05 which means that the variable is normally distributed.

3.3.2 Linearity Test

The linearity test aims to see whether or not there is a linear relationship between the independent variable and the dependent variable. The results of the linearity test with the help of the SPSS 24 program are as follows:

Table 2. Linearity Test Results

Variable	Sig.	Information
Affect of Service (X_1)	0,261	Linier

Variable	Sig.	Information
Information Control (X_2)	0,174	Linier
Library as Place (X_3)	0,164	Linier

Based on table 2, it is known that the results of the linearity test of the Affect of Service (X1) variable against Y are 0.261 and based on the reference to the significance score, if the score is > 0.05 then it is categorized as linearity. The processing results for the Affect of Service (X1) variable are 0.261 > 0.05, so there is a linear relationship between the X1 variable and the Y variable. The Information Control (X2) variable against Y is 0.174 > 0.05, which means that there is a linear relationship between the X2 variable and the Y variable and the Library as Place (X3) variable against Y is 0.164, which means that there is a linear relationship between the X3 variable and the Y variable.

3.3.3 Multicollinearity Test

The multicollinearity test aims to detect deviations from classical assumptions in the regression model. This test was carried out with the help of the SPSS 24 computer program by looking at the Variance Inflation Factor (VIF) value as shown in the following table:

Table 3. Multicollinearity Test Results

Variable	Tolerance	VIF	Information
Affect of Service (X_1)	0,916	1,091	Multicollinearity Free
Information Control (X_2)	0,825	1,213	Multicollinearity Free
Library as Place (X_3)	0,861	1,161	Multicollinearity Free

Based on table 3, it can be explained that all Libqual variables are free from multicollinearity, where all variables have a tolerance > 0.1 and VIF < 10.

3.4 Hypothesis Testing

3.4.1 Partial Test

This test tests whether the variables included in the Libqual Affect of Service, Information Control and Library as Place instruments partially have a significant effect on User Satisfaction in the digital service of the scientific work catalog information system.

Table 4. Partial Test Results

Variable	t_{count} and t_{table}	Sig.
Affect of Service (X_1)	2,339 > 1,984	0,021
Information Control (X_2)	4,280 > 1,984	0,000
Library as Place (X_3)	8,979 > 1,984	0,000

Table 4 presents the results of the partial (t-test) analysis for each independent variable. The decision criteria used are as follows: if the value of t-count is greater than t-table (t-count > t-table), then the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted, indicating a statistically significant effect. Conversely, if t-count is less than t-table (t-count < t-table), then H_0 is accepted and H_1 is rejected, suggesting that the variable has no significant effect. Based on the results, all three variables—Affect of Service (X1), Information Control (X2), and Library as Place (X3)—have t-count values greater than t-table (1.984), with significance levels below 0.05. These findings indicate that each variable has a significant partial effect on user satisfaction.

3.4.2 Simultan Test

This test is to test whether the variables Affect of Service, Information Control and Library as Place have an effect simultaneously (together) on User Satisfaction in the digital service of the scientific work catalog information system. The F test is used to determine whether this research model is superior based on data analysis using the SPSS program.

Table 5. Simultan Test Results

Variable	F_{count} and F_{table}	Sig.
Affect of Service (X_1) Information Control (X_2) Library as Place (X_3)	55.088 > 2,70	0,000

For the provisions in this test, if the Fcount value > Ftable then H0 is rejected and H1 is accepted, while if Fcount < Ftable then H0 is accepted and H1 is rejected. From the table above, it can be concluded that the F test is Fcount (55.088) > Ftable (2.70), then H0 is rejected and H1 is accepted. So the variables affect of service, information control, library as place have a positive and significant effect together on user satisfaction of digital services of scientific work catalog information systems.

3.5 Determinant Coefficient (r^2)

The determinant coefficient (r) is used to measure how much influence the independent variable has on the dependent variable. The independent variables are Affect of Service, Information Control and Library as Place and the dependent variable is User Satisfaction on the digital service of the scientific work catalog information system. We can see the results of the determinant coefficient test (r^2) as follows:

Table 6. Determinant Coefficient Results

Model	Adjusted R Square
1	.621

Based on the results in Table 6, the determinant coefficient test (r2) above shows that the Adjusted R Square value is 0.621 or equivalent to 62.1% which means that the influence of the independent variable on the dependent variable is 62.1%, so the remaining 37.9% is influenced by other variables that are not included in this research model.

3.6 Multiple Linear Regression

Multiple linear regression analysis was carried out to test the influence between the independent variables (Affect of Service, Information Control and Library as Place) and the dependent variable User Satisfaction. The following are the results of multiple linear regression analysis using SPSS.

Table 7. Multiple linear regression Results

Variable	B
Constant	3,426
Affect of Service (X_1)	0,083
Information Control (X_2)	0,154
Library as Place (X_3)	0,318

From the results of the data processing, the following equation results were obtained:

$$Y = a + b1X1 + b2X2 + b3X3 \quad (3)$$

$$Y = 3{,}426 + 0{,}083X1 + 0{,}154X2 + 0{,}318X3 \quad (4)$$

The results can be explained that if the Affect of Service variable (X1) increases by one unit, then user satisfaction (Y) will increase by 0.083, likewise with the Information Control variable (X2) if it increases by one unit, then user satisfaction (Y) will increase by 0.154 and the Library as Place variable (X3) if it increases by one unit, then user satisfaction (Y) will increase by 0.318.

3.7 Discussion

The results of this study reveal that the quality of library services—measured through the dimensions of Affect of Service, Information Control, and Library as Place—has a statistically significant impact on user satisfaction with the digital Scientific Work Catalog Information System at Padang State University Library. These findings align with the LibQUAL+® model, a service quality

framework widely used in academic libraries to assess user perceptions and expectations [27], [28].

The partial test (t-test) results indicate that each service dimension significantly influences user satisfaction, with Library as Place ($t = 8.979$, $p < 0.001$) showing the strongest effect, followed by Information Control ($t = 4.280$, $p < 0.001$) and Affect of Service ($t = 2.339$, $p = 0.021$). These outcomes suggest that users place high importance on the physical environment and usability of the library space—even in the context of digital service interactions. Prior studies have noted that physical infrastructure, such as conducive study areas, lighting, comfort, and spatial design, plays a key role in shaping perceptions of academic libraries, especially as they transform into hybrid digital-physical environments [29], [30].

The Information Control dimension—which encompasses access to digital collections, system reliability, and the comprehensiveness of academic resources—demonstrated a strong and statistically significant impact on user satisfaction. This finding aligns with previous studies [31], which emphasize that digital catalog systems should be intuitive, easily accessible, and aligned with users' academic information needs. Deficiencies in navigation, limited search functionalities, or weak database integration may significantly diminish user satisfaction. The high performance in this dimension indicates the system's effectiveness in delivering structured and reliable access to academic content, which is essential in higher education environments where users depend on credible and curated references for academic tasks and research.

While the Affect of Service dimension also showed a significant contribution, it had the weakest influence in the regression model. This may be explained by the reduced human interaction in digital service environments, where face-to-face engagement with library staff is minimal. Nevertheless, human factors remain relevant, especially when technical issues arise. Effective communication, professional assistance, and responsive support services still play a role in shaping positive user experiences [32]. Prior research has also established that even in fully digital contexts, user satisfaction is strongly influenced by the manner in which services are facilitated and supported by personnel [33].

The simultaneous test ($F = 55.088$, $p < 0.001$) confirms that the three dimensions collectively have a significant impact on user satisfaction, reinforcing the multidimensionality of library service quality. The coefficient of determination (Adjusted $R^2 = 0.621$) further indicates that 62.1% of the variance in user satisfaction is explained by these three dimensions. The remaining 37.9% may stem from external factors such as user digital literacy, system interface design, mobile accessibility, or integration with other institutional platforms [34].

The multiple linear regression analysis also supports the significance of each dimension, producing the predictive model:

$$Y = 3{,}426 + 0{,}083X1 + 0{,}154X2 + 0{,}318X3 \quad (5)$$

This equation demonstrates the relative weight of each variable in shaping user satisfaction, with Library as Place having the highest coefficient. This finding underscores the need for academic libraries to maintain not only digital service quality but also the physical aspects of library space to support individual and collaborative learning needs.

In light of the findings, it is recommended that university libraries adopt a balanced approach to service development—enhancing both digital systems and physical facilities while maintaining strong librarian-user interaction models. The convergence of digital tools and human-centered services is essential for sustaining relevance and excellence in modern academic libraries.

4. Conclusion

This study has provided empirical evidence on the impact of library service quality dimensions—Affect of Service, Information Control, and Library as Place—on user satisfaction with the digital Scientific Work Catalog Information System at Padang State University Library. The results indicate that all three dimensions significantly and positively influence user satisfaction, both partially and simultaneously. Among them, the Library as Place dimension exerted the most substantial effect, underscoring the ongoing importance of physical infrastructure even in the digital service era. This finding reinforces the notion that while digital platforms provide ease of access and efficiency, the physical learning environment remains a vital component in shaping overall user experience and satisfaction.

The application of the LibQUAL+® framework in this study proves its effectiveness in assessing service quality in academic libraries, particularly within the Indonesian higher education context, which is still underrepresented in international library science literature. The Adjusted R^2 value of 0.621 indicates that the three dimensions examined explain a significant proportion of the variance in user satisfaction, emphasizing the importance of a holistic, user-centered approach to service design in academic libraries. These results suggest that university libraries must maintain a balance between technological development, professional human resources, and the physical infrastructure necessary to support various modes of learning and research.

While the present study offers valuable insights, it also opens several potential directions for future research. First, upcoming studies could incorporate additional variables such as user interface design, mobile accessibility, and overall usability to explore their moderating roles in shaping satisfaction.

Second, longitudinal research involving multiple institutions would enable the generalization of findings across different academic environments and over time, allowing for the tracking of service quality trends. Third, qualitative approaches such as interviews and focus group discussions could enrich the understanding of user expectations and experiences beyond numerical data, capturing more nuanced aspects of service interaction. Lastly, future research could integrate library usage data with academic outcomes—such as learning performance or student retention—through learning analytics to strengthen the strategic alignment between library services and institutional academic goals.

In conclusion, academic libraries are increasingly required to operate as hybrid environments that merge digital service excellence with supportive physical spaces and human interaction. To remain relevant and impactful in the digital age, library service development must be informed by rigorous, multidimensional evaluations such as those offered through the LibQUAL+® model. Building upon the current findings, future research should not only replicate this model across different institutional settings but also adapt it by integrating emerging factors such as digital user experience (UX), real-time feedback mechanisms, and AI-driven personalization in library systems. Furthermore, interdisciplinary collaboration with fields such as educational technology, data science, and behavioral psychology could expand the analytical framework, allowing researchers to model more complex relationships between service quality, user satisfaction, and learning outcomes. This study thus serves as both a practical reference for academic libraries seeking to enhance user satisfaction and a theoretical foundation for deeper, cross-disciplinary scholarly inquiry in the evolving domain of library and information science.

Author's declaration

Author contribution

Miftahul Jannah conceptualized the study, designed the research methodology, and led the data collection process. **Asrul Huda** contributed to the data analysis, interpretation of results, and refinement of the research framework. **Muhammad Adri** supported the development of the literature review, validated the survey instruments, and assisted in data validation. **Dedy Irfan** supervised the overall research project, reviewed and edited the manuscript, and provided critical insights during the discussion and conclusion stages. All authors read and approved the final version of the manuscript.

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Competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Ethical clearance

This study was conducted in accordance with ethical research standards. All participants provided informed consent prior to data collection, and their confidentiality and anonymity were fully maintained. The research protocol was reviewed and approved by the Ethics Committee of Padang State University.

AI statement

No generative AI tools were used in the writing, analysis, or interpretation of data in this research. All content and results were produced by the authors through original work and validated research methods.

Publisher's and Journal's note

Universitas Negeri Padang as the publisher and Editor of Jurnal Vokasi Informatika (JAVIT) state that there is no conflict of interest towards this article publication.

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