emerald PUBLISHING

Performance Measurement and M

Role of information literacy for the user satisfaction of a University Library

Journal:	*Performance Measurement and Metrics*
Manuscript ID	PMM-04-2025-0021.R2
Manuscript Type:	Research Paper
Keywords:	Information Literacy, User Satisfaction, PLS-SEM, Digital Literacy, Library Instruction, Library Services

Role of information literacy for the user satisfaction of a University Library

Abstract

Purpose: This study investigates the mediating role of Information Literacy (IL) in the relationship between key library service components: Access to Information Resources, Digital Literacy Skills, Information Searching Behavior, Awareness of Library Services, Library Instruction Programs, Staff Support and Guidance, and Technological Infrastructure and User Satisfaction in a university library context. Grounded in the Information Systems (IS) Success Model, the study aims to provide a theoretically coherent and empirically validated framework for understanding user satisfaction in academic libraries.

Design/Methodology/Approach: The study adopts a quantitative research design and collects data from 380 users of a university library in Bangladesh. Partial Least Squares Structural Equation Modeling (PLS-SEM) was conducted using SmartPLS software to examine both the direct and indirect effects of the independent variables on user satisfaction through information literacy (IL).

Findings: Results indicate that IL significantly mediates the effects of most library service components on user satisfaction. While Digital Literacy and Instruction Programs showed weaker direct effects, variables such as Staff Support, Technological Infrastructure, and Access to Resources demonstrated strong predictive relationships. The findings underscore IL as a pivotal construct in enhancing the effectiveness of academic library services.

Theoretical Implications: By embedding IL as a central mediator within the IS Success Model, the study extends theoretical understanding of how user-centered constructs interplay to influence satisfaction. It advances academic discourse by integrating service quality, system quality, and information quality dimensions into a unified model specific to the library sciences domain.

Practical Implications: The findings offer actionable insights for library administrators aiming to boost user satisfaction. Strategic investment in IL programs, staff development, and technology infrastructure is essential for cultivating a responsive and efficient academic library environment.

Originality/Value: This research uniquely positions IL as a transformative mediator within a validated theoretical framework, offering both conceptual clarity and practical guidance. It fills

a significant research gap by empirically testing a comprehensive model tailored to academic libraries in developing country contexts like Bangladesh.

Keywords: Information Literacy, User Satisfaction, University Library, Library Services, PLS-SEM, Digital Literacy, Library Instruction

Introduction

Higher education institutions play a critical role in supporting the knowledge-based economy and addressing global social challenges (Wirba, 2021). The rapid expansion of higher education in Bangladesh is reflective of the country's commitment to developing human capital and advancing sustainable development. University libraries have evolved from basic book repositories to dynamic environments that combine digital and physical resources, support learning activities, and enable innovative studies (Saharkhiz et al., 2017). Academic libraries around the world are using blended approaches more frequently to meet the difficulties presented by the digital revolution (Ocholla & Ocholla, 2020). Research indicates how these models facilitate the use of technology in learning and instruction, increase resource accessibility, and accelerate methods of research (Qazi et al., 2024; Hamad et al., 2023). In developing countries like Bangladesh, university libraries must simultaneously sustain traditional services while embracing digital advances in areas where technological infrastructure shortages continue to remain (Sonia et al., 2023). To overcome challenges, libraries must align their strategic objectives with the broader goals of their institutions, ensuring their relevance and impact in the evolving academic landscape (Moonasar, 2024).

Cox (2021) stated that university libraries serve as a crucial resource for meeting the academic and research requirements of staff, instructors, and students. As the key hub for knowledge dissemination, the effectiveness largely depends on user satisfaction with the resources and services offered. The ability to efficiently obtain, assess, and use information skills commonly referred to as information literacy (IL) is closely related to user satisfaction (Amarasekara & Marasinghe, 2020). Information literacy is the capacity to identify when information is required and to find, assess, and apply that information properly (Sommer et al., 2021). Studies have shown that information-literate users are more adept at navigating digital and physical resources, leading to higher levels of library utilization and satisfaction (Oseghale, 2023; Caffrey et al., 2023). Information literacy has a variety of roles in promoting consumer satisfaction. Users can make accurate choices regarding the reliability and applicability of resources through it. Deja et al. (2021) posited that it gives users the ability to explore library

materials on their own, minimizing the time for regular searching and improving their experience in general.

Institutions differ in how information literacy training is included in library services, despite its well-recognized significance. User satisfaction may suffer when structured information literacy programs are not implemented properly due to a lack of resources or expertise. In the context of university libraries in Bangladesh, there is a growing need to explore how information literacy initiatives impact user satisfaction. This study aims to investigate the role of information literacy in enhancing user satisfaction at a University Library of Bangladesh. By evaluating the effectiveness of information literacy initiatives, the study seeks to identify best practices and areas for improvement in fostering a more user-centred library experience.

Research Objectives

The objectives of the study are:

i. To determine the relationship between information literacy skills and user satisfaction in a university library.
ii. To measure the effect of digital literacy on user satisfaction.
iii. To evaluate the influence of library instruction programs on user satisfaction.
iv. To assess the impact of library resources' accessibility on user satisfaction.
v. To quantify the contribution of staff and support to user satisfaction.
vi. To provide data-driven recommendations for enhancing library services to improve user satisfaction.

Literature Review

The role of information literacy in enhancing user satisfaction within university libraries is a critical area of research, particularly as libraries evolve to meet the needs of a diverse and technologically adept user base. Information literacy involves the ability to find, assess, and utilize information efficiently, an essential skill in today's digital environment (Kaba et al., 2025). This literature review synthesizes recent studies that explore the relationship between information literacy and user satisfaction, the impact of digital literacy, library instruction programs, resource accessibility, staff support, and the overall contribution of technological resources to user satisfaction. The relationship between information literacy skills and user satisfaction in university libraries is well-documented. Xu and Du (2018) highlight that users with higher information literacy skills tend to exhibit greater satisfaction

with digital library services as they can navigate these resources more effectively. This is echoed by Alam and Mezbah-Ul-Islam (2022), who found that the competence of library staff in imparting information literacy significantly influences user satisfaction. Furthermore, the study by Datuamala (2024) emphasizes that users' perceptions of their information literacy directly correlate with their satisfaction levels, suggesting that libraries must prioritize the development of these skills among their patrons.

Digital literacy also plays a pivotal role in user satisfaction (Khoeini et al., 2025). The transition to digital resources has transformed how users interact with libraries, making digital literacy essential for effective engagement. Gul and Bano (2019) argue that smart technologies in libraries facilitate targeted learning and enhance user experiences, thereby contributing to higher satisfaction levels. Additionally, the findings of Hermansyah et al. (2022) indicate that libraries that offer robust digital literacy training programs see improved user satisfaction, as patrons feel more empowered to utilize available resources effectively. A study by Durodolu et al. (2021) noted that metaliteracy is an integrated framework that facilitates the development, creation, and exchange of knowledge within collaborative digital environments. Library instruction programs are another critical factor influencing user satisfaction (Dunya & De Groote, 2019). Studies have shown that effective library instruction can significantly enhance users' information-seeking skills, leading to increased satisfaction with library services. For instance, Prashanthan (2024) found that structured library orientation programs positively impacted user satisfaction by familiarizing students with available resources and services. Similarly, Rathnayaka (2024) emphasizes the importance of guided tours and user education in fostering a better understanding of library offerings, which in turn enhances user satisfaction.

Access to library resources is also a significant determinant of user satisfaction. Riyanto (2023) notes that the quality and availability of collections directly influence user perceptions of satisfaction. This is supported by Alam (2020), who found that tangible resources and facilities within libraries have a statistically significant effect on user satisfaction. Furthermore, the research conducted by Boakye et al. (2022) during the COVID-19 pandemic underscored the necessity of accessible resources, as users reported higher satisfaction levels when they could easily access digital materials and services. Staff support is another crucial element impacting user satisfaction in university libraries (Khan et al., 2022). Effective staff interactions can enhance the overall user experience, as highlighted by the work of Mugo and Mathu (2021), who found that competent and approachable library staff significantly contribute to user satisfaction. Technological resources in libraries also contribute significantly to user satisfaction. The integration of advanced technologies, such as online public access catalogues

(OPACs) and digital databases, has transformed how users interact with library services. The research by Kato et al. (2021) indicates that the development and implementation of digital library resources are crucial for meeting user expectations and enhancing satisfaction. Moreover, the findings of Rafi et al. (2019) suggest that digital library database resources have a profound impact on academic research productivity, which correlates with user satisfaction as students and faculty find the resources, they need to support their work.

In an increasingly digital academic landscape, information literacy (IL) serves as a cornerstone for effective engagement with library services, directly influencing user satisfaction. As defined by Li et al. (2022), information literacy extends beyond simply retrieving data; it encompasses the ethical and analytical use of information in academic contexts. This skillset has become indispensable as universities transition from traditional resource centres to hybrid environments where physical and digital collections coexist. Contemporary research indicates that information-literate users are better equipped to locate, interpret, and apply information, which enhances their overall library experience (Caffrey et al., 2022). Moreover, Yang et al. (2023) underscore that the capacity to independently assess the quality and relevance of sources leads to more efficient use of library resources. When users possess strong information literacy skills, they are more confident in navigating digital catalogues, engaging with online databases, and avoiding issues like plagiarism, key factors in academic success and satisfaction (Caffrey et al., 2023). Despite its recognized importance, disparities in program quality and access remain, especially in developing contexts such as Bangladesh, where institutional constraints can limit the scope and impact of IL training (Maurer & Morshed, 2022). Therefore, exploring the role of information literacy within library services is not only timely but crucial for advancing user-centered academic support. As libraries continue to adapt to the changing landscape of information access and user needs, it is imperative that they prioritize the development of information literacy programs, enhance digital literacy initiatives, and ensure that resources are accessible and supported by knowledgeable staff. However, while existing research has addressed these factors individually, there remains a lack of comprehensive studies examining how information literacy mediates the collective impact of these service components on user satisfaction, particularly within the context of university libraries in developing countries like Bangladesh. This gap underscores the need for integrated, empirical investigations that consider the interdependence of these variables.

Theoretical Framework

Access to Information Resources: Since academic libraries promote research and education, information resources are an essential part of these institutions. According to the resource-based theory, libraries serve as centres for the dissemination of knowledge; thus, having access to both digital and physical resources is crucial for users to meet their academic objectives (Rafi et al., 2022). To increase user satisfaction and productivity, libraries must offer a broad collection, including a variety of subjects, and make sure that resource availability aligns with academic or research goals (Hibner & Kelly, 2023). Rahman and Ahmad (2024) stated that Continuous access to digital materials shows how dedicated the library is to meeting changing user needs in the digital era. This concept highlights how libraries function in providing effective and user-focused access to the information resources necessary for academic achievement.

Digital Literacy Skills: According to Wei (2023), Digital literacy is a lot more than merely technological proficiency; it also includes assessing and incorporating digital resources into productive activities. The environment of academic libraries has been significantly transformed by the rapid technological advancement of the digital age, and the expertise of academic databases and digital catalogs demonstrates the use of technical and information retrieval abilities, as noted by Dube et al. (2024). Additionally, the ability to manage academic knowledge using digital tools and organize it is consistent with the ideas of digital fluency, which includes flexibility and problem-solving in technologically advanced environments (Diseiye et al., 2023). Resolving technological problems and incorporating digital resources into processes demonstrate practical digital literacy and promote learning and development throughout every aspect of life.

Information Searching Behavior: Information-seeking behavior models, such as Wilson's (1999) model, highlight the significance of relevancy, timeliness, and ease of use in obtaining resources to efficiently satisfy consumers' demands. The theoretical foundations of information literacy focus on the capacity to identify information requirements, obtain information effectively, and critically assess sources (Goodsett, 2020). The strategic use of advanced search strategies, like Boolean operators, shows how to refine searches for efficiency (Sanches et al., 2022). Moreover, assessing search results for relevance and reliability aligns with iterative learning models, which advocate for adapting strategies when initial searches yield unsatisfactory results (Gusenbauer & Haddaway, 2020). Together, these elements form a robust framework for understanding and improving information-seeking practices in academic libraries.

Awareness of Library Services: To increase the usefulness and efficacy of library resources for both teachers and students, awareness of library services is essential (Khan et al., 2022). According to Chan et al. (2022), user awareness has a big impact on how valuable people think library services are and how often they use them. Although libraries are knowledge centers that provide specialized services to help students in academic and research endeavors, their effectiveness is dependent on the users' capacity to access and utilize these resources (Ali et al., 2023). For the library to fully promote academic excellence and lifelong learning, its patrons must be knowledgeable (Amarasekara & Marasinghe, 2020). This paradigm shows how awareness is a fundamental component of using library services effectively.

Library Instruction Programs: Programs for library instruction are essential for giving patrons the tools they need to find, assess, and use information efficiently (Zhang et al., 2020). The Association of College and Research Libraries (ACRL) Framework for Information Literacy, which promotes user empowerment through critical thinking and resource evaluation, is often incorporated into these programs (Pun, 2020). Training workshops and orientation programs help users develop a basic awareness of library resources, which improves their ability to conduct research and promotes lifelong learning (Thorpe, 2021). The integration of modern information technology is reflected in the provision of digital literacy training, which ensures users are skilled in utilizing both digital and physical resources (Anurogo et al., 2023). Thus, these programs serve as a bridge between users and effective resource utilization, contributing to academic and professional success.

Staff Support and Guidance: The idea of user-centered information services is the foundation for the guidance and support provided by library personnel. The view demonstrates how crucial it is to understand and satisfy the particular requirements and expectations of library users (Williams & Ogden, 2021). It adheres to human-centered design principles, which emphasize the user experience when creating and providing services (Rosinsky et al., 2022). User satisfaction, the growth of information literacy, and general library use can all be strongly impacted by the caliber of staff interactions (Khan et al., 2023). In this context, providing good staff assistance and direction is essential to creating a satisfying and fruitful library experience.

Technological Infrastructure: The foundation for assessing technological infrastructure in libraries is the knowledge that technology is not only a tool but rather a crucial component of the institution's mission to facilitate learning and give access to information (Al-Taweel et al., 2021). The transformative view of technology, which highlights how it can significantly

change how libraries operate and serve their communities, aligns with that perspective (Okunlaya et al., 2022). In this context, the emphasis moves from merely offering technology to developing a user-centered, integrated technological environment that improves the overall library experience.

Information Literacy: The ability to identify when information is needed, find it, assess its dependability, and use it efficiently and morally is known as information literacy (IL) (Phippen et al., 2021). According to Wei (2023), IL involves possessing the ability to use and access information resources on one's own. It also involves the ability to evaluate the validity and practicality of information critically. IL enables students to effectively manage their information requirements and apply these abilities to a range of academic responsibilities.

The Information Systems (IS) Success Model proposed by DeLone and McLean (1992) provides a comprehensive framework to evaluate the success of an information system.

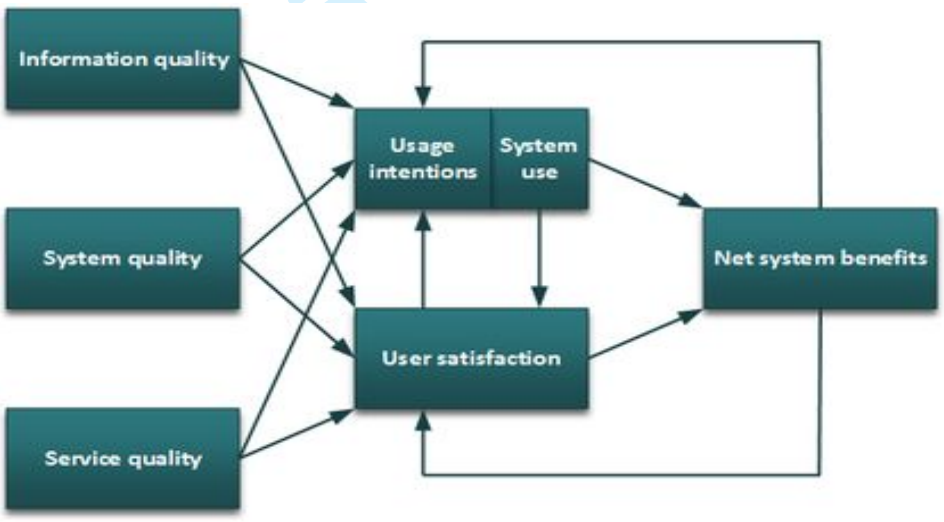

Figure 1: Information Systems (IS) Success Model (DeLone and McLean, 1992)

The IS Success Model offers a clear and concise framework for understanding how Information Literacy improves User Satisfaction with university library services. In this model, User Satisfaction is defined as the dependent variable, which means it depends on how well users can satisfy their academic and research needs through library services. The independent variables are Access to Information Resources which is associated with Information Quality in terms of relevance and accuracy, Digital Literacy Skills which are related to System Quality in terms of the ability to use digital tools effectively, and Information Searching Behavior which also enhances Information Quality by enabling the retrieval of relevant information from the

database. Library Services Awareness and Library Instruction Programs enhance Service Quality by making sure that users are knowledgeable and capable of using the available resources. Staff Support and Guidance also add to Service Quality through helpful assistance, while Technological Infrastructure supports System Quality by enabling easy and consistent access to resources. Information Literacy works as the mediator between these variables and their effects into real benefits, including enhanced productivity and learning accomplishments that directly impact User Satisfaction. Thus, the IS Success Model provides a clear and unified view of how library services, with Information Literacy as the mediator, contribute to user satisfaction in this context.

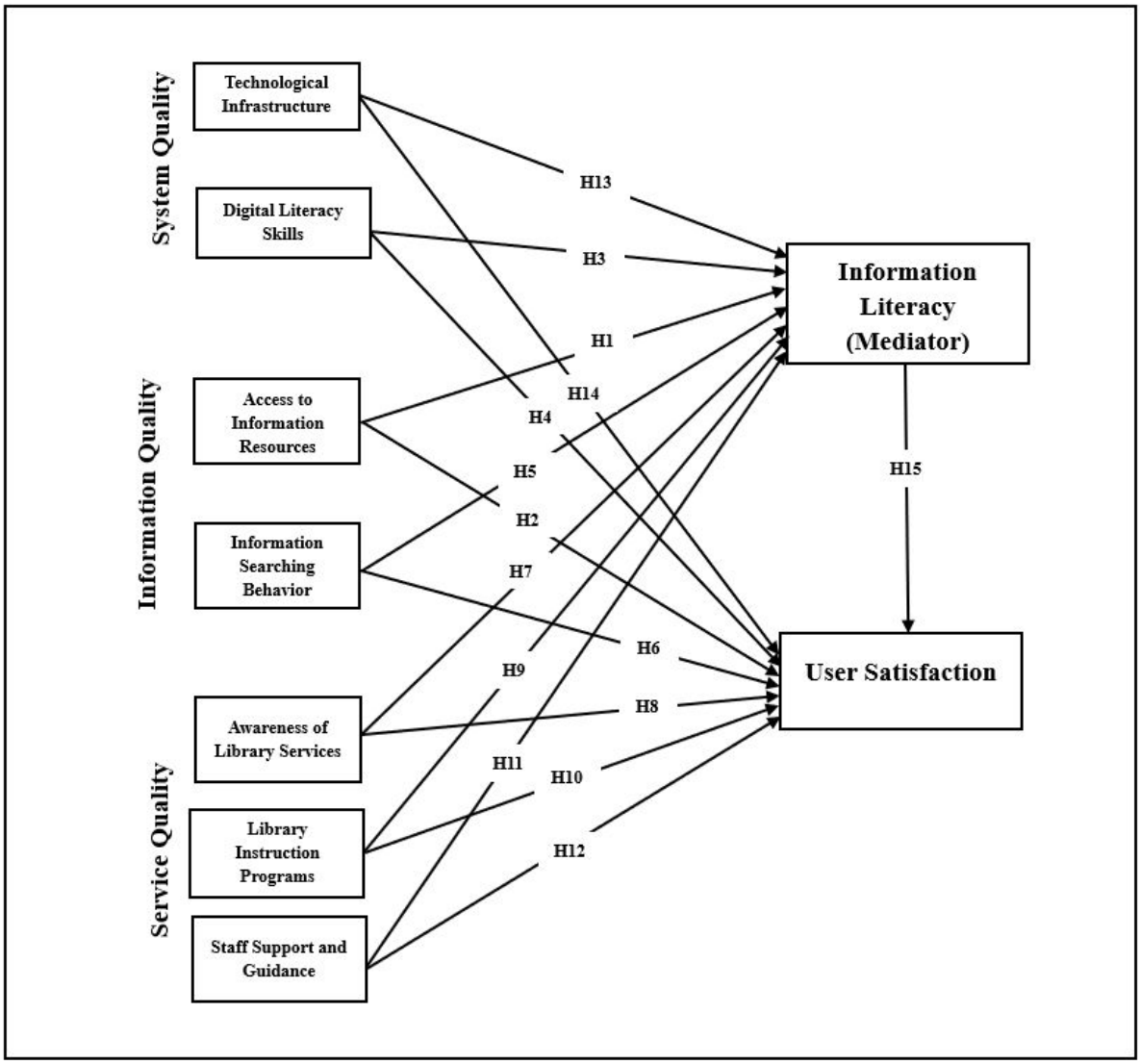

Figure 2: Conceptual Framework (Author's Creation)

Hypotheses

Here are the hypotheses for the research, aligned with the Information Systems Success Model (DeLone and McLean Model) and incorporating independent variables, mediators, and dependent variables:

1. **H1**: Access to Information Resources has a positive impact on Information Literacy.
2. **H2**: Information Literacy mediates the relationship between Access to Information Resources and User Satisfaction.
3. **H3**: Digital Literacy Skills have a positive impact on Information Literacy.
4. **H4**: Information Literacy mediates the relationship between Digital Literacy Skills and User Satisfaction.
5. **H5**: Information Searching Behavior has a positive impact on Information Literacy.
6. **H6**: Information Literacy mediates the relationship between information-searching behavior and User Satisfaction.
7. **H7**: Awareness of Library Services has a positive impact on Information Literacy.
8. **H8**: Information Literacy mediates the relationship between Awareness of Library Services and User Satisfaction.
9. **H9**: Library Instruction Programs have a positive impact on Information Literacy.
10. **H10**: Information Literacy mediates the relationship between Library Instruction Programs and User Satisfaction.
11. **H11**: Staff Support and Guidance has a positive impact on Information Literacy.
12. **H12**: Information Literacy mediates the relationship between Staff Support and Guidance and User Satisfaction.
13. **H13**: Technological Infrastructure has a positive impact on Information Literacy.
14. **H14**: Information Literacy mediates the relationship between Technological Infrastructure and User Satisfaction.
15. **H15**: Information Literacy has a positive impact on User Satisfaction.

Justification of Variable Selection and Framework Alignment

The selection of the seven variables; Access to Information Resources, Digital Literacy Skills, Information Searching Behavior, Awareness of Library Services, Library Instruction Programs, Staff Support and Guidance, and Technological Infrastructure, was guided by the Information Systems (IS) Success Model (DeLone & McLean, 1992), which classifies user satisfaction antecedents into system quality, service quality, and information quality. These variables were chosen because they represent key, actionable aspects of academic library

operations and align with the components of the IS model. Although other factors, such as library anxiety, motivation, or personality traits, could influence user satisfaction, they were omitted to keep the focus on institutional and behavioral elements directly linked to library services. This choice was intentional to emphasize variables that can be affected by library policy, design, and instruction programs, ensuring practical usefulness. Regarding the objectives, while five of them explicitly mention user skills (Information Literacy, Digital Literacy), service components (Access to Resources, Staff Support), and educational interventions (Library Instruction), the other two, Awareness of Library Services and Technological Infrastructure, are included within the broader analysis and reflected in the structural model. Although these constructs are not listed separately in the research objectives, they were incorporated into the data collection and analysis stages. Including all seven constructs in the theoretical framework maintains consistency between the conceptual base and the empirical implementation.

Methodology

This study employed a cross-sectional survey design within a quantitative research framework to examine the mediating role of information literacy in the relationship between library service components and user satisfaction. A quantitative design was chosen because it enables the systematic measurement of constructs, the testing of hypothesized relationships, and the generation of findings that can be generalized across a large population. The target population comprised active undergraduate and postgraduate students of a university library in Bangladesh. To ensure adequate representation across disciplines and user groups, a stratified random sampling technique was adopted. Based on Raosoft's sample size calculator, a minimum of 370 responses was required from a population of approximately 10,000 students at a 95% confidence level and a 5% margin of error. A total of 380 valid responses were collected, exceeding the requirement.

Data were gathered through an offline structured questionnaire survey conducted from October to December 2024. The questionnaire incorporated validated scales from prior studies to measure the independent variables (library instruction, digital literacy), the mediator (information literacy), and the dependent variable (user satisfaction). All constructs were measured using a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). Responses were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 4. This analytical technique is suitable for exploratory models involving latent constructs and relatively modest sample sizes (Hair & Alamer, 2022). The model allowed for

the evaluation of both direct and indirect (mediated) effects, thereby enhancing explanatory power.

Ethical standards were rigorously observed. Participation was voluntary, informed consent was obtained from all respondents, and confidentiality was maintained by excluding personally identifiable information. The study followed the ethical guidelines set by the host institution.

Data Analysis

The demographic data (Table 1) indicates that among the 380 respondents, the gender distribution is about equal (51.6% male, 48.4% female). 78.7% of them are between the ages of 21 and 25. The majority of students are undergraduates (88.7%). The majority of library users (51.1%) use it weekly, with 27.6% using it every day and 6.6% using it infrequently.

Table 1: Demographic Characteristics of Respondents (N = 380)

Demographic Variable	Category	Frequency	Percentage
Gender	Male	196	51.6%
	Female	184	48.4%
	Total	380	100%
Age	Under 20 y/o	34	8.9%
	21–25 y/o	299	78.7%
	26–30 y/o	37	9.7%
	31 and above	10	2.6%
	Total	380	100%
Academic Level of Student	Undergraduate	337	88.7%
	Postgraduate	43	11.3%
	Total	380	100%
Frequency of Library Use	Daily	105	27.6%
	Weekly	213	51.1%
	Monthly	37	9.7%
	Rarely	25	6.6%
	Total	380	100%

Measurement Model Assessment

This is an important step in structural equation modeling (SEM) that helps to ensure the reliability and validity of the constructs being measured. The evaluation involves testing the goodness-of-fit of the measurement model and examining key criteria such as factor loadings, construct reliability, and convergent and discriminant validity. Factor loadings should generally be ≥ 0.70, indicating that the items are representing the constructs adequately (Hair et al., 2019). Construct reliability is assessed through Cronbach's alpha (CA) and composite

reliability (CR), with values of ≥ 0.70 in both cases generally considered acceptable (Nunnally & Bernstein, 1994; Bagozzi & Yi, 1988). Convergent validity is assessed using the Average Variance Extracted (AVE), where values ≥ 0.50 indicate acceptable validity (Fornell & Larcker, 1981). When these criteria are met, the measurement model is robust and supports the validity of the SEM results.

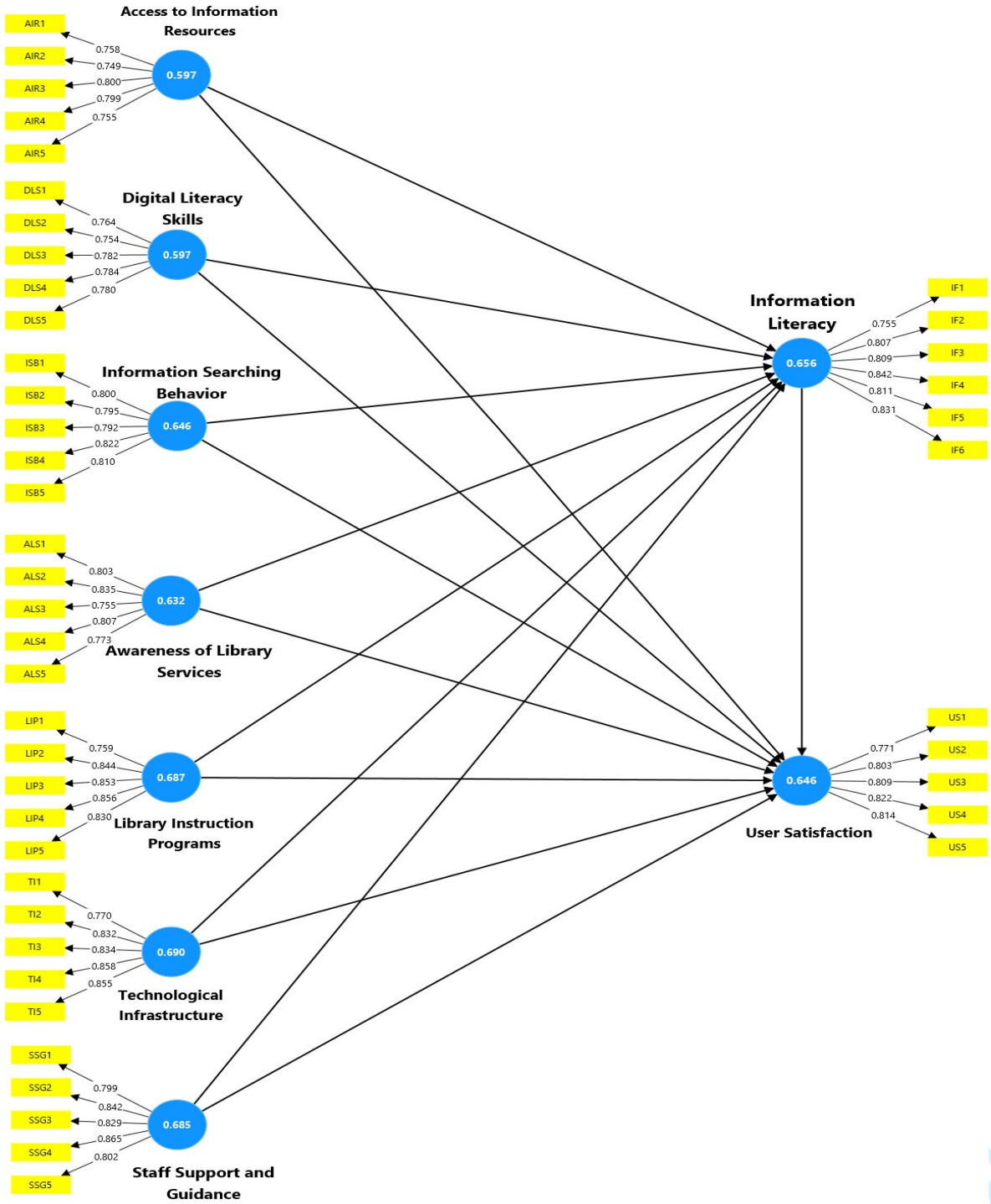

Figure 3: Factor Loadings and AVE (Author's Creation)

Here, Table 2 and Figure 3 demonstrate strong reliability and validity. Factor loadings ranged from 0.749 to 0.865, indicating that all components contributed well to their respective constructs. Cronbach's alpha (CA) values are above 0.80 for all variables, which confirms high internal consistency. Composite reliability (CR) values are above 0.88 for all variables, which further strengthens the construct reliability. In addition, the average variance extracted (AVE) values are above 0.50, which confirms sufficient convergent validity. Moreover, the Variance Inflation Factor (VIF) indicates that multicollinearity is not a concern in the model, as all values remain below the critical threshold of 5.0. Most VIF values range between 1.5 and 2.6, suggesting a moderate correlation among predictor variables but no severe multicollinearity issues. The highest VIF values are observed for 'Library Instruction Programs' (2.611) and 'Technological Infrastructure' (2.499), which still fall within an acceptable range. These results confirm that the predictors are sufficiently independent, ensuring the stability and reliability of the regression analysis. These results indicate that the measurement model is reliable and valid for further analysis.

Table 2: Measurement Model

Variables	Items	Factor Loadings	VIF	Cronbach's Alpha (CA)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Access to Information Resources	AIR1	0.758	1.642	0.831	0.881	0.597
	AIR2	0.749	1.541			
	AIR3	0.8	1.803			
	AIR4	0.799	1.89			
	AIR5	0.735	1.642			
Digital Literacy Skills	DLS1	0.734	1.715	0.832	0.881	0.597
	DLS2	0.754	1.705			
	DLS3	0.782	1.661			
	DLS4	0.784	1.781			
	DLS5	0.78	1.77			
Information Searching Behavior	ISB1	0.8	1.904	0.863	0.901	0.646
	ISB2	0.795	1.858			
	ISB3	0.792	1.957			
	ISB4	0.822	2.001			
	ISB5	0.81	1.996			
Awareness of Library Services	ALS1	0.803	1.95	0.854	0.896	0.632
	ALS2	0.835	2.227			
	ALS3	0.755	1.634			
	ALS4	0.807	1.941			
	ALS5	0.773	1.673			
Library Instruction Programs	LIP1	0.759	1.844	0.886	0.916	0.687
	LIP2	0.844	2.293			
	LIP3	0.853	2.354			

	LIP4	0.856	2.611			
	LIP5	0.83	2.541			
Staff Support and Guidance	SSG1	0.799	1.844	0.885	0.916	0.685
	SSG2	0.842	2.098			
	SSG3	0.829	2.336			
	SSG4	0.865	2.167			
	SSG5	0.802	2.504			
Technological Infrastructure	TI1	0.77	2.013	0.888	0.917	0.69
	TI2	0.832	1.997			
	TI3	0.834	2.381			
	TI4	0.858	2.143			
	TI5	0.855	2.499			
Information Literacy	IF1	0.755	2.439	0.895	0.919	0.656
	IF2	0.807	1.954			
	IF3	0.809	2.242			
	IF4	0.842	2.055			
	IF5	0.811	2.533			
	IF6	0.831	2.545			
User Satisfaction	US1	0.771	2.341	0.863	0.901	0.646
	US2	0.803	1.777			
	US3	0.809	2.034			
	US4	0.822	1.917			
	US5	0.814	2.051			
	US6	0.796	1.98			

[NB: AIR=Access to Information Resources, DLS=Digital Literacy Skills, ISB=Information Searching Behavior, ALS=Awareness of Library Services, LIP=Library Instruction Programs, SSG=Staff Support and Guidance, TI=Technological Infrastructure, Information Literacy=IF, US=User Satisfaction]

Discriminant Validity

Discriminant validity ensures that constructs are distinct from each other in structural equation modeling (SEM) analyses. Two common methods for assessing discriminant validity are the heterotrait-monotrait ratio (HTMT) and the variance inflation factor (VIF). HTMT measures the relationship between different constructs, with values below 0.85 (in some contexts 0.90) considered sufficient evidence of discriminant validity (Henseler et al., 2015). VIF tests for multicollinearity among predictors, and values above 5 (or 10) indicate potential problems with discriminant validity, as high multicollinearity can distort results (Hair et al., 2019). Both methods help ensure that constructs are sufficiently distinct in the model.

Table 3: Heterotrait-monotrait ratio (HTMT) - Matrix

Relationships	Heterotrait–monotrait ratio (HTMT)
Awareness of Library Services ↔ Access to Information Resources	0.669
Digital Literacy Skills ↔ Access to Information Resources	0.815
Digital Literacy Skills ↔ Awareness of Library Services	0.682
Information Literacy ↔ Access to Information Resources	0.595

Information Literacy ↔ Awareness of Library Services	0.793
Information Literacy ↔ Digital Literacy Skills	0.649
Information Searching Behavior ↔ Access to Information Resources	0.807
Information Searching Behavior ↔ Awareness of Library Services	0.779
Information Searching Behavior ↔ Digital Literacy Skills	0.875
Information Searching Behavior ↔ Information Literacy	0.737
Library Instruction Programs ↔ Access to Information Resources	0.673
Library Instruction Programs ↔ Awareness of Library Services	0.751
Library Instruction Programs ↔ Digital Literacy Skills	0.641
Library Instruction Programs ↔ Information Literacy	0.760
Library Instruction Programs ↔ Information Searching Behavior	0.644
Staff Support and Guidance ↔ Access to Information Resources	0.557
Staff Support and Guidance ↔ Awareness of Library Services	0.781
Staff Support and Guidance ↔ Digital Literacy Skills	0.531
Staff Support and Guidance ↔ Information Literacy	0.752
Staff Support and Guidance ↔ Information Searching Behavior	0.653
Staff Support and Guidance ↔ Library Instruction Programs	0.622
Technological Infrastructure ↔ Access to Information Resources	0.640
Technological Infrastructure ↔ Awareness of Library Services	0.588
Technological Infrastructure ↔ Digital Literacy Skills	0.597
Technological Infrastructure ↔ Information Literacy	0.686
Technological Infrastructure ↔ Information Searching Behavior	0.566
Technological Infrastructure ↔ Library Instruction Programs	0.763
Technological Infrastructure ↔ Staff Support and Guidance	0.534
User Satisfaction ↔ Access to Information Resources	0.689
User Satisfaction ↔ Awareness of Library Services	0.756
User Satisfaction ↔ Digital Literacy Skills	0.628
User Satisfaction ↔ Information Literacy	0.795
User Satisfaction ↔ Information Searching Behavior	0.705
User Satisfaction ↔ Library Instruction Programs	0.728
User Satisfaction ↔ Staff Support and Guidance	0.737
User Satisfaction ↔ Technological Infrastructure	0.679

The Heterotrait-Monotrait Ratio (HTMT) results in Table 3 indicate that the construct has good divergent validity, as most values are below the conservative limit of 0.85. The highest correlation is observed between information search behavior and digital literacy skills (0.875), indicating a close relationship. Other relatively high values include digital literacy skills and access to information resources (0.815) and user satisfaction and information literacy

(0.795). Relatively low values, such as between staff support and guidance and digital literacy skills (0.531) and between technological infrastructure and staff support and guidance (0.534), ensure appropriate differentiation between the constructs. Overall, the results support the independence of the variables in the study.

Structural Model Assessment

Structural model evaluation is an important step in structural equation modeling (SEM) that helps to assess the relationship between latent variables. The main criteria for this evaluation include T-value, p-value, β-value, f^2, R^2, and Q^2. T-value indicates the statistical significance of the path coefficient, where a value above 1.96 usually indicates significance at the 5% level (Aibinu, 2010). p-value is related to β-value, and values below 0.05 indicate statistical significance (Filzmoser & Viertl, 2004). β-value indicates the strength and direction of the relationship between constructs, indicating the magnitude of the effect of one construct on another (Jones et al., 2010). The f^2 effect size measures the influence of exogenous variables on endogenous variables, where values of 0.02, 0.15, and 0.35 indicate small, medium, and large effects, respectively (Campus & Adyar, 2018). R^2 measures the proportion of variance in endogenous constructs that is explained by exogenous constructs, and higher values indicate better explanatory power, with values of ≥ 0.10 generally considered acceptable (Götz et al., 2009). Finally, Q^2 assesses predictive relevance, and values above 0 indicate better predictive power (Akter et al., 2011).

Coefficient of Determination (R^2),* Predictive Relevance (Q^2), *and Effect Size (f^2)

Table 4: *R^2 & Q^2*

Variables	R-square	R-square adjusted	Q^2 predict
Information Literacy	0.661	0.655	0.635
User Satisfaction	0.621	0.613	0.571

The coefficient of determination (R^2) (Table 4) values indicate that the model explains 66.1% of the variability in information literacy and 62.1% of the variability in user satisfaction, while the adjusted values are slightly lower, indicating a good fit. The Q^2 predict values for Information Literacy (0.635) and User Satisfaction (0.571) indicate strong predictive relevance for both constructs, as both values are well above the threshold of 0. This suggests that the model has substantial predictive power for these variables. Specifically, the higher Q^2 value for Information Literacy (0.635) implies that the predictors in the model are highly effective in explaining and forecasting this construct. Similarly, the Q^2 value for User Satisfaction (0.571)

also reflects good predictive relevance, though it is slightly lower than that of Information Literacy. Overall, the model demonstrates a robust ability to predict both constructs, with Information Literacy showing slightly stronger predictive performance. These results highlight the model's utility in understanding and forecasting the relationships between the studied variables.

Table 5: f^2

	Information Literacy	User Satisfaction
Access to Information Resources	0.015	0.025
Awareness of Library Services	0.035	0.009
Digital Literacy Skills	0.002	0.001
Information Literacy		0.051
Information Searching Behaviour	0.045	0.004
Library Instruction Programs	0.05	0.01
Staff Support and Guidance	0.092	0.047
Technological Infrastructure		

The effect size (f^2) (Table 5) analysis shows that staff support and guidance have the highest effect on information literacy (0.092) and user satisfaction (0.047), followed by library instruction programs and information-seeking behavior. Other antecedents, such as digital literacy skills and awareness of library services, have relatively small effects. These results show that staff support and structured guidance have an important role in increasing information literacy and user satisfaction.

Table 6: Hypothesis Testing

Hypothesis	Relationship	β values	Sample mean (M)	Standard deviation	T statistics	P values
H1	Access to Information Resources -> Information Literacy	-0.108	-0.107	0.054	2.006	0.043 Accepted
H2	Access to Information Resources -> User Satisfaction	0.15	0.147	0.06	2.483	0.014 Accepted
H3	Digital Literacy Skills -> Information Literacy	0.043	0.047	0.063	0.681	0.505 Rejected

H4	Digital Literacy Skills -> User Satisfaction	-0.023	-0.018	0.066	0.353	0.726 Rejected
H5	Information Searching Behaviour -> Information Literacy	0.216	0.214	0.067	3.207	0.001 Accepted
H6	Information Searching Behaviour -> User Satisfaction	0.069	0.067	0.077	0.897	0.376 Rejected
H7	Awareness of Library Services -> Information Literacy	0.181	0.179	0.061	2.953	0.003 Accepted
H8	Awareness of Library Services -> User Satisfaction	0.098	0.1	0.057	1.732	0.086 Rejected
H9	Library Instruction Programs -> Information Literacy	0.208	0.208	0.067	3.088	0.002 Accepted
H10	Library Instruction Programs -> User Satisfaction	0.101	0.098	0.074	1.357	0.181 Rejected
H11	Staff Support and Guidance -> Information Literacy	0.251	0.251	0.068	3.687	0.000 Accepted
H12	Staff Support and Guidance -> User Satisfaction	0.2	0.198	0.062	3.202	0.001 Accepted
H13	Technological Infrastructure -> Information Literacy	0.189	0.192	0.051	3.742	0.000 Accepted
H14	Technological Infrastructure -> User Satisfaction	0.132	0.135	0.063	2.114	0.036 Accepted
H15	Information Literacy -> User Satisfaction	0.238	0.237	0.075	3.164	0.002 Accepted

The results of the tested hypotheses in Table 6 and Figure 4 provide important insights into the impact of various factors on information literacy and user satisfaction in the Library of the University. Access to information resources has a significant impact on information literacy (β = -0.108, T = 2.006, P = 0.043) and user satisfaction (β = 0.150, T = 2.483, P = 0.014), indicating that the availability of resources plays an important role in both. However, digital literacy skills do not have a significant impact on information literacy (β = 0.043, T = 0.681, P = 0.505) or user satisfaction (β = -0.023, T = 0.353, P = 0.726), indicating that users may need more training to apply these skills effectively.

Information-seeking behavior has a positive effect on information literacy (β = 0.216, T = 3.207, P = 0.001) but does not significantly affect user satisfaction (β = 0.069, T = 0.897, P = 0.376). Awareness of library services has a positive effect on information literacy (β = 0.181, T = 2.953, P = 0.003) but does not significantly affect user satisfaction (β = 0.098, T = 1.732, P = 0.086), indicating that although users are aware of the services available, their satisfaction may depend on other factors. Similarly, library guidance programs increase information literacy (β = 0.208, T = 3.088, P = 0.002), but do not significantly improve user satisfaction (β = 0.101, T = 1.357, P = 0.181), indicating that these programs may need further refinement to improve user experience. On the other hand, staff play an important role in both support and guidance, improving both information literacy (β = 0.251, T = 3.687, P = 0.000) and user satisfaction (β = 0.200, T = 3.202, P = 0.001), highlighting the importance of human support in library services. In addition, technological infrastructure has a significant impact on information literacy (β = 0.189, T = 3.742, P = 0.000) and user satisfaction (β = 0.132, T = 2.114, P = 0.036), reflecting the need for strong digital resources and technology. Finally, information literacy provides a strong predictor of user satisfaction (β = 0.238, T = 3.164, P = 0.002), indicating that users who are capable of using information effectively are more satisfied with library services.

The results indicate that staff support, technological infrastructure, and information literacy play the most important roles in both. On the other hand, digital literacy skills, awareness of library services, and further development are needed to enhance the impact of library guidance programs.

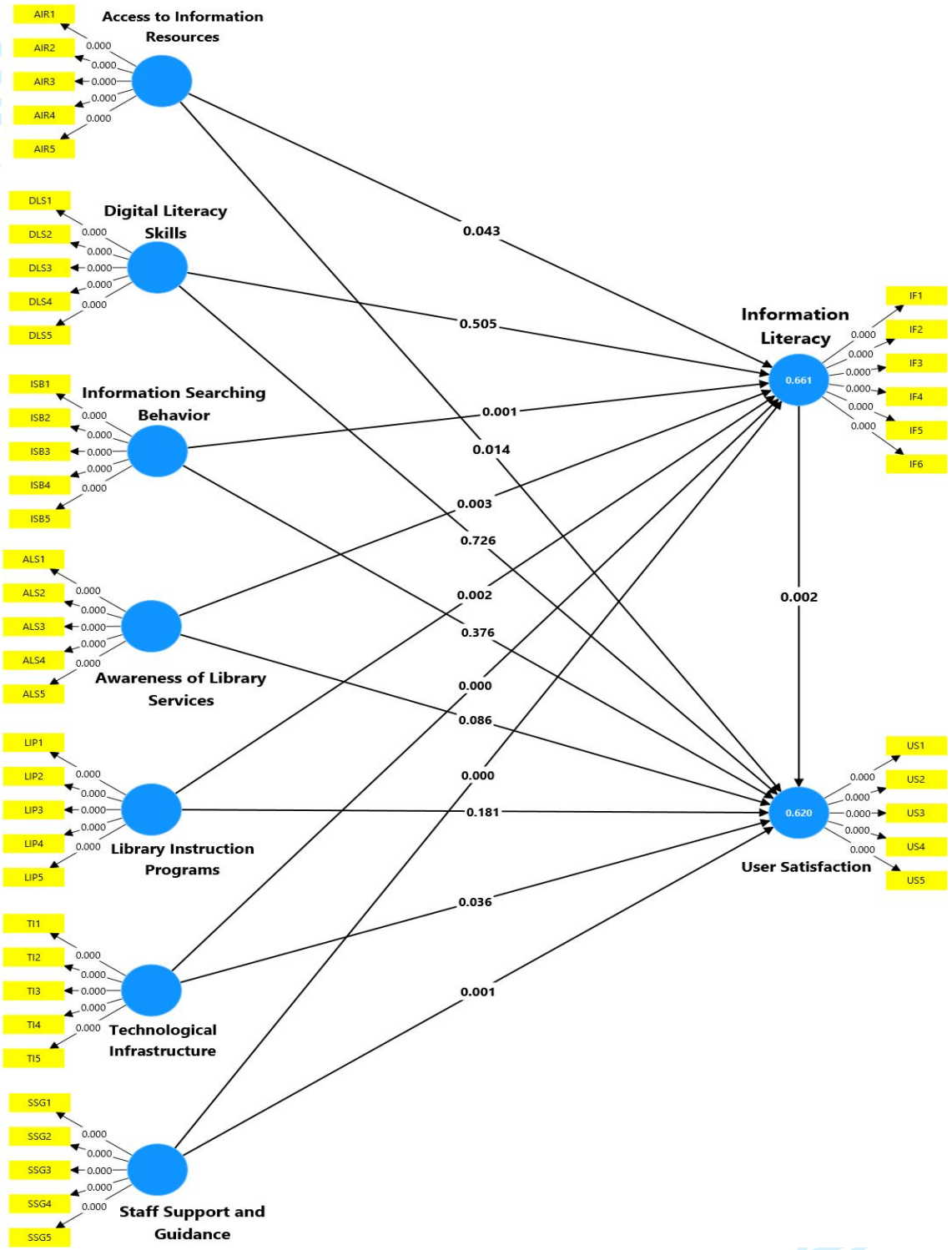

Figure 4: Hypothesis Testing an R^2 (Author's Creation)

Discussion

The findings of this study demonstrate strong reliability and validity, supported by factor loadings ranging from 0.749 to 0.865, Cronbach's alpha (CA) values exceeding 0.80, and composite reliability (CR) values above 0.88, confirming the internal consistency of the

constructs. Additionally, average variance extracted (AVE) values above 0.50 reinforce the model's convergent validity.

A substantial body of research corroborates these findings, emphasizing the importance of reliability in evaluating information literacy frameworks. For instance, Agyei and Yamson (2019) highlighted that the reliability of instruments measuring health information literacy directly impacts the validity of educational outcomes. Their research underscores the necessity of developing reliable measurement tools to derive meaningful conclusions regarding literacy programs and user satisfaction. Similarly, Weightman et al. (2017) conducted a systematic review demonstrating the significance of validated assessment tools in evaluating information literacy and their correlation with academic success. While many studies highlight the positive impact of reliable information literacy measures, inconsistencies emerge when these tools are applied in informal settings. Henkel (2015) noted that public libraries often deprioritize information literacy training, complicating efforts to obtain consistent outcome measurements. This finding suggests that while high reliability and validity are essential, they do not always guarantee consistent user satisfaction across diverse library environments.

In the realm of digital literacy, Berber et al. (2023) reinforce the present study's findings by linking digital literacy skills to career satisfaction. This underscores the importance of validated measurement models in understanding user experiences. However, Abdullahi et al. (2024) explore the potential disconnect between reliable measurements and practical application, particularly in how librarians' information literacy skills influence service delivery. Their research suggests that while internal constructs may be reliably measured, real-world application significantly influences user satisfaction. These insights align with Hussien and Mokhtar (2018), who emphasize the necessity of continuous feedback mechanisms to enhance user satisfaction in libraries by refining information literacy programs based on user needs and experiences. Another critical dimension involves the growing role of technology in shaping user experiences. Soria et al. (2017) demonstrate a direct relationship between technology-supported library usage and improved academic performance, aligning with the present study's emphasis on the reliability of its measurement model. Pinto et al. (2023) advocate for adaptive measurement models that consider evolving educational contexts, reinforcing the idea that reliable models can facilitate pedagogical advancements to improve user satisfaction. Despite these strengths, the findings also highlight the complexities involved in translating theoretical reliability into practical effectiveness. The interplay between validated measurement tools,

real-world application, user satisfaction, and technological advancements presents an evolving challenge for academic libraries. Future research should further develop this framework to integrate both quantitative reliability measures and qualitative user experiences.

The study's findings regarding the Heterotrait-Monotrait Ratio (HTMT) further substantiate the reliability and validity of the constructed model within the context of information literacy and user satisfaction. The HTMT results indicate strong divergent validity among the constructs, with most values below 0.85, except for a notable correlation between information search behavior and digital literacy skills (0.875). The VIF values, ranging from 1.5 to 2.6, confirm the absence of multicollinearity, ensuring the independence of predictor variables, an essential factor for reliable regression analysis. These findings align with prior literature emphasizing the importance of divergent validity in educational assessments. For example, Amandac and Pañares (2023) stress the necessity of maintaining clear distinctions between constructs to avoid conflating related competencies. Their research resonates with the current study's emphasis on differentiating variables such as information literacy and digital literacy. Additionally, Behre (2022) explores the overlap between digital literacy and information-seeking behavior, concluding that increased digital literacy enhances individuals' information-seeking capabilities. This observation aligns with the present study's findings, reinforcing the need for integrated educational frameworks that concurrently develop these skills. Furthermore, Umar and Habib (2022) highlight how digital literacy training enhances legal information-seeking skills among undergraduate law students. Their findings emphasize the broader necessity of embedding digital literacy within academic programs, a principle mirrored in the current study's conclusions on information search behavior. The moderate correlations observed between staff support and digital literacy skills (0.531) and between technological infrastructure and staff support (0.534) further illustrate the intricate relationships among these factors. Fouché (2021) argues that staff support alone does not guarantee improved digital literacy outcomes without robust training and infrastructure, particularly in resource-constrained settings. This suggests that a comprehensive approach, integrating leadership and infrastructure, is crucial for optimizing staff support's impact on digital literacy.

Regarding VIF results, which indicate manageable multicollinearity levels, the study aligns with Weightman et al. (2017), who stress the importance of maintaining statistical rigor in educational assessments. This supports the study's regression model, affirming that observed effects are attributable to independent variables such as library instruction programs and

technological infrastructure. Gómez et al. (2023) further reinforce the role of technological infrastructure in enhancing user engagement and satisfaction within library settings. Their research underscores the necessity for libraries to invest in both digital and physical infrastructure to optimize user experiences.

The study's results regarding the impact of various factors on information literacy and user satisfaction within the Library of the University, as detailed in Table 6 and Figure 4, provide critical insights into the interplay between resource accessibility, digital literacy skills, and library services. Specifically, the positive impact of access to information resources (β = 0.150) on both information literacy (β = -0.108) and user satisfaction highlights the significance of resource availability. This finding aligns with prior research, such as Alam (2020), which identified a direct correlation between library resource availability and user satisfaction across academic institutions. Conversely, the study finds no significant impact of digital literacy skills on either information literacy (β = 0.043, P = 0.505) or user satisfaction (β = -0.023, P = 0.726), suggesting a gap between digital literacy proficiency and its practical application. This aligns with Sambo et al. (2022), who identified barriers such as inadequate training and overwhelming workloads as factors limiting effective digital literacy application. Similarly, Eynon (2020) emphasizes that digital literacy training effectiveness depends on contextual factors influencing learning and application.

Information-seeking behavior positively influences information literacy (β = 0.216, P = 0.001) but does not significantly impact user satisfaction (β = 0.069, P = 0.376). This finding suggests that while proactive information seekers enhance their literacy skills, satisfaction with library services depends on additional factors. Chen (2011) similarly observed that although information literacy instruction improved students' perceptions, additional refinements to library services were needed to meet user expectations. Furthermore, technological infrastructure significantly affects both information literacy (β = 0.189, P = 0.000) and user satisfaction (β = 0.132, P = 0.036), underscoring the necessity for robust technological frameworks in libraries. Detlor et al. (2019) similarly found that technological enhancements significantly improve user experiences by providing seamless access to information resources. Additionally, Iqbal et al. (2022) highlight the pivotal role of digital resources in shaping user interactions in digital libraries. Ultimately, the study confirms that information literacy is a strong predictor of user satisfaction (β = 0.238, P = 0.002), reinforcing the importance of equipping users with effective literacy skills. Future research should explore contextual factors

influencing these relationships and develop tailored strategies to enhance both information literacy and user satisfaction within library settings.

The inclusion of Information Literacy as a mediating construct within the Information Systems (IS) Success Model represents a critical advancement in conceptualizing library user satisfaction. By situating IL at the nexus of system, service, and information quality, the study not only reinforces the model's multidimensional applicability but also highlights IL as a transformative enabler of user outcomes. This integration addresses a notable gap in existing literature where IL has often been treated as an outcome rather than an active mechanism shaping user experience. The empirical validation of IL's mediating role provides a theoretical lens through which future research can explore the dynamics of digital transformation, service innovation, and user engagement in academic libraries, particularly in developing countries. Thus, the proposed framework offers both conceptual depth and operational direction for institutions aiming to elevate user-centered service delivery.

Conclusion

The findings of this study affirm the strong reliability and validity of the information literacy measurement model, reinforcing its significance in evaluating user satisfaction within a university library. The results indicate that key constructs such as access to information resources, staff support, and technological infrastructure positively impact both information literacy and user satisfaction, while digital literacy skills and awareness of library services require further refinements to enhance their practical contributions. The strong internal consistency, as evidenced by high Cronbach's alpha and composite reliability values, ensures that the constructs measured provide a stable and dependable framework for assessing library user experiences. The model's validity is further strengthened by the AVE and HTMT values, confirming its robustness in differentiating between distinct but interrelated constructs. Despite these strengths, the study highlights the complex interplay between methodological rigor and real-world applications of information literacy in library settings. While access to resources and staff guidance play crucial roles in enhancing user experience, the lack of significant impact from digital literacy skills suggests a need for more tailored and contextualized training programs. Furthermore, the findings indicate that awareness of library services alone does not necessarily translate into higher satisfaction, pointing to a potential gap between information dissemination and user engagement. These insights align with existing literature, which

emphasizes the importance of continuously adapting measurement tools and intervention strategies to accommodate the evolving needs of users in academic libraries.

Overall, this research contributes to the growing body of knowledge on information literacy's role in shaping user satisfaction, offering practical implications for library management and policy formulation. Libraries must not only ensure reliable measurement models but also integrate continuous feedback loops, adaptive literacy programs, and technological enhancements to foster a more user-centered approach. Future research should explore the contextual variations in library user demographics, the long-term impact of digital literacy interventions, and the evolving relationship between information literacy and user satisfaction in an increasingly digital information landscape. By addressing these areas, libraries can better support users in navigating complex information environments, ultimately enhancing their academic and research outcomes.

References

Abdullahi, A., Amao, M., Abubakar, U., & Ibrahim, M. (2024). Information literacy skills of librarians and service delivery in the 21st century. AJHCER, 15(1), 390-398. https://doi.org/10.62154/twqmk778

Agyei, D. and Yamson, G. (2019). Health information literacy among malaria patients in ghana: sustainable development goals (sdg) 3 in focus. The Open Public Health Journal, 12(1), 100-105. https://doi.org/10.2174/1874944501912010100

Aibinu, A. A., & Al-Lawati, A. M. (2010). Using PLS-SEM technique to model construction organizations' willingness to participate in e-bidding. *Automation in construction*, *19*(6), 714-724. https://doi.org/10.1016/j.autcon.2010.02.016

Aksu Dunya, B., & De Groote, S. (2019). Revision of an academic library user experience survey. *Performance measurement and metrics*, *20*(1), 48-59. https://doi.org/10.1108/PMM-10-2018-0026

Akter, S., D'ambra, J., & Ray, P. (2011). An evaluation of PLS based complex models: the roles of power analysis, predictive relevance and GoF index.

Alam, M. (2020). Effects of service quality on satisfaction in eastern university library, bangladesh. Ifla Journal, 47(2), 209-222. https://doi.org/10.1177/034003522095909

Alam, M. and Mezbah-ul-Islam, M. (2022). Impact of service quality on user satisfaction in public university libraries of bangladesh using structural equation modeling. Performance Measurement and Metrics, 24(1), 12-30. https://doi.org/10.1108/pmm-06-2021-003

Ali, N., Shoaib, M., & Abdullah, F. (2023). Information literacy and research support services in academic libraries: A bibliometric analysis from 2001 to 2020. *Journal of Information Science*, *49*(6), 1593-1606. https://doi.org/10.1177/01655515211068169

Al-Taweel, F. B., Abdulkareem, A. A., Gul, S. S., & Alshami, M. L. (2021). Evaluation of technology-based learning by dental students during the pandemic outbreak of coronavirus disease 2019. *European Journal of Dental Education*, *25*(1), 183-190. https://doi.org/10.1111/eje.12589

Amandac, D. and Pañares, N. (2023). Teachers' 21st-century skills and pupils' academic performance. International Journal of Research Publications, 125(1). https://doi.org/10.47119/ijrp1001251520234908

Amarasekara, K. M. R. K., & Marasinghe, M. M. I. K. (2020). User Satisfaction on library resources and services: survey conducted in main library of the Open University of Sri Lanka. *Journal of the University Librarians Association of Sri Lanka*, *23*(2). https://doi.org/10.4038/jula.v23i2.8007

Anurogo, D., La Ramba, N. H., Putri, N. N. D., & Putri, N. U. M. P. (2023). Digital Literacy 5.0 to enhance multicultural education. *Multicultural Islamic Education Review*, *1*(2), 109–179. https://doi.org/10.23917/mier.v1i2.3414

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the academy of marketing science*, *16*, 74-94. https://doi.org/10.1007/BF02723327

Banleman, K., Dukper, B., & Banleman, L. (2024). Evaluation of academic library services and programs in ghana: insight from the sd dombo university of business and integrated development studies. International Journal of Applied Research in Social Sciences, 6(1), 89-105. https://doi.org/10.51594/ijarss.v6i1.734

Behre, J. (2022). Young adults' online sexual health information seeking and evaluating skills: implications for everyday life information literacy instruction. Proceedings of the Association for Information Science and Technology, 59(1), 1-10. https://doi.org/10.1002/pra2.599

Berber, Ş., Deveciyan, M., & Alay, H. (2023). Digital literacy level and career satisfaction of academics. İnsan Ve Toplum Bilimleri Araştırmaları Dergisi, 12(4), 2363-2387. https://doi.org/10.15869/itobiad.1343893

Boakye, S., Boakye, E., & Adjei, K. (2022). User satisfaction with resources and services of kumasi technical university library during the covid-19 pandemic. Ghana Library Journal, 27(1), 44-59. https://doi.org/10.4314/glj.v27i1.4

Caffrey, C., Lee, H., Withorn, T., Clarke, M., Castañeda, A., Macomber, K., ... & Kohn, K. P. (2022). Library instruction and information literacy 2021. *Reference Services Review*, *50*(3/4), 271-355. https://doi.org/10.1108/RSR-09-2022-0035

Caffrey, C., Lee, H., Withorn, T., Galoozis, E., Clarke, M., Philo, T., ... & Vermeer, W. (2023). Library instruction and information literacy 2022. *Reference Services Review*, *51*(3/4), 319-396. https://doi.org/10.1108/RSR-08-2023-0061

Campus, M., & Adyar, M. (2018). Measuring the effect size of coefficient of determination and predictive relevance of exogenous latent variables on endogenous latent variables through PLS-SEM. *International Journal of Pure and Applied Mathematics*, *119*(18), 39-48.

Chan, V. H. Y., Chiu, D. K., & Ho, K. K. (2022). Mediating effects on the relationship between perceived service quality and public library app loyalty during the COVID-19 era. *Journal of Retailing and Consumer Services*, *67*, 102960.https://doi.org/10.1016/j.jretconser.2022.102960

Chen, Y. (2011). Undergraduates' perceptions and use of the university libraries web portal: can information literacy instruction make a difference?. Proceedings of the American Society for Information Science and Technology, 48(1), 1-10. https://doi.org/10.1002/meet.2011.14504801051

Cox, J. (2021). Positioning the academic library within the institution: A literature review. *Positioning the Academic Library within the University*, 9-33.

Datuamala, A. (2024). Quality of public library services as predictors of barmm community's information needs satisfaction. British Journal of Multidisciplinary and Advanced Studies, 5(1), 1-14. https://doi.org/10.37745/bjmas.2022.0393

Deja, M., Rak, D., & Bell, B. (2021). Digital transformation readiness: perspectives on academia and library outcomes in information literacy. *The Journal of Academic Librarianship*, *47*(5), 102403. https://doi.org/10.1016/j.acalib.2021.102403

DeLone, W.H. and McLean, E.R., 1992. Information systems success: The quest for the dependent variable. *Information systems research*, *3*(1), pp.60-95.

Detlor, B., Nasery, M., & Julien, H. (2019). The efficacy of digital literacy training initiatives led by local community organizations. Proceedings of the Association for Information Science and Technology, 56(1), 634-635. https://doi.org/10.1002/pra2.115

Diseiye, O., Ukubeyinje, S. E., Oladokun, B. D., & Kakwagh, V. V. (2023). Emerging Technologies: Leveraging Digital Literacy for Self-Sufficiency among Library Professionals. *Metaverse Basic and Applied Research*, *3*, 59. https://doi.org/10.56294/mr202459

Dube, T. V., Rammutloa, M. W., & Matatiele, R. (2024). Skills and competencies of academic librarians to use information technology tools in the digital era: A systematic literature review. *Information Development, 0*(0). https://doi.org/10.1177/02666669241302054

Durodolu, O. O., Chisita, C. T., & Dube, T. V. (2021). Flattening the curve of fake news in the epoch of infodemic: an epistemic challenge. In *Deep fakes, fake news, and misinformation in online teaching and learning technologies* (pp. 143-161). IGI Global.

Eynon, R. (2020). Becoming digitally literate: reinstating an educational lens to digital skills policies for adults. British Educational Research Journal, 47(1), 146-162. https://doi.org/10.1002/berj.3686

Filzmoser, P., & Viertl, R. (2004). Testing hypotheses with fuzzy data: the fuzzy p-value. *Metrika*, *59*, 21-29. https://doi.org/10.1007/s001840300269

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, *18*(1), 39-50. https://doi.org/10.1177/002224378101800104

Fouché, I. (2021). Impact measurement: quantitatively determining the improvement in students' academic literacy levels at a south african university. Journal for Language Teaching, 51(1), 163-199. https://doi.org/10.4314/jlt.v51i1.7

Goodsett, M. (2020). Best practices for teaching and assessing critical thinking in information literacy online learning objects. *The Journal of Academic Librarianship*, *46*(5), 102163. https://doi.org/10.1016/j.acalib.2020.102163

Götz, O., Liehr-Gobbers, K., & Krafft, M. (2009). Evaluation of structural equation models using the partial least squares (PLS) approach. In *Handbook of partial least squares: Concepts, methods and applications* (pp. 691-711). Berlin, Heidelberg: Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-540-32827-8_30

Gul, S. and Bano, S. (2019). Smart libraries: an emerging and innovative technological habitat of 21st century. The Electronic Library, 37(5), 764-783. https://doi.org/10.1108/el-02-2019-0052

Gusenbauer, M., & Haddaway, N. R. (2020). Which academic search systems are suitable for systematic reviews or meta-analyses? Evaluating retrieval qualities of Google Scholar, PubMed, and 26 other resources. *Research synthesis methods*, *11*(2), 181-217. https://doi.org/10.1002/jrsm.1378

Hair Jr, J. F., LDS Gabriel, M., Silva, D. D., & Braga, S. (2019). Development and validation of attitudes measurement scales: fundamental and practical aspects. *RAUSP Management Journal*, *54*(4), 490-507. https://doi.org/10.1108/RAUSP-05-2019-0098

Hair, J., & Alamer, A. (2022). Partial Least Squares Structural Equation Modeling (PLS-SEM) in second language and education research: Guidelines using an applied example. *Research Methods in Applied Linguistics*, *1*(3), 100027. https://doi.org/10.1016/j.rmal.2022.100027

Hamad, F., Al-Fadel, M., & Fakhouri, H. (2023). The provision of smart service at academic libraries and associated challenges. *Journal of Librarianship and Information Science, 55*(4), 960-971. https://doi.org/10.1177/09610006221114173.

Henkel, M. (2015). Educators of the information society: information literacy instruction in public and academic libraries of canada. Proceedings of the Association for Information Science and Technology, 52(1), 1-10. https://doi.org/10.1002/pra2.2015.145052010036

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the academy of marketing science*, *43*, 115-135. https://doi.org/10.1007/s11747-014-0403-8

Hermansyah, N., Mayasari, N., Winingsih, N., Darmawan, A., & Ismiraj, M. (2022). Reference service user' satisfaction at the animal husbandry faculty library, universitas padjadjaran. Jurnal Kajian Informasi & Perpustakaan, 10(2), 205. https://doi.org/10.24198/jkip.v10i2.32837

Hibner, H. and Kelly, M., 2023. *Making a collection count: a holistic approach to library collection management*. Elsevier.

Hussien, F. and Mokhtar, W. (2018). The effectiveness of reference services and users' satisfaction in the academic library. International Journal of Academic Research in Progressive Education and Development, 7(3). https://doi.org/10.6007/ijarped/v7-i3/4370

Iqbal, M., Rafiq, M., & Soroya, S. (2022). Examining predictors of digital library use: an application of the information system success model. The Electronic Library, 40(4), 359-375. https://doi.org/10.1108/el-01-2022-0008

Jones, B. D., Paretti, M. C., Hein, S. F., & Knott, T. W. (2010). An analysis of motivation constructs with first-year engineering students: Relationships among expectancies, values, achievement, and career plans. *Journal of engineering education*, *99*(4), 319-336. https://doi.org/10.1002/j.2168-9830.2010.tb01066.x

Kaba, A., Aburezeq, I. M., Dweikat, F., & ElRefae, G. A. (2025). The impact of users' experience and satisfaction on users' intention to use digital library resources. *Performance Measurement and Metrics*, *26*(1), 1-16. https://doi.org/10.1108/PMM-09-2024-0042

Kato, A., Kisangiri, M., & Kaijage, S. (2021). A review development of digital library resources at university level. Education Research International, 2021, 1-13. https://doi.org/10.1155/2021/8883483

Khan, A. U., Rafi, M., Zhang, Z., & Khan, A. (2023). Determining the impact of technological modernization and management capabilities on user satisfaction and trust in library services. *Global Knowledge, Memory and Communication*, *72*(6/7), 593-611. https://doi.org/10.1108/GKMC-06-2021-0095

Khan, A. U., Zhang, Z., Chohan, S. R., & Rafique, W. (2022). Factors fostering the success of IoT services in academic libraries: a study built to enhance the library performance. *Library Hi Tech*, *40*(6), 1976-1995. https://doi.org/10.1108/LHT-06-2021-0179

Khan, A., Masrek, M., & Mahmood, K. (2019). The relationship of personal innovativeness, quality of digital resources and generic usability with users' satisfaction. Digital Library Perspectives, 35(1), 15-30. https://doi.org/10.1108/dlp-12-2017-0046

Khoeini, S., Noruzi, A., Naghshineh, N., & Sheikhshoaei, F. (2025). Designing the digital transformation model of public university libraries in Iran based on Delphi method. *Digital Library Perspectives*, *41*(1), 45-73. https://doi.org/10.1108/DLP-06-2024-0100

Li, X., Islam, A. A., Cheng, E. W., Hu, X., & Wah Chu, S. K. (2022). Exploring determinants influencing information literacy with activity theory. *Online Information Review*, *46*(3), 568-589. https://doi.org/10.1108/OIR-03-2020-0092

Maurer, M., & Morshed, M. M. (2022). Promoting the recognition of prior learning in the context of development cooperation: The case of Bangladesh. *International Journal of Educational Development*, *91*, 102592. https://doi.org/10.1016/j.ijedudev.2022.102592

Misra, P., Chopra, G., & Bhaskar, P. (2023). Continuous usage intention for digital library systems among students at higher learning institutions: moderating role of academic involvement. Journal of Applied Research in Higher Education, 15(5), 1752-1766. https://doi.org/10.1108/jarhe-06-2022-0185

Moonasar, A. (2024). Continuing professional development and the changing landscape of academic libraries. *Library Management*, *45*(3/4), 226-242. https://doi.org/10.1108/LM-09-2023-0100

Mugo, G. and Mathu, M. (2021). Assessment of customer service provision for enhanced user satisfaction in academic libraries: a case study of st paul's university library, kiambu county, kenya. International Journal of Current Aspects, 5(1), 20-34. https://doi.org/10.35942/ijcab.v5i1.155

Nunekpeku, P. (2019). Establishing clients' satisfaction levels with automated library based services. Digital Library Perspectives, 36(1), 8-20. https://doi.org/10.1108/dlp-02-2019-0004

Nunnally, J., & Bernstein, I. (1994). *Psychometric Theory 3rd edition (MacGraw-Hill, New York)*.

Ocholla, D. N., & Ocholla, L. (2020). Readiness of academic libraries in South Africa to research, teaching and learning support in the Fourth Industrial Revolution. *Library Management*, *41*(6/7), 355-368. https://doi.org/10.1108/LM-04-2020-0067

Okunlaya, R. O., Syed Abdullah, N., & Alias, R. A. (2022). Artificial intelligence (AI) library services innovative conceptual framework for the digital transformation of university education. *Library Hi Tech*, *40*(6), 1869-1892. https://doi.org/10.1108/LHT-07-2021-0242

Oseghale, O. (2023). Digital information literacy skills and use of electronic resources by humanities graduate students at Kenneth Dike Library, University of Ibadan, Nigeria. *Digital Library Perspectives*, *39*(2), 181-204. https://doi.org/10.1108/DLP-09-2022-0071

Phippen, A., Bond, E., & Buck, E. (2021). Effective strategies for information literacy education: combatting 'fake news' and empowering critical thinking. In *Future Directions in Digital Information* (pp. 39-53). Chandos Publishing. https://doi.org/10.1016/B978-0-12-822144-0.00003-3

Pinto, M., Mariscal, D., & Segura, A. (2023). Discovering the synergies among information literacy and mobile learning in higher education. Ibersid Revista De Sistemas De Información Y Documentación, 17(2), 73-85. https://doi.org/10.54886/ibersid.v17i2.4936

Prashanthan, B. (2024). Users' satisfaction of the academic library facilities and services in swamy vipulananda institute of aesthetic studies, sri lanka. IJAMRS, 4(3), 1380-1383. https://doi.org/10.62225/2583049x.2024.4.3.2949

Pun, R. (2020). Aligning ACRL's Framework for information literacy with communication studies' learning outcomes for library instruction: An exploratory study. *Education Quarterly Reviews*, *3*(3).

Qazi, M. A., Sharif, M. A., & Akhlaq, A. (2024). Barriers and facilitators to adoption of e-learning in higher education institutions of Pakistan during COVID-19: Perspectives from an emerging economy. *Journal of Science and Technology Policy Management*, *15*(1), 31-52. https://doi.org/10.1108/JSTPM-01-2022-0002

Rafi, M., Jian Ming, Z., & Ahmad, K. (2022). Estimation of the knowledge management model for performance measurement in university libraries. *Library Hi Tech*, *40*(1), 239-264. https://doi.org/10.1108/LHT-11-2019-0225

Rahman, M. M., & Ahmad, Z. (2024). Lifelong learning and technologic advancement in the halal industry. In *Advances in educational technologies and instructional design book series* (pp. 186–216). https://doi.org/10.4018/979-8-3693-1410-4.ch009

Rathnayaka, R. (2024). Learning odyssey: assessing user satisfaction through library guided tour. Sri Lanka Library Review, 38(1), 33-48. https://doi.org/10.4038/sllr.v38i1.69

Riyanto, S. (2023). Collection quality analysis at the animal husbandry library, universitas padjadjaran. Jurnal Kajian Informasi & Perpustakaan, 11(2), 161. https://doi.org/10.24198/jkip.v11i2.32836

Rosinsky, K., Murray, D. W., Nagle, K., Boyd, S., Shaw, S., Supplee, L., & Putnam, M. (2022). A review of human-centered design in human services. Human Centered Design for Human Services.

Saharkhiz, Y., Valizadeh, M., & Salamat, H. (2017). The evolution of academic libraries in the age of technology. *Journal of History Culture and Art Research*, *5*(4), 402-415.

Sambo, A., Imran, A., & Akanbi, M. (2022). Digital literacy skills among certified librarians in nigerian libraries: library overview. Journal of Digital Learning and Education, 2(2), 70-79. https://doi.org/10.52562/jdle.v2i2.316

Sanches, T., Antunes, M. L., & Lopes, C. (2022). International standards for information literacy. *LIBER Quarterly the Journal of the Association of European Research Libraries*, *32*(1), 1–22. https://doi.org/10.53377/lq.11131

Soltani-Nejad, N., Taheri-Azad, F., Zarei-Maram, N., & Saberi, M. (2020). Developing a model to identify the antecedents and consequences of user satisfaction with digital libraries. Aslib Journal of Information Management, 72(6), 979-997. https://doi.org/10.1108/ajim-04-2020-0099

Sommer, M., Kohnen, A. M., Ritzhaupt, A. D., & Hampton, J. (2021). Investigation of the Validity Evidence of the Information Literacy Self-Efficacy Scale (ILSES) among Undergraduate Students. *Communications in Information Literacy*, *15*(1), 1-23.

Sonia, S., Mebin, M.R., Hussain, T.U., Huda, M.M., Hasan, M.A. (2023). Technological Shock in Digital Transformation of Higher Education in Bangladesh. In: Sultan, P. (eds) Innovation, Leadership and Governance in Higher Education. Springer, Singapore. https://doi.org/10.1007/978-981-19-7299-7_12

Soria, K., Fransen, J., & Nackerud, S. (2017). Beyond books: the extended academic benefits of library use for first-year college students. College & Research Libraries, 78(1), 8-22. https://doi.org/10.5860/crl.78.1.8

Thorpe, C. (2021). Transforming a university library into a learning organisation. *Library management*, *42*(6/7), 436-447. https://doi.org/10.1108/LM-01-2021-0003

Trigos-Carrillo, L. (2019). Community cultural wealth and literacy capital in latin american communities. English Teaching Practice & Critique, 19(1), 3-19. https://doi.org/10.1108/etpc-05-2019-0071

Ukwoma, S., Iwundu, N., & Iwundu, I. (2016). Digital literacy skills possessed by students of unn, implications for effective learning and performance. New Library World, 117(11/12), 702-720. https://doi.org/10.1108/nlw-08-2016-0061

Umar, H. and Habib, Z. (2022). Information literacy programme and the use of legal information resources by undergraduate law students in bayero university, kano. Information Impact Journal of Information and Knowledge Management, 13(1), 25-33. https://doi.org/10.4314/iijikm.v13i1.3

Wei, Z. (2023). Navigating digital learning landscapes: unveiling the interplay between learning behaviors, digital literacy, and educational outcomes. *Journal of the Knowledge Economy*, 1-31. https://doi.org/10.1007/s13132-023-01522-3

Weightman, A., Farnell, D., Morris, D., Strange, H., & Hallam, G. (2017). A systematic review of information literacy programs in higher education: effects of face-to-face, online, and blended formats on student skills and views. Evidence Based Library and Information Practice, 12(3), 20-55. https://doi.org/10.18438/b86w90

Williams, R. D., & Ogden, L. P. (2021). What knowledge and attitudes inform public librarians' interactions with library patrons in crisis?. *Journal of Librarianship and Information Science*, *53*(1), 62-74. https://doi.org/10.1177/0961000620917720

Wilson, T. D. (1999). Models in information behaviour research. *Journal of documentation*, *55*(3), 249-270. https://doi.org/10.1108/EUM0000000007145

Wirba, A. V. (2021). Transforming Cameroon into knowledge-based economy (KBE): The role of education, especially higher education. *Journal of the Knowledge Economy*, 1-31. https://doi.org/10.1007/s13132-021-00776-z

Xu, F. and Du, J. (2018). Factors influencing users' satisfaction and loyalty to digital libraries in chinese universities. Computers in Human Behavior, 83, 64-72. https://doi.org/10.1016/j.chb.2018.01.029

Yang, R., Tan, T. F., Lu, W., Thirunavukarasu, A. J., Ting, D. S. W., & Liu, N. (2023). Large language models in health care: Development, applications, and challenges. *Health Care Science*, *2*(4), 255-263. https://doi.org/10.1002/hcs2.61

Zhang, Y., Lo, P., So, S., & Chiu, D. K. (2020). Relating library user education to business students' information needs and learning practices: a comparative study. *Reference Services Review*, *48*(4), 537-558. https://doi.org/10.1108/RSR-12-2019-0084