

# An Analysis of the Evolution of University-Level Digital Libraries

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**Abstract:** *This study examined the development, awareness, adoption, and use of digital library (DL) resources at the university level. Building and executing a successful system requires examining the success criteria and identifying the main technical elements of digital library resources. The definition and grouping of information technology used in electronic libraries has an impact on user satisfaction in a digital library (DL) environment. These consist of ease of use, accessibility, a straightforward interface design, superior communication quality, Internet performance, services for performance assurance, ease of contact on social networks, and acquisition led by the client. These important aspects of DL services have made the functionality of DL utilities and the simplicity of accessing online information crucial issues. The DL discovery system was then built using the Blacklight open-source software after a number of research papers were reviewed and evaluated to determine the value of DL services.*

**Keywords:** Digital Library, University Level

## I. INTRODUCTION

Libraries utilize networks to manage user diversity, knowledge overload, and budgets. Groups improve digital service access and lower subscription prices [1, 2]. Digital users may access hardware and software-processed, digitally driven electronic library materials via remote information provider networks or install them locally via digital library (DL) administrators. It moves the citadel of information acquisition to a culture of tailored, flexible, and synergistic ICT [3]. Library issues are addressed by digital libraries. DL e-books, bulletins, references, theses, and dissertations are online [4]. DL user satisfaction is determined by ease of access, minimal download exceptions and limits, simplicity of the DL interface design, quality of interaction, Internet performance, quality assurance service, and social network-enabled communication [5, 6].

Online academic libraries are needed for teaching, training, and research [7]. DL resources were built to preserve history, discoveries, and accomplishments in records and collections [8]. Membership fees, information management systems, marketing, and awareness campaigns help academic libraries promote digital library resources [9]. To value library investments, users must identify their information requirements and use DL. Researchers are expanding DL understanding, availability, and usage since academic institutions cannot simply educate students how to utilize it. The worldwide knowledge and use of DL shows that students confront many challenges to utilizing online library resources [10–12].

Global libraries are changing owing to ICT expansion and use [13]. Underdeveloped nations have more obstacles than wealthy ones, even when institutions constrain DL resources. The literature highlights several challenges, including inadequate information and digital literacy skills, unfavorable student attitudes toward electronic tools, inadequate Internet connectivity, inadequate ICT infrastructure, information overload, excessive amounts of irrelevant data, licensing restrictions on access to the DL collection, preference for print assets over electronic resources, and deterring academic students from using

Most library users use popular search engines, therefore most services are underused. Thus, librarians must adapt teaching goals, methods, and effectiveness [18]. Without training, library personnel and consumers may not know how to appraise services, making e-resources less accessible and usable [19]. DL development requires a lot of money, effort, and labor for e-library administration to satisfy users. Since most libraries have little funding, sharing items is

common. Consortium, or library organization, aims include resource sharing and collaboration. This research analyzes how university academics use, produce, and understand library electronic resources. This report critically assesses library services and DL resources. The document defines university research DL criteria. This study reviews many studies on DL service usability and designs a user-friendly DL discovery technique to decrease these learners' technical obstacles. DL resources related to usability, development, accessibility, and discovery systems are examined in this research.

### **The Quality of Service in Digital Libraries**

With DL services, QoS is critical to service delivery. Many DL system QoS analysis approaches and designs exist [20]. However, most DL QoS attempts focus on user experience breadth. Ahmad and Abawajy [20] discussed several digital service provider difficulties. As seen in the model, digital service providers' QoS impacts end customers' pleasure.

An alternative electronic library design hypothesis by DeLone and McLean [21] studied how procedural and data reliability affects user satisfaction. Wixom and Todd [22] discovered that data storage system information, device dependability, perceived usefulness, usability, and application behavior impact user satisfaction. Zhang's research [23] shows that information quality and arrangement impact social media users' satisfaction and connection. In library-connected mobile learning, Tu and Hwang studied sensing technologies and learning approaches [24]. The research studied library-supported mobile learning and location-based sensor technologies. The findings demonstrated that mobile, wireless network, and sensor technologies had improved library resources and services.

Guajardo et al. [25] from the University of Houston Libraries indicated academic libraries' discovery tactics have changed. The authors observed that libraries have used discovery systems for years to satisfy user expectations and deliver relevant search experiences. The University of Houston Libraries uses a two-index-based discovery system, open-source tool, and federated search solution to follow this trend. To increase consumer alternatives and e-resource access, discovery system assessment criteria and critical lessons must be defined for future system review and implementation. Oh and Colón-Aguirre [26] observed that academic library seeking tools and Google Scholar differ in comprehensiveness, subjective norm, loyalty, and intended use. Google Scholar had superior ratings for ease of use, contentment, and system quality than academic library discovery systems, showing that user enjoyment is a key indicator of DL service quality.

### **The Satisfaction of Users with Digital Library Systems**

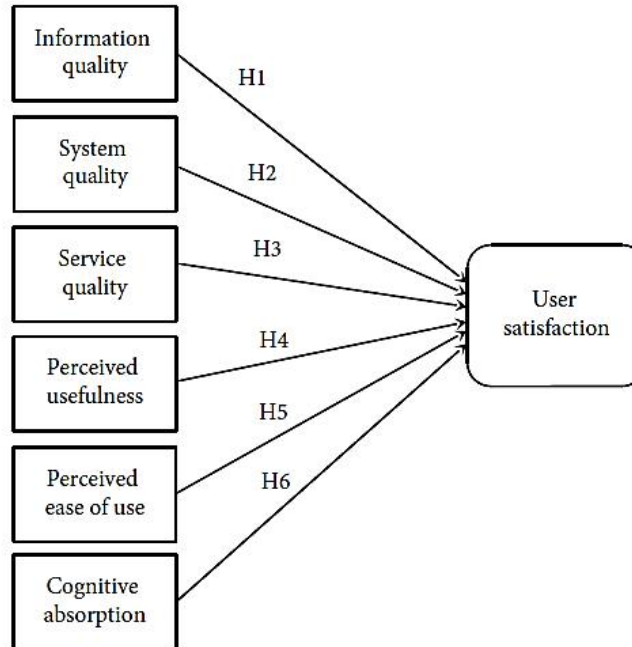
Library quality management requires user satisfaction assessment and preservation. DL backdrop describes pleasure as "feeling happy with the DL in helping to complete a task" [27]. Customer satisfaction with DL services depends on their experience. DL suppliers often need comprehensiveness, accessibility, rapid satisfaction, reaction speed, smooth software capacity, user-friendliness, single interface, and numerous forms, words, pictures, and audio. [28]. DL evaluation depends on user satisfaction with its design and functionality [13].

Info quality. Many academics and researchers believe data reliability is essential for computer-based data analysis. DL considers information quality essential for information needs. Its attributes include consistency, design, timeliness, currency, reliability, completeness, accuracy, and importance [29]. Information quality greatly affects DL users' satisfaction.

A quality system. System quality affects user perception of DL knowledge gathering and delivery [29]. In many cases, the quality cycle affects user satisfaction in information system development. Quality, accuracy, reliability, and accessibility are essential for DL performance evaluation [29–32]. High quality, accessibility, and consistency provide the DL requires remote infrastructure access to information anytime, wherever. This preserves DL accuracy and utility. DL search effectiveness relies on user quality, correctness, and completeness. According to Masrek and Gaskin [13], DL program quality greatly affects user satisfaction. Figure 1 shows that system quality greatly predicts DL user happiness.

Good service. Service quality represents user perception of DL information processing and distribution. Research shows that QoS is crucial to DL user pleasure, along with information quality and applications. Researchers use many service quality models to assess DL. Design options include DigiQUAL [33] and LibEval [29]. Many authors assessed DL service quality in addition to these models [32]. Digital service success depends on access, reliability, accessibility,

and reactivity. Service quality affects digital library uptake (18, 36-38). However, other research suggests that perceived worth greatly affects contentment [39, 40]. DLers seek details. If DL's information is useless, their pleasure may diminish.



**Figure 1: Users' satisfaction with digital libraries [13].**

3.5 Usability. Whether a system is simple to use is called perceived ease of use (34). User-friendliness indicates low-effort DL use. Usability and accessibility are linked in the literature [41]. When DLs are hard to get, consumers find them tough to use, whereas readily available ones are easy to use [42]. Easy usage associated with OPAC satisfaction in other library research [43]. Research shows that perceived ease of use boosts pleasure. The lack of face-to-face interaction in digital communication makes it vital. Users should be happy and QoS and reliability matter for an open, healthy, sensitive, and well-integrated DL.

Seen benefit. How well DL supports academic success is termed perceived usefulness [34]. To evaluate perceived value, authors integrated DL service net benefit and ISSM in the Technology Acceptance Model (TAM) [31, 35]. Several studies show that perceived user-friendliness increases DL user happiness.

Cognitive Absorption. Cognitive absorption involves extensive DL use. This idea originated in information system (IS) research to help users evaluate systems. The original building concept considered utilization [44]. Mental retention was included to the updated model to assess user-friendliness [13]. No research has examined how cognitive focus affects DL satisfaction. Since DL is a subset of computer-based ISS, it works like e-learning. DLs need previous research on cognitive integration and user satisfaction. Cognitive immersion improves DL user satisfaction.

Patron-driven Buy. A library development model called patron-driven acquisition (PDA) or demand-driven acquisition (DDA) only acquires resources when customers require them. Libraries provide DL users appropriate access to search engines, instructional resources, and catalogs to request things. A library buys an item and offers users quick access after a certain number of pages or requests [45]. The library may buy the content permanently or with a restricted license. Since material is digital, "PDA emphasizes collecting for and at the time of need" rather than long-term attention [46]. Usually, patron-driven acquisition involves e-book sets, although print and hybrid PDA are choices [47]. This PDA digital content use strategy offers several advantages. E-books are immediate, don't need space, increase collecting capacity, and are guaranteed, which is important when purchasing materials [45]. Security prevents library funds from being drained without intervention. However, customers can only print a few pages, some publishers do not write book pages, and e-books can only be "checked-out" temporarily. Many customers cannot access titles without

“checking-in.” Patrons may not desire specific publisher or third-party publications in electronic format, and some shops block e-book downloads [48]. Not all enable chapter or e-book downloads.

Comparison of e-book suppliers is impossible without a library with multiple vendors. Software subscriptions may be difficult, library finances may change, e-books may be expensive, and dealers may charge extra for digital copies. E-book maintenance assessment uses seller-specific project counter information. These data affect the dependability of counter statistics, DL Resource Administrators' access, and merchants', faculty's, and students' text annotation and note-taking. This is students' main complaint over one- or multi-seat e-book licensing [49]. Libraries worry about broken Internet connections to e-books, not online book theft, using PDAs. If aware, publishers may address this problem. Libraries provide e-books on- and off-campus, making them accessible anywhere. A new tool for library integration, e-book PDAs can conserve storage and be immediately available [50]. Table 1 shows major DL adoption and usage characteristics.

### **The Way Forward and Future Prospects**

ICT has revolutionized worldwide information consumption. Even if academics and research groups have trouble finding internet material, library customers may now access other resources to meet their information needs. These include accessibility concerns, download constraints and exceptions, complex information system interface design, poor communication process quality, and poor Internet quality. Electronic library resources with multitasking information accessibility, an easy-to-use interface, a quality assurance service, and simple social network communication have been built to gratify DL users.

Libraries' discovery systems are still limited. Discovery technologies are strong and easy to use, but all content producers must cooperate to give their content. Occasionally, discovery tools may not work with specific databases. Such situations need researchers to be educated and encouraged to examine databases. Another big problem is that many databases use their specialist terminology to enable subject access to website information. Because a discovery tool mixes several databases, researchers must be aware that various databases may describe the same topic differently. In psychological databases and literature, "imagery" is used multiple times. Therefore, researchers should utilize more descriptors while searching for publications to reduce field incompatibilities. Google searches the complete text, not just the information like the library discovery system. This makes library discovery system search efficacy difficult [79]. Based on these findings, the review analyzes the accessibility of DL information in the following areas: (i) obstacles that prevent students from using online resources, (ii) user satisfaction with digital libraries, (iii) key factors associated with DL adoption and usage, and (iv) upcoming DL services and user-friendly DL discovery systems to reduce technical difficulties for distant learners.

## **II. CONCLUSION**

The objectives of this study were to create a user-friendly DL discovery system and conduct a thorough analysis of the accessibility of DL content. The analysis indicates that the most crucial element in the creation of DL systems is the library user's dimension. This makes it possible for researchers to identify which features—specifically for the enhancement of the DL system—might be derived from other technologies. This paper describes the different DL systems and models, DL tools, and the proposed architecture of digital library services. It also yields a user-friendly DL discovery system. The DL discovery system is created with quality of service (QoS) for its users in mind. The created DL discovery system places emphasis on certain components aimed at guaranteeing environmental quality, delivery quality, result quality, and uniformity with DL procedures. This work supports the conceptual design and development of the discovery tool in university libraries about the transition from conventional DL resources to modern DL resources. Additionally, it offers thorough user forecasts and instructions on how to use information processing and reference tools in libraries. But today, most libraries are starting to provide one-stop shopping options to their customers, enabling them to simultaneously browse through a range of items. Moreover, this research offers a comprehensive understanding of library users' knowledge, acceptance, and use of DL resources. It distinguishes between the usage of DL discovery systems' development tools and other library services such as repositories and online catalogs.

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