Analysis of User Satisfaction of Academic Digital Libraries: A case of Uzbekistan

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Abstract—**This study was conducted to examine user satisfaction with academic digital libraries in Uzbekistan. A survey was carried out among academic users from various higher education institutions, including students and faculty members. The survey aimed to identify key factors such as information quality, system usability, service efficiency, and the availability of digital resources. The results indicated that the majority of users consider academic digital libraries beneficial for research and study purposes, with high ratings for accessibility and resource diversity. However, certain shortcomings were identified, particularly in system navigation and technical support services, which require improvements. The study highlights the necessity of continuous development in digital library infrastructure to enhance user experience. These findings provide valuable insights for policymakers and educational institutions striving to improve digital library services in Uzbekistan.**

Keywords— *Academic Libraries, Digital Libraries, Information Quality, Library Services, Library Resources, User Satisfaction, System Quality, Service Quality, UniLibrary system.*

I. INTRODUCTION

Today, libraries have become not only a place to provide information resources, but also innovative centers that provide services to users through modern technologies. The level of user satisfaction with an academic digital library is a key factor affecting the effectiveness and long-term success of libraries. A digital library provides services and opportunities aimed at ensuring the information needs of its users, including availability, resource quality, and ease of use of the system. Measuring user satisfaction is a key way to obtain important data for continuous improvement and development of user-oriented services. The development of information management technologies and information systems has led to significant changes in the educational environment and the library system. In Uzbekistan, academic digital libraries are increasingly integrated into higher education institutions in order to improve the scientific and pedagogical experience.

Understanding user interaction with the system and their satisfaction with library services helps to identify areas where service quality needs to be improved. Samadi et al. also emphasized the need to evaluate the effectiveness of digital libraries through user interaction and satisfaction. A study conducted at the University of Tehran identified information quality, system quality, and service quality as important factors that directly affect user satisfaction [1]. Meanwhile, a study conducted by Nordin et al. evaluated the effectiveness of digital reference services in university libraries and found that user satisfaction is directly related to service quality. Their findings highlight the importance of library services being responsive, having good communication skills, and providing services that meet user expectation [2]. Furthermore, a study conducted by Norizan Anvar et al. focused on how the user experience (UX) of library

websites affects the effectiveness of digital libraries. The results of the study indicate that users' experience with a digital library website is directly related to its usability, ease of use, and overall value [3]. Pratiwi et al. used the System Usability Scale (SUS) to assess the usability and effectiveness of information systems in digital libraries. Their study found that the INLISLite digital library system was moderately usable and some users had difficulty using the system. The results of this study confirmed the importance of improving usability and user satisfaction for digital libraries [4].

User satisfaction assessment is important for optimizing digital library services and meeting the needs of academic users. A study by Bopape et al. found that researchers in public libraries in the Limpopo province of South Africa found that they should regularly assess user needs and adjust services accordingly. This finding is consistent with the trend in modern academic digital libraries, where user needs assessment is important for improving service quality [5]. The study conducted by Kishor and Bhakt also emphasized the need to study the information needs of library users and provide them with appropriate services. The results of the study show that the methods of searching for information by library users depend on their level of education, specialization and access to technology. It is also noted that increasing the level of information access of users is important for effective use of electronic library resources and services [6].

There are also a number of other studies investigating factors that influence user satisfaction in academic libraries. Emmanuel Baffour Gyau et al. assessed user satisfaction at Jiangsu University Library and found that users were highly satisfied with the library's support for teaching and research, how users were treated, and the overall quality of service. These results can help academic libraries improve their service quality and increase user satisfaction [7]. In a 2020 study, N. Soltani-Nejad and colleagues developed a model to identify factors that influence user satisfaction with digital libraries. The study found that ease of use of a digital library and the quality of digital resources are key factors in user satisfaction. Greater satisfaction leads to greater engagement, including recommending the library to others and reusing it. In addition, system quality, service quality, and information quality play a crucial role in shaping users' perceptions and attitudes toward digital libraries [8]. Mra Kadir et al. focused on improving the effectiveness of digital library services used by university students in 2023. They developed an empirical model to examine the relationships between information quality, system quality, service quality, and digital library collections with student satisfaction. Mediating factors such as perceived usefulness and ease of use were included to test their effects on user satisfaction. Their study highlights the importance of these factors in improving digital library services [9]. Jeong Hyun-chun

and colleagues identified 18 non-contact services in academic libraries in Korea and categorized them as supported information access, supported learning and research, and supported support opportunities. This study identified five key factors for improving non-contact services. Convenience, responsiveness, security, reliability, and personalization. They found that reliability affects satisfaction with research support, but convenience and reliability are key when accessing information and learning support [10]. Nur Azima Azib et al. found that system quality and service quality are the most influential factors on user satisfaction. They suggested that libraries improve these aspects to improve user experience [11].

V.V.K.Suryanarayana Merti in his study recommended conducting regular orientation sessions to provide students with detailed information about library services and resources and conducting frequent in-house trainings for library staff [12]. Zakaria Abkari in his study noted that there are serious shortcomings in the library of Nar-Bit University, such as excessive noise and outdated textbooks, which negatively affect the study and research activities of students. He suggested updating the library collection with the latest textbooks, improving the electronic library, and reducing furniture and noise to increase efficiency [13]. Rahmatullaev M. suggested that in today's information-rich environment, where it is necessary to determine the information needs of users based on many parameters, fuzzy modeling is a practical way to work with expert knowledge. This helps to identify more structured needs of users and makes library services more effective [14].

II. Materials and Methods

The main objective of this study was to analyze the level of user satisfaction with academic digital libraries in Uzbekistan.

The specific objectives of the study are as follows:

a) To analyze and assess the level of use of digital library services among university students and staff.

b) To identify factors affecting user satisfaction with available digital resources and services.

c) To study the frequency and preferences of digital library users in higher education institutions in Uzbekistan.

The study used a survey method to collect data from a diverse group of participants, including undergraduate students, graduate students, teaching assistants, senior lecturers, associate professors, and professors. The study involved 54 participants, which provided valuable information about user satisfaction and patterns of use of digital libraries in academic settings.

The survey included the following questions:

- What is your age?
- What is your gender?

- What is your academic degree?
- For what purposes do you use the library?
- What types of resources do you usually use in the electronic library?
- Does the collection of the library at your institution satisfy your information needs?
- How do you evaluate the service quality provided by traditional library staff?
- Is the working schedule of the library at your institution convenient for you?
- What are your thoughts on the electronic resources and online services available in the library at your institution?
- What new services or resources would you like to be added to the library at your institution?

III. RESULTS AND DISCUSSION

This section analyzes the factors influencing user satisfaction of university digital libraries. The study results are based on the respondents' experiences, highlighting their preferences and problems when using digital resources. In addition, users' opinions on library services are summarized and recommendations are given to eliminate existing shortcomings.
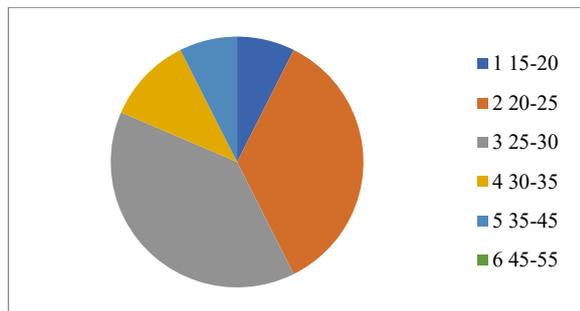

Fig. 1. Age Distribution of the Respondents.

Fig. 1 presents the age distribution of the respondents. The majority of the participants fall within the 25-30 age group, representing 38.9% of the total respondents. The second largest group consists of individuals aged 20-25, accounting for 35.2%. The 30-35 age group follows with 11.1% of the respondents. Both the 15-20 and 35-45 age categories contribute equally, each representing 7.4%. Notably, no respondents fall within the 45-55 age range. Overall, the data indicates that the sample is predominantly composed of younger adults, with the highest concentration in the 25-30 age bracket. The majority of the participants are female, accounting for 75.9% of the total sample, whereas males make up only 24.1% of the respondents.

Fig. 2 illustrates the academic degree categories of the respondents. The largest group consists of undergraduate students, making up 46.3% (25) of the total sample. Master's students and senior lecturers each account for

16.7%, sharing the second-largest representation. PhD students make up 9.3%, while associate professors represent 5.6% of the respondents. Assistant lecturers contribute 3.7%, and the smallest group is professors, comprising only 1.9%. Overall, the data indicates a higher participation from students, particularly undergraduates, compared to faculty members and senior academic staff.
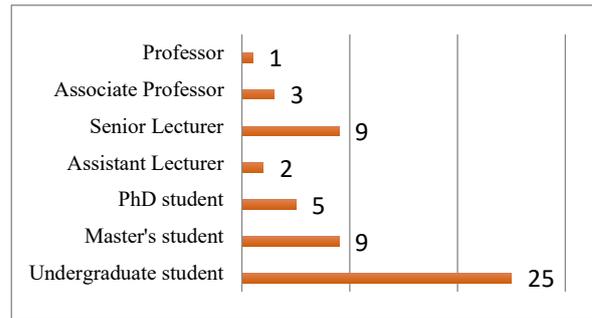

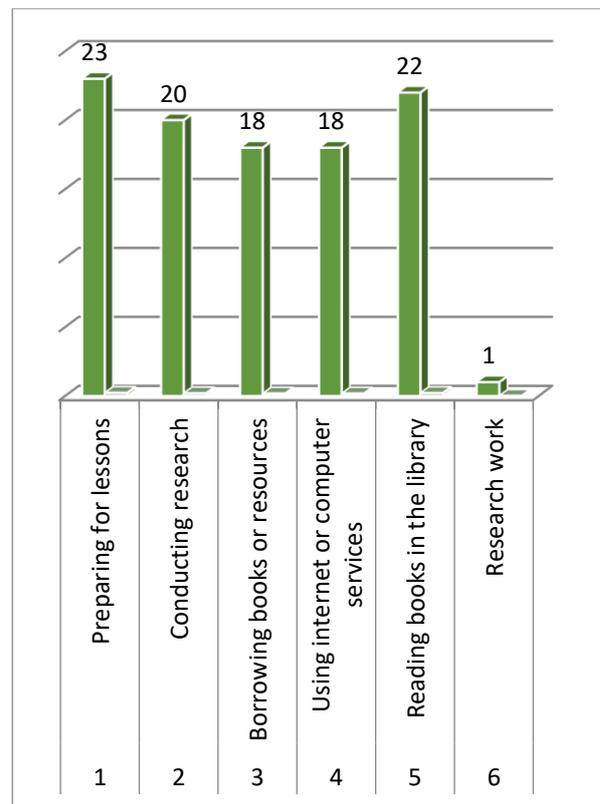Fig. 2. Academic Degree Categories of the Respondents.

Fig. 3. Purpose of visits to Library.

Fig. 3 shows the distribution of purposes for library visits among respondents. The most common reason for visiting the library is preparing for lessons, accounting for 22.55% (23) of the total responses. Conducting research follows closely with 19.61% of the respondents.

Both borrowing books or resources and using internet or computer services are tied, each representing 17.65% of the total. Reading books in the library is another prominent reason, making up 21.57% of the responses. Lastly, only 0.98% of the respondents visit the library specifically for research work. Overall, the data reveals that the majority of respondents visit the library for academic and educational purposes, with the highest focus on lesson preparation and research activities.
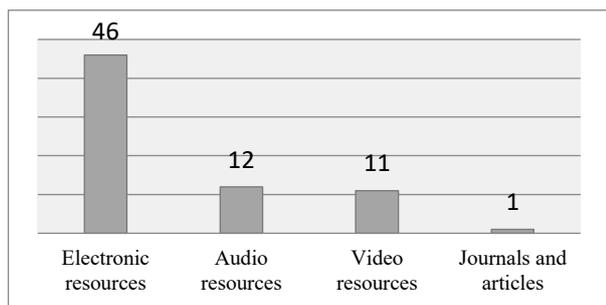

Fig. 4. Using e-library resources of the Respondents.

Fig. 4 shows the distribution of use of electronic library resources among respondents. According to it, the most frequently used resource is electronic resources, accounting for 65.71% (46) of the total responses. Electronic resources include e-books, scientific articles, digital publications and other information materials, and these resources are considered the most effective and convenient among users. Audio resources are used by 17.14% of respondents. These resources include audiobooks or other information materials in audio format, and they are mainly suitable for users who prefer to read or listen. Video resources are used by 15.71% of respondents. These resources include video tutorials or scientific videos and are useful for users who want to gain knowledge through reading or watching. Only 1.43% of respondents who are familiar with journals and articles use them as electronic library resources. These resources may be necessary for scientific research or special studies, but they are less in demand among general users. Thus, electronic resources are the most popular in library use, while other resources (audio, video, magazines, and articles) are used less frequently.

Also, when asked the question "Does the literature in the library of the institution where you study or work meet your needs?", 53.7% of respondents answered "Yes", indicating that the literature in the library fully meets their information needs. This means that the books, scientific articles, magazines and other resources in the library provide sufficient and necessary information for users. Respondents consider library resources to be useful for scientific research, reading and other purposes. 35.2% of respondents answered "No", indicating that the library does not fully meet their needs. These users do not consider the resources available in the library to be sufficient and believe that there is no information or

literature they need. Perhaps these users are unable to find additional materials, new publications or specialized literature in the library for their special research or study. 11.1% of respondents chose the "I do not know" option, indicating uncertainty. This group of users could not express a clear opinion about the literature in the library. This probably refers to users who use the library resources less or do not have a clear idea of how they can meet their needs. In general, these data show that the majority of respondents consider the library collection to be adequate for their needs, that is, they believe that they can obtain the information they need through the resources available in the library. However, a significant part, namely 35.2% of respondents, do not consider the library collection to be sufficient and they could not find the necessary literature in the library. At the same time, these results indicate the need to develop the library collection and adapt its resources to the needs of users. The data also indicate that the library resources need to be updated or expanded to cover unmet needs.
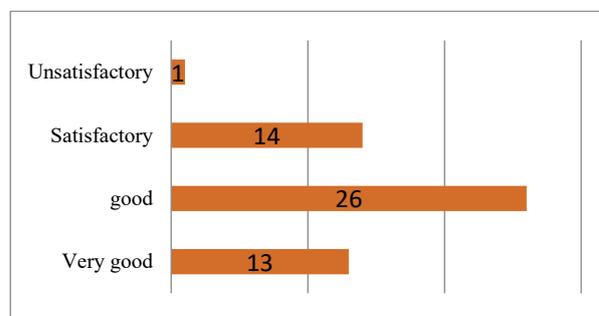

Fig. 5. Respondents' evaluation of the service quality of traditional library staff.

Fig. 5 shows respondents' ratings of the quality of services provided by traditional library staff. 48.1% (26) of respondents rated the service provided by library staff as "good". This indicates that most users are satisfied with the services provided by the library and consider them to be of good quality. High ratings of service quality indicate that the service is efficient, helpful to users, and appropriate. 24.1% of respondents described the service as "very good". These users rate the library services as of high quality and are completely satisfied with the services. This means that the library staff is meeting the needs of the users perfectly and providing a high level of service quality. 25.9% of respondents rated the service as "satisfactory". Users in this group are satisfied with the quality of library services, but they see some shortcomings or areas that need improvement in the service. They believe that some aspects of library services can be improved or expanded. 1.9% of respondents considered the service to be "unsatisfactory". This small group of users are not at all satisfied with library services and they believe that the quality of library services is very low or does not fully meet their needs. Overall, these data show that the majority of respondents are satisfied with the services provided by library staff. Most of them rated the quality of service as "good" or

"very good", which indicates that the library's service system is working effectively and is satisfactory for users. Also, some respondents rated the service as "satisfactory", which also indicates that the quality of services can be improved. Only a small part, namely 1.9% of respondents, consider library services to be "unsatisfactory", which indicates the need to improve library services.

When asked "Are the library hours of the institution where you study or work convenient for you?", the majority of respondents, 81.5%, considered the library's working hours convenient. This indicates that most users find the library's working hours convenient for their needs and they can find a convenient time to use the library. However, 18.5% of respondents rated the library's working hours as inconvenient. Users in this group said that the library's working hours did not fit their schedule or were not convenient for them. They indicated that additional time or flexible working hours were required to fully utilize library services. Overall, the data shows that the majority of respondents are satisfied with the library's working hours, which means that the library's working hours are comprehensive and flexible for users. Although a small proportion, 18.5% of users, expressed dissatisfaction with the library's working hours, this situation indicates the need to further optimize the library's working hours system.

Fig. 6 depicts respondents' opinions on electronic resources and online services. 44.4% (24) of respondents rated electronic resources and online services as "Good". This indicator shows that the majority of library users are satisfied with these services. A "Good" rating indicates a positive opinion that the quality of services meets the needs of users and is provided as intended. 29.6% of respondents rated the services as "satisfactory". These users consider the library services to be satisfactory, but note that some aspects need to be improved. Such users probably feel that some features or the convenience of the services need to be improved. 16.7% of respondents rated the services as "excellent". Users in this group rate the library resources and online services at the highest level and state that they are completely satisfied with them. This indicator shows that the library provides the highest quality of services. 5.6% of respondents rated the services as "unsatisfactory", indicating that this subgroup is not fully satisfied with the quality of the library's services. They note significant shortcomings in the services or their failure to meet the needs of users. 1.9% of respondents rated the services as "very poor". Users in this group consider the library services to be of very low quality and see a need to improve the services. Overall, these data show that the majority of respondents have a positive opinion of electronic resources and online services. Most users rated the services as "Good" or "Satisfactory". However, some users were dissatisfied

with these services, noting that there is a need to improve the quality and adapt the services to the needs of users.
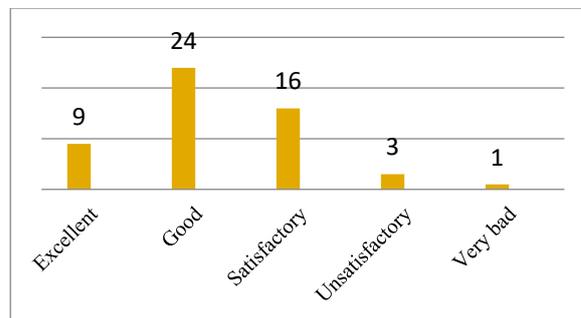

Fig. 6. Respondents' opinions on electronic resources and online services

In addition, in response to the question of what new services or resources they would like to see, added to the library of their institution, users have expressed many offers. The most common requests were to increase the availability of electronic literature, organize training sessions on subscribing to and using scientific databases, create a special area for scientific researchers, provide access to an international digital library, introduce advanced search services, introduce modern information and library services, develop a recommendation system, expand the collection of foreign scientific literature, etc.

The survey results provide valuable information about the current state of academic digital libraries in Uzbekistan and user satisfaction with their services. The results show that although the majority of users are satisfied with the availability of electronic resources, there is still significant room for improvement. The main factors affecting user satisfaction include the use of digital materials, the quality of services provided by library staff, the ease of use of the system, and the convenience of working hours. One of the most important conclusions is that most respondents consider e-resources to be extremely useful, with 65.71% often using e-books, articles, and other digital materials. However, a significant proportion of users expressed concerns about the availability of certain scientific databases and access to the most current foreign literature, suggesting that even when digital libraries offer a wide range of materials, their collections may not fully meet the research and teaching needs of all users. By expanding access to international digital libraries and expanding subscriptions that are considered scientific databases, solving this issue will significantly improve user satisfaction.

Furthermore, this study highlights the importance of training sessions to improve digital literacy among students and teachers. Many respondents suggested holding seminars and workshops to teach users how to effectively navigate digital library resources, use search tools, and access scholarly databases on a subscription basis. Such efforts could narrow the gap between

available resources and users' ability to use them effectively.

Another important aspect that respondents discuss is the need for advanced research services and recommendation systems. Many academic digital libraries in Uzbekistan are still based on basic research capabilities and do not always produce effective and relevant results. Implementing AI-based search algorithms and personalized recommendation systems can provide more accurate and targeted information, significantly improving user experience.

The survey also identified issues related to the library environment and facilities. While many users expressed satisfaction with the opening hours and quality of services provided by existing library staff, some suggested improvements such as dedicated study areas for researchers, better noise control, and improved research facilities. Creating dedicated research spaces and providing a more conducive environment for research can meet the needs of graduate students and faculty who require a calm and professional environment. Finally, respondents emphasized the importance of modernizing library services in line with international standards. The introduction of innovative library technologies, such as artificial intelligence-based cataloging, real-time support chatbots, and mobile-enabled digital library platforms, can further optimize the accessibility of library resources.

Overall, this study shows the need to further improve digital library services in Uzbekistan. Although users perceive the benefits of academic digital libraries, addressing identified challenges such as limited access to academic databases, the need for study sessions, enhanced search capabilities, dedicated research areas, and streamlining of services would significantly improve user satisfaction and the overall effectiveness of digital libraries. By introducing these recommendations, universities and university establishments may ensure that their digital libraries remain precious and relevant in the development landscape in development. In addition, the Unilibrary system is a platform for a digital library implemented in higher education establishments in Uzbekistan. This system is intended to provide students and teachers with access to various academic resources, supporting both training and scientific research. Academic digital libraries in Uzbekistan are always at the development stage concerning the implementation of user satisfaction mechanisms. Although the UniLibrary system offers essential services and resources to meet user needs, there are currently no structured mechanisms, such as surveys or questionnaires, to evaluate user satisfaction. Therefore, introducing such mechanisms would be crucial for further improving the system and gaining a better understanding of user demands.

IV. CONCLUSION

This study examined user satisfaction with academic digital libraries in Uzbekistan, analyzing awareness, usage, and key influencing factors. The results show that while most users appreciate the availability of digital resources, there are significant challenges with resource availability, service quality, and use of library systems. Most respondents expressed a need for more electronic literature, improved access to scholarly databases, and training in the use of digital resources. In addition, users emphasized the importance of improving library services, including the introduction of advanced search tools, modern recommendation systems, and specialized research platforms. Based on the results, the following recommendations were proposed to improve the efficiency of the academic digital library of Uzbekistan and increase user satisfaction:

a) Expand digital resources - increase the availability of electronic books, journals, and research articles to meet the diverse needs of students, faculty, and researchers.

b) Subscribe to international databases to access high-performance global research to support academic activities and improve research outcomes.

c) Training and seminars. We will organize regular training, webinars and seminars on the effective use of digital library services and research resources.

d) An advanced research system and recommendations to provide artificial intelligence-based research tools and personalized recommendations to improve the efficiency of information retrieval.

e) Dedicated research spaces - creating library specialties so that academic researchers can do their work in a resource-rich environment to achieve their goals.

f) Improve library service. Improved user experience, including more responsive library staff, extended opening hours and simplified billing and login processes.

g) Integration with global digital libraries. We will strengthen partnerships with international digital libraries to ensure wider access to high-quality research materials.

h) Improve user-centered services – Regularly evaluate user feedback to optimize the functionality of the digital library and ensure that services meet the changing needs of academic users.

Implementation of these recommendations will help enhance the role of academic digital libraries in supporting education and research in Uzbekistan. A digital library that addresses existing problems and includes improvements for users can be more effective, accessible, and valuable to the university community.

motivation, which made the research process more enjoyable and manageable.

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