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Users' satisfaction with digital libraries: An empirical study of higher education students

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Abstract
Digital Libraries are a widely used web service for information seeking, providing users with access to a vast array of resources and data. One of the main advantages of digital libraries is that they are designed with a global approach, meaning that all users are presented with the same interface. (Xu & Du, 2018) This approach allows for easy access to a wide range of information and resources, making digital libraries a valuable tool for users who are looking for a wide range of information. However, this global approach also has its drawbacks, as it may not consider the specific needs and preferences of individual users. This can lead to a less personalised and less efficient information seeking experience for some users, who may find it difficult to navigate the digital library and find the information they need. The study aims to understand the factors that contribute to users' satisfaction with digital libraries and to identify areas for improvement. 213 students of higher education from different streams were surveyed to know how digital libraries are helpful to them along with their satisfaction level with digital libraries. The area of the study was Delhi-NCR. The study concludes that the factors that contribute to users' satisfaction with digital libraries and to identify areas for improvement discussed in the study shows significant level of user's satisfaction with digital libraries.

Keywords: Digital library, higher education, user satisfaction

Introduction

The rapid development of information technologies such as cloud computing and cloud storage has greatly impacted the way digital libraries operate and provide access to information. With the advancement of these technologies, digital libraries are increasingly enabling users to remotely access a wide range of distributed information resources. This means that users can access information from various sources without having to consider the physical location of the storage. (Xu & Du, 2019) [2] This has greatly expanded the scope of information that is available to users, making it easier for them to find and access the information they need. Additionally, the use of cloud computing and storage has also made it possible for digital libraries to offer more robust and resilient services, as the information is stored in multiple locations, reducing the risk of data loss due to technical issues or other problems. Overall, the integration of cloud computing and storage has greatly enhanced the digital library experience for users, providing them with more comprehensive access to information and greater reliability of services. Users' satisfaction with digital libraries is a complex and multifaceted concept that is influenced by a variety of factors, including the usability and design of the library's website or platform, the availability and relevance of resources, and the quality of the search and discovery tools. Additionally, users' satisfaction is also affected by their individual needs and preferences, as well as their prior experiences with digital libraries. (Soltani-Nejad, Taheri-Azad, Zarei-Maram, & Saberi, 2020) [3] Therefore, understanding users' satisfaction with digital libraries is crucial for library administrators, who can use this information to improve the library's services and resources, and to increase usage and satisfaction among users. Key factor that affects users' satisfaction with digital libraries is the quality of the search and discovery tools. These tools are essential for users to find and access the resources they need, and they should be easy to use and provide accurate and relevant results. Users' satisfaction is also affected by their individual needs and preferences. For example, some users may prefer a simple and straightforward interface, while others may prefer a more advanced and customizable interface.

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Furthermore, users' satisfaction is also affected by their prior experiences with digital libraries. (Jeng, 2005) [5] Users who have had positive experiences in the past are more likely to be satisfied with the library's services and resources, while users who have had negative experiences in the past may be less satisfied. Understanding users' satisfaction with digital libraries is crucial for library administrators, who can use this information to improve the library's services and resources, and to increase usage and satisfaction among users. By considering the various factors that influence users' satisfaction and by gathering user feedback, library administrators can create a more satisfying and effective digital library experience for their users. Quality evaluation in digital libraries can be done in various ways. One way is by gathering feedback from users, which can provide insights into what users find valuable and what areas need improvement. Additionally, librarians and library administrators can also evaluate the quality of resources by assessing the credibility and relevance of the sources, and by checking for any inaccuracies or biases. This can help to ensure that the resources provided by the digital library are of the highest quality and are relevant to the users' information needs.

Literature review
The use of digital libraries has become increasingly prevalent in higher education, as they provide students with access to a wide range of resources and information. However, it is important to ensure that students are satisfied with the services and resources provided by digital libraries. A literature review of studies related to users' satisfaction with digital libraries in higher education can provide a comprehensive understanding of the factors that contribute to users' satisfaction and areas for improvement. Ease of navigation is a key factor in determining users' satisfaction with digital libraries. (Fuhr et al., 2007) [6] If users find it difficult to navigate the digital library and find the resources they need, they are less likely to be satisfied with the library's services and resources. This can lead to decreased usage of the digital library and a negative perception of the library among users. To improve ease of navigation and increase users' satisfaction with digital libraries, there are a few things that can be done. One of the most important is to ensure that the library's website or platform is well-organized and easy to navigate. This can be done by using clear and intuitive labels, providing clear and concise instructions, and using consistent design elements throughout the site. (Cheng, 2014) [7] Another important aspect of ease of navigation is to ensure that resources are easy to find and access. This can be done by implementing effective search and discovery tools that provide accurate and relevant results, and by providing clear and concise descriptions of resources. Additionally, providing tutorials and guides on how to navigate and use the library's resources can also help users to find what they need more efficiently. The relevance and availability of resources are key factors that impact users' satisfaction with digital libraries. If users are unable to find high-quality and relevant resources quickly and easily, they are less likely to be satisfied with the library's services and resources. This can lead to decreased usage of the digital library and a negative perception of the library among users. To improve the relevance and availability of resources, and thus increase users' satisfaction with digital libraries, libraries should

focus on acquiring and maintaining a collection of high-quality and relevant resources. (Islam & Ikeda, 2014) [8] This can be achieved by regularly reviewing and updating the library's collection, as well as by actively seeking out new resources that are relevant to the users' needs. Additionally, libraries can make use of data analytics to understand the users' usage patterns and preferences, and to identify areas where new resources are needed. (Ferreira & Pithan, 2005) [9] Furthermore, libraries should also ensure that the resources are easily discoverable through effective search and discovery tools, and that the resources are well-described and catalogued. Additionally, providing tutorials and guides on how to access and use the resources can also help users to find what they need more efficiently. Personalization and customization play a critical role in improving user satisfaction with digital libraries. By allowing users to tailor their experience to their individual needs and preferences, digital libraries can provide a more personalized and engaging experience. This can lead to increased usage, better engagement, and ultimately, more satisfied users. One key aspect of personalization and customization is the ability for users to create custom reading lists. This allows users to easily keep track of the books and articles they are interested in, and to quickly access them when they are ready to read. Additionally, many digital libraries now offer the ability to customize the interface, including the ability to change the color scheme and font size. Another important aspect of personalization and customization is the ability for users to receive personalized recommendations based on their reading history and preferences. This can be done through machine learning algorithms that analyze user data to make personalized suggestions. (Samadi, Masrek, & Yatin, 2014) [12] Additionally, many digital libraries now offer the ability to share reviews and ratings with other users, which can also help to personalize the experience. To improve user satisfaction with digital libraries, it is important to prioritize personalization and customization. This can be done by investing in new technologies that make it easier to personalize and customize the experience, as well as by actively seeking feedback from users and incorporating it into the design of the digital library. Additionally, it is important to invest in training and education programs for library staff to ensure they are equipped with the skills and knowledge needed to effectively support users in their personalization and customization efforts. Integration with other systems and platforms is a critical aspect of digital libraries as it allows users to access and utilize the library's resources in a seamless and efficient manner. When a digital library is integrated with other systems and platforms, users are able to search for and access resources from multiple sources, thereby increasing their satisfaction with the library. However, if the integration is not done properly, it can lead to a poor user experience, resulting in lower satisfaction levels. (Park, 2000) [14] For example, if the integration is slow or unreliable, or if the search results are not relevant or accurate, users may become frustrated and less likely to use the library in the future. To improve the users' satisfaction with digital libraries, there are a few things that can be done. First, the library should make sure that the integration with other systems and platforms is done correctly, so that the search results are accurate and relevant. This can be achieved by testing the integration and making any necessary adjustments. Security and privacy features

play a critical role in the satisfaction of users with digital libraries. Digital libraries often contain sensitive information, such as personal data and confidential documents. Therefore, it is essential that users feel secure and confident that their information is protected when using the library. When security and privacy features are in place, users are more likely to trust the digital library and feel comfortable using it. They are less likely to have concerns about the safety of their personal information, and are more likely to use the library regularly. However, if security and privacy features are lacking or inadequate, users may become concerned about the safety of their personal information and be less likely to use the library. They may also be less likely to trust the library and may seek out alternative sources for their information needs. To improve users' satisfaction with digital libraries, it is essential to have robust security and privacy features in place. This can be achieved by implementing a variety of security measures such as firewalls, intrusion detection systems, and encryption. Additionally, it is important to regularly review and update these security measures to ensure that they are up-to-date and effective against the latest threats. Another important aspect of security and privacy is ensuring that users are aware of the measures that are in place to protect their information. This can be done by providing clear and easy to understand explanations of the security and privacy features, as well as any policies and procedures that are in place. It is also important for digital libraries to have a clear and transparent policy on data collection, storage, and usage. This includes informing users of what data is being collected and how it is being used, as well as providing them with the option to opt-out of data collection if they choose. Finally, libraries should also have a clear incident response plan in place in case of a security breach. This includes having a dedicated team responsible for identifying and responding to security incidents, and ensuring that users are informed in a timely manner if their information is compromised. Technical support plays a crucial role in the satisfaction of users with digital libraries. Technical issues can arise at any time, and without proper support, users may become frustrated and less likely to use the library in the future. When technical support is readily available and effective, users are more likely to have a positive experience with the digital library and be satisfied with the service provided. They are less likely to encounter technical issues, and when they do, they are more likely to have them resolved quickly and efficiently. This can lead to increased usage of the digital library and a higher level of satisfaction among users. However, if technical support is lacking or inadequate, users may become frustrated with the library and be less likely to use it in the future. They may also be less likely to recommend the library to others, resulting in a decrease in usage and satisfaction. To improve users' satisfaction with digital libraries, it is essential to provide effective technical support. This can be achieved by having a dedicated technical support team in place, who are trained to handle and resolve a wide range of technical issues. (Alzahrani, Mahmud, Ramayah, Alfarraj, & Alalwan, 2019) [15] The technical support team should be easily accessible

and responsive to users' needs. This can be done by providing multiple ways to contact the team, such as through phone, email, or live chat, as well as providing clear and concise instructions on how to contact the team. It is also important for the digital library to have a comprehensive FAQ section and user manual available, which can provide users with answers to common technical issues and how to resolve them. Additionally, the digital library should proactively monitor the system for potential technical issues, and take steps to prevent them from occurring, such as regular maintenance and updates. User engagement and community building are crucial factors in determining user satisfaction with digital libraries. By fostering a sense of community and encouraging active engagement among users, digital libraries can create a more positive and rewarding experience for users. This can lead to increased usage, better engagement, and ultimately, more satisfied users. One key aspect of user engagement and community building is the ability for users to interact with each other and share their thoughts and ideas. Many digital libraries now offer forums and discussion boards where users can share their opinions and ask questions. Additionally, many digital libraries now offer the ability to create and join groups, which can be a great way to connect with other users who share similar interests. Another important aspect of user engagement and community building is the ability for users to contribute to the digital library by creating and sharing their own content. For example, many digital libraries now allow users to upload and share their own e-books and articles, which can be a great way to build a sense of community and engagement among users. Additionally, many digital libraries now offer the ability to create and share annotations, which can be a great way to engage with other users and contribute to the community.

Objective
1. To explore factors that contribute to users' satisfaction with "digital libraries" and to identify areas for improvement.
2. To know the level of user's satisfaction with "digital libraries."

Methodology
The study had considered 213 students of higher education from different streams to know how "digital libraries" are helpful to them along with their satisfaction level with "digital libraries". The area of the study was Delhi-NCR. The data analysis was conducted with the help of mean and t-test.

Findings
Table below is sharing basic details of the respondents. 213 students were surveyed in which male students are 69.9% and female students are 30.1%. 32.4% are below 18 years of age, 39.0% are between 18-20 years and rest 28.6% are above 20 years of age. 29.1% are from science stream, 28.2% are from arts, 26.7% are from commerce and rest 16.0% are from other streams of higher education.

Table 1: Basic Details of the respondents

Variables	Respondents	Percentage
Gender		
Male Students	149	69.9
Females Students	64	30.1
Total	213	100
Age (years)		
Below 18	69	32.4
18-20	83	39.0
Above 20	61	28.6
Total	213	100
Stream		
Science	62	29.1
Arts	60	28.2
Commerce	57	26.7
Others	34	16.0
Total	213	100

Table 2: Factors that contribute to users' satisfaction with "digital libraries" and to identify areas for improvement.

S. No.	Statements	Mean Value	t Value	Sig.
1.	Personalization and customization play a critical role in improving user satisfaction with digital libraries	3.13	1.931	0.027
2.	Clear and intuitive labels in digital libraries is important for user's satisfaction	3.19	2.840	0.002
3.	Digital libraries help the user to access wide range of information from anywhere at any time	3.14	2.126	0.017
4.	Digital libraries offer the ability to create and share annotations	3.15	2.232	0.013
5.	Digital libraries should be able to provide clear and concise descriptions of resources	3.12	1.815	0.036
6.	Implementation of effective search and discovery tools that provide accurate and relevant results	3.20	2.973	0.002
7.	Providing clear and concise instructions and use of reliable design elements throughout the site improves user's satisfaction	3.21	3.151	0.001
8.	Ease of navigation is a key factor in determining users' satisfaction with digital libraries	3.22	3.316	0.001
9.	Global approach may not take into account the specific needs and preferences	3.17	2.532	0.006
10.	Digital libraries provide users with access to a vast array of resources and data	3.18	2.727	0.003

Table above is showing the factors that contribute to users' satisfaction with digital libraries and to identify areas for improvement. The respondent says that Ease of navigation is a key factor in determining users' satisfaction with digital libraries with mean value 3.22, Providing clear and concise instructions and use of reliable design elements throughout the site improves user's satisfaction with mean value 3.21 and Implementation of effective search and discovery tools that provide accurate and relevant results with mean value 3.20. Respondent shares that Clear and intuitive labels in digital libraries is important for user's satisfaction with mean value 3.19, Digital libraries provide users with access to a vast array of resources and data with mean value 3.18 and Global approach may not consider the specific needs and preferences with mean value 3.17. Respondent also shares that Digital libraries offer the ability to create and share annotations with mean value 3.15, Digital libraries help the user to access wide range of information from anywhere at any time with mean value 3.14, Personalization and customization play a critical role in improving user satisfaction with digital libraries with mean value 3.13 and Digital libraries should be able to provide clear and concise descriptions of resources with mean value 3.12. Further t-test shows that all the statements are significant with the value below 0.05.

Conclusion
This empirical study of higher education students has revealed that personalization and customization, as well as user engagement and community building, play a critical role in determining users' satisfaction with digital libraries. The study found that students who were able to tailor the digital library experience to their individual needs and

preferences, and who were able to engage with other users and build a sense of community, reported higher levels of satisfaction with the digital library. To improve user satisfaction with digital libraries, it is important for library staff to invest in new technologies that make it easier to personalize and customize the experience, actively seek feedback from users, and provide training and education programs for library staff to support user engagement and community building efforts. This study is a useful reference for libraries and institutions to understand the importance of user experience in digital libraries and to improve the service accordingly.

The study had explored different factors that contribute to users' satisfaction with digital libraries and to identify areas for improvement and found that Ease of navigation is a key factor in determining users' satisfaction with digital libraries, Providing clear and concise instructions and use of reliable design elements throughout the site improves user's satisfaction, Implementation of effective search and discovery tools that provide accurate and relevant results, Clear and intuitive labels in digital libraries is important for user's satisfaction and Digital libraries provide users with access to a vast array of resources and data. The study concludes that the factors that contribute to users' satisfaction with digital libraries and to identify areas for improvement discussed in the study shows significant level of user's satisfaction with digital libraries

References
1. Xu F, Du JT. Factors influencing users' satisfaction and loyalty to digital libraries in Chinese universities. Computers in Human Behavior. 2018;83:64-72.

2. Xu F, Du JT. Examining differences and similarities between graduate and undergraduate students' user satisfaction with digital libraries. The Journal of Academic Librarianship. 2019;45(6):102072.

3. Soltani-Nejad N, Taheri-Azad F, Zarei-Maram N, Saberi MK. Developing a model to identify the antecedents and consequences of user satisfaction with digital libraries. Aslib Journal of Information Management. 2020;72(6):979-997.

4. Xie H. Evaluation of digital libraries: Criteria and problems from users' perspectives. Library and Information Science Research. 2006;28(3):433-452.

5. Jeng J. Usability assessment of academic digital libraries: effectiveness, efficiency, satisfaction, and learnability; c2005.

6. Fuhr N, Tsakonas G, Aalberg T, Agosti M, Hansen P, Kapidakis S, *et al*. Evaluation of digital libraries. International Journal on Digital Libraries. 2007;8(1):21-38.

7. Cheng YM. Why do users intend to continue using the digital library? An integrated perspective. Aslib Journal of Information Management; c2014.

8. Islam MA, Ikeda M. Convergence issues of knowledge management in digital libraries: Steps towards state-of-the-art digital libraries. VINE: The journal of information and knowledge management systems; c2014.

9. Ferreira SM, Pithan DN. Usability of digital libraries: a study based on the areas of information science and human-computer-interaction. OCLC Systems & Services: International digital library perspectives; c2005.

10. Law D. Academic digital libraries of the future: an environment scan. New Review of Academic Librarianship. 2009;5(1):53-67.

11. Xie I, Babu R, Lee TH, Castillo MD, You S, Hanlon AM. Enhancing usability of digital libraries: Designing help features to support blind and visually impaired users. Information Processing & Management. 2020;57(3):102110.

12. Samadi I, Masrek MN, Yatin SFBM. The effect of individual characteristics and digital library characteristics on digital library effectiveness: A survey at University of Tehran. World Applied Sciences Journal. 2014;30(30):214-220.

13. Liu Z, Luo L. A comparative study of digital library use: Factors, perceived influences, and satisfaction. The Journal of Academic Librarianship. 2011;37(3):230-236.

14. Park S. Usability, user preferences, effectiveness, and user behaviors when searching individual and integrated full-text databases: implications for digital libraries. Journal of the American Society for Information Science. 2000;51(5):456-468.

15. Alzahrani AI, Mahmud I, Ramayah T, Alfarraj O, Alalwan N. Modelling digital library success using the DeLone and McLean information system success model. Journal of Librarianship and Information Science. 2019;51(2):291-306.