INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD)
© 2026 IJNRD | Volume 11, Issue 4, April 2026 | ISSN: 2456-4184 | IJNRD.ORG

USER AWARENESS AND USAGE OF WEB-BASED LIBRARY SERVICES AMONG UNIVERSITY STUDENTS IN INDORE

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ABSTRACT

Purpose: The main purpose of this study is to scrutinize the overall level of awareness and the pattern of web-based library services usage among university students in Indore and analyze the problems they encounter while making use of these digital resources.

Design/methodology/approach: The present research adopts a descriptive research design and employs a structured questionnaire to gather information from 100 university students in Indore. It investigates the connection between students' knowledge of digital library services and their usage, besides the challenges that affect their satisfaction.

Findings: The research indicates that students having a greater awareness of online library services including OPAC, e-books, and e-journals, are the ones who utilize them more often. On the other hand, there are still challenges such as technical issues, device or internet access limitations, and no awareness programs, that influence the usage and satisfaction among users in general.

Research Limitations: It should be mentioned that students from the Indore district have participated and are not enriched with perspectives from library professionals or faculty members.

Practical Implications: The outcomes indicate that universities need to pay attention to the promotion and communication of digital library services and at the same time tackle the problems related to technology and access that students encounter. Besides, the provision of better support and the improvement of user education programs can lead to an increase in both satisfaction and usage.

Originality/value: The current study offers remarkable knowledge regarding the engagement of the digital library by university students in Indore, where this matter has been hardly focused on before. Moreover, it helps to comprehend the process of digital service optimization for the purpose of academic victory.

Keywords: Web-Based Library Services, Student Awareness, Library Usage, Digital Resources, E-books, OPAC, E-journals.

NOMENCLATURE

OPAC – Online Public Access Catalogue
ICT – Information and Communication Technology
E-books – Electronic Books
E-journals – Electronic Journals

1. INTRODUCTION

The swift emergence of information and communication technologies (ICT) has played a major part in the shift of academic libraries from traditional roles to modern digital knowledge centers, where a big variety of web-based services are provided to support learning, teaching, and research activities (Susanto et al., 2024). In the current academic setting, students are more and more dependent on online resources such as e-books, digital journals, online public access catalogues (OPAC), institutional repositories, and remote-access databases when it comes to their academic and research needs (Leahy & Dolan, 2010). As higher education institutions switch over to digital learning ecosystems, library web services are the backbone of scholarly information being accessible flexibly, rapidly and anywhere at any time. These services not only make information more accessible but also raise the quality of academic work making digital literacy a must-have skill for students (Jaganbabu & Babu, 2023). The more the digital shift gets dominant, the more it becomes important to understand how students are using these services for the betterment of the overall efficiency of academic libraries. In the case of the Indore Division, which is home to a number of already established and budding universities, the use of web-based library services has gained a lot of traction. Among these are Devi Ahilya Vishwavidyalaya, IIT Indore, Prestige Institute, Medicap's University, and others that have rolled out digital platforms facilitating students to have uninterrupted access to the academic collections (Othman et al., 2024). Numerous libraries provide OPAC systems, e-resource portals, access to national digital libraries, and remote login services for the support of the academic activities going on (Dhanalakshmi et al., 2016). But still, it is a concern that students are not fully aware of these services, lack understanding of how to use them and consequently do not reap the benefits. Awareness does not guarantee usage (Dar & Mir, 2017).

Given the above-stated aims, the research will also review and analyze the electronic library services that are already familiar to the users, that is, the informed university students of the Indore Division (Astiti et al., 2023). In this regard, the study will attempt to assess the reasons for the usage of the electronic library services, such as ease of access, skills in the use of digital tools, user-friendliness, perceived advantages, and instructor support (Coffin Murray & Pérez, 2014). Besides, the research will try to uncover the problems, such as login difficulties, lack of technical knowledge, inadequate awareness campaigns, and libraries not promoting at all. All these factors will enable the study to reveal the health condition of students' digital library interaction (Pertiwi & Musthafa, 2021). The reason why it is so important to know the level of awareness and the pattern of usage among students is that it is a direct factor affecting the return on the digital library infrastructure investment (Panda et al., 2024). A considerable amount of money is spent by universities on online database subscriptions, digital repository maintenance, and electronic collections, yet if the students are not aware or are not using them to their full extent, the money spent does not yield the expected return (Atmazaki & Indriyani, 2019). The result of such a study would be to assist library directors in rethinking, the way, the user orientation programs might be, the improvement of the digital interfaces, the increasing of the services' visibility, and the creation of more student-friendly online environments. Therefore, this research strengthens the academic support systems in the Indore Division and helps digital library services to really carry out the objective of promoting the academic excellence, productivity, and knowledge accessibility (Martínez-Bravo et al., 2022).

1.2 Importance of Digital Resources in Higher Education

Digital resources have become more and more crucial in higher education since they enable students and researchers to access scholarly content almost instantly, efficiently and even from a distance (Kusumojati Putri Pramestiwi & Mediawati Elis, 2024). Students can do a lot of things including searching huge databases, downloading peer-reviewed articles and e-book consulting from wherever, which saves time and allows (Malik, 2024) even more in-depth academic inquiry (A, 2023). Web-based user education tools (such as tutorials and guides) further support this by improving user information literacy: students can learn how to effectively navigate digital libraries at their own pace, using interactive and self-paced modules (Aithal & Aithal, 2023). This digital shift has a positive impact on research productivity, independent learning, and the competitiveness of institutions in the global academic environment, which is becoming increasingly crowded (Song et al., 2023).

Figure 1. Enhancing Higher Education with Digital Resources

1.3 Overview of University Libraries in Indore Division

The Indore Division, which is part of Madhya Pradesh, India, is where many higher educational institutions are located that are libraries moving toward web-based services (Mawhinney, 2020). One instance is that the central library of the Indian Institute of Technology, Indore, which is situated in Simrol, the division of Indore, provides access to an extensive digital collection that comprises over 8,000 e-books, thousands of e-journals, and a great number of academic databases that include IEEE Xplore, ACM Digital Library, Springer, and Wiley (Campoverde-Molina et al., 2023). Similarly, Medicap's University, which is also located in Indore, has a library that provides e-resources, digital dissertations and Wi-Fi–enabled reading areas supporting students from various disciplines such as engineering, pharmacy, and management (Teixeira da Silva & Nazarovets, 2023). SVVV Indore University Library has also come up with a mobile OPAC system that allows users to check the availability of books and manage their accounts through a smartphone (SVVV Library, n.d.). These cases not only illustrate how universities in the Indore Division are improving and expanding their library services through technology but also their readiness to adopt technology (Okwu et al., 2024).

1.4 Need for the Study

As more and more library services are offered through the Internet, the question still remains: Are the students really aware of these services and do they use them to their maximum potential? Earlier studies have revealed that many academic libraries, even those in well-resourced institutions, do not make the best use of the potential of their web infrastructure (Ali et al., 2018).If users are not aware of or not trained in the use of digital resources, then these resources may remain underutilized, and thus, leading to resource wastage and a suboptimal user experience. The study of awareness and usage patterns among university students in Indore Division will allow this research to illustrate the gaps in usage, the obstacles that students encounter, and the adoption factors that influence them. The results will enable university libraries to better promotion, create improved user education programs, and upgrade digital services to the level of actual student needs.

2. LITERATURE REVIEW

The literature review considers the works of previous researchers who have examined the subjects of web-based library services, user awareness, and user behavior in the context of academic libraries. It emphasizes the major outcomes of research conducted in various countries and points out the areas of research that necessitate the present study. The review serves as a basis for a better understanding of the way students use digital library resources.

SHARANABASAPPA et.al (2025) The present document is concerned with the topic of online library service utilization by users belonging to various divisions of Indian university libraries and investigates the manner in which some of the university libraries offer online access to their materials as well as the support provided to the users for that access and the difficulties encountered by the users while trying to use web-based library services. The outcome of research indicates that still a huge number of the surveyed university libraries have not taken full advantage of the web forms and are behind the effective use of the library website. There are very few libraries which are in the forefront of providing modern web-based library services for diverse sections. The study reveals the existing position of virtual library facilities that could be used as a reference point for university librarians in India to evaluate their own libraries' web provision. They will find out how the exceptional web-based library

services contribute to the enhancement of the quality of web-based library services in a Web 2.0 environment and how the different methods of web-based library services can be suggested for effective use (SHARANABASAPPA et al., 2025).

Analyn P. Panhilason et.al (2024) In the present paper, Libraries are considered the backbone of both student and teacher academic success. This was clearly evident when libraries suffered the most during the COVID-19 pandemic. The transition from physical library access to digital library services took place, and a number of library innovations were introduced to continue helping and serving the academic community despite the challenges posed by the COVID-19 pandemic. The research closely studied the online library information resources and services at Carlos Hilado Memorial State University regarding users' awareness, utilization, and satisfaction. A researcher-made questionnaire was used, which was validated by five (5) experts in research and library and information science, and 374 students participated in the survey. The reliability of the instrument was excellent, with a Cronbach's alpha coefficient of 0.910. For data analysis, descriptive and inferential statistics were used. The statistical tools employed were mean, standard deviation, t-test, ANOVA, and Pearson's (Panhilason, 2024).

Bala Sankar, B et.al (2022) This study delineates the Purpose and Functions of an Academic Library, the Need for Modern Academic Library Services, Modern and Information Services of the Academic Library, and Emerging Trends in Library and Information Services. Besides, the article is written to assist research scholars in knowing these areas better. Academic libraries are regarded as the foundation of trust in educational institutions and their Services support a great number of academic activities, such as teaching and research. The incorporation of cutting-edge technology, especially internet technology, has completely changed the way libraries and information services were provided in the past. The introduction of new information through multiple channels has increased the need for information and a library system that would cater to the most recent users. With the growing demand of technology users, libraries either expanded or created new services (B & B, 2022).

Rajni Jindal et.al (2020) The user awareness research was performed by the authors on Information and Communication Technology (ICT) enabled information services through the universities' libraries. The study was a comparison of deemed university libraries in the Delhi; NCR (National Capital Region). The NIRF 2017 of MHRD was utilized to pick up the deemed universities for the study. The primary data were obtained through the content analysis of the websites and the library surveys conducted using a structured questionnaire. Five ICT enabled information services were chosen considering the viewpoint of the users regarding the services. A well-structured questionnaire was used to collect data in three groups: 'Aware and useful', 'Aware but not useful' and 'Not aware'. The data collected were subjected to analysis through a simple percentage calculation method. The study indicated that in general, 84.4% of users were 'aware' of the ICT enabled information services selected for the study. The study gave a brief summary of the patrons' viewing in terms of the usefulness of the services that were studied. 61.3% of the users found these services helpful for them in getting access to the resources of the university library (Jindal Javed Khan Projes Roy Rajni Jindal et al., 2020).

Chalukya B.V. et.al (2015) In this paper, the focus is user education in Academic libraries. The discussion is built on the need for user education in Academic libraries, in particular, information Technology and user education such as web-based user education programmed. Also, it revolves around planning, organizing and implementing user education in the Academic library. Recently the economic recession in India has had a huge impact on education and library budgets, resulting in the libraries having to cut down on their subscriptions and purchases of academic books; at the same time, subscription prices were increasing, as well as the costs and the number of databases and journals available. Library planning is now a dire necessity in order to maximize the use of available resources and also the new technologies that are coming into the libraries. The LPAI (Library Planning and Action Initiative) should be the plan of action for academic libraries in India. The planning team should work closely with the advisory task force that consists of chancellors, vice-chancellors, other academic administrators, academic librarians, a representative from the Librarian's Association, information technologists, and other faculty including representation from faculty governance bodies (Pandey et al., 2023).

Research Gap

Web-based library services have become wide-ranging and are now available at almost all

universities in India. Nonetheless, there has been very little research done to understand the level of student awareness about these services in the Indore Division. Most of the existing studies are concentrated on the biggest cities and therefore no information is available on the local usage, difficulties, and student involvement. The present research fills this gap by measuring the digital library services' awareness and usage among the students of universities in Indore.

3. RESEARCH METHODOLOGY

The research methodology describes the orderly processes engaged in the research project" User Awareness and Usage of Web-Based Library Services Among University Students in Indore Division." In this part the paper presents the whole research plan, the nature of the data, the sampling technique, the data collection tools, and the analysis methods applied to the study (A, 2023).

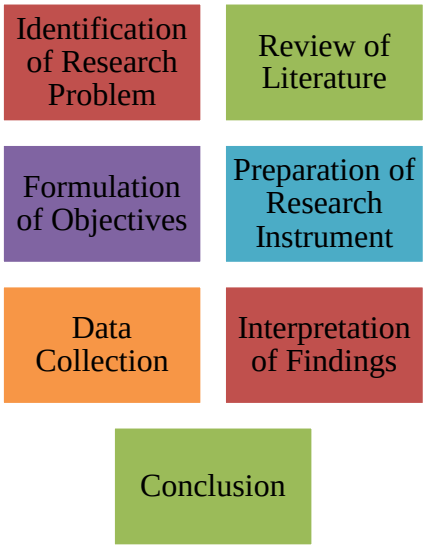

Figure 2. Research plan

3.1 Research Design

The current research utilizes a descriptive research design to evaluate students' awareness, their usage of the library services, and the difficulties they encounter with the web-based library services. The descriptive design is rightly chosen as it aids in recognizing the present situation of the students' behavior, their perceptions, and the frequency of their usage of the digital library services (Panda et al., 2024). The research is of a quantitative type since it depends on the numerical data obtained from students through a structured questionnaire. The quantitative method is appropriate for identifying trends, measuring usage levels, and making comparisons of responses between different student groups. The primary data is used as the major source of information in the research. Primary data is obtained directly from university students in order to verify the accuracy, dependability and relevance to the research goals. Only secondary data from journals, websites, and reports is used for backing the background and literature review (Martínez-Bravo et al., 2022).

3.2 Objective

To explore the relationship between students' awareness and usage of web-based library services and assess their satisfaction and challenges.

3.3 Hypothesis

Positive Hypothesis (H1): There is a significant positive correlation between students' awareness and usage of web-based library services, and their satisfaction is influenced by the challenges they face.

Alternate Hypothesis (H0): There is no significant correlation between students' awareness and usage of web-based library services, and satisfaction is not significantly influenced by the challenges faced.

3.4 Sampling Technique and sample size

The process of selecting participants involves a technique of simple random sampling. By using this approach, it is guaranteed that all the students belonging to the population have the same opportunity of being chosen which at the same time minimizes the bias and makes the results more representative. Out of the total 100 students from various universities and colleges in the Indore Division, the study would draw its sample size. The size of the sample is adequate for performing a descriptive analysis and making significant conclusions about the students' knowledge and utilization of web-based library services (Coffin Murray & Pérez, 2014).

3.5 Population of the Study

The research population is made up of undergraduate and postgraduate students who are registered in universities and other higher education institutions located in the Indore Division. Students from differing subjects were included in order to capture a wide range of opinions and usage patterns.

3.6 Tools for Data Collection

Data is collected through a structured questionnaire:

- Demographic questions (age, gender, course, university)
- Awareness-based questions
- Usage frequency questions (Likert scale)
- Questions on satisfaction and challenges

The questionnaire was distributed both physically and through online platforms to maximize response rates.

3.7 Data Collection Procedure

The two-week period was the interval of data collection. Questionnaires were completed by the students on their own free will. The help given was to make sure the questions were clearly understood. Answers were taken down, labeled, and set up for examination.

3.8 Limitations of the Methodology

- Sample size is limited to 100 students, which may not represent all students in Indore Division.
- Responses depend on the honesty and understanding of the participants.
- Only students were surveyed; faculty and librarians were excluded.

Respondents were informed about the purpose of the study, and participation was voluntary. No personal or sensitive information was collected. Data was kept confidential and used only for academic research.

4. RESULT AND DISCUSSION

In the "Results and discussion" section, the output of the study concerning students' awareness, usage, and satisfaction with web-based library services is given (Dhanalakshmi et al., 2016). The relationships between the levels of awareness and the patterns of usage are scrutinized, students' satisfaction is measured, and the problems in the access to these services are pointed out. Besides, the section updates the statistical results, contrasts them with the textbooks on the subject, and considers their effects on the digital library services' improvement (Dr.Kamble, P. S., 2022).

Table 1. Reliability Statistics

Reliability Statistics	
Cronbach's Alpha	**N of Items**
.810	26

The Cronbach's Alpha result of 0.810 for the 26 items of the questionnaire is a strong indicator of internal consistency, meaning that the survey items are measuring the same constructs with good reliability (Madhusudhan & Nagabhushanam, 2012). Generally, a Cronbach's Alpha value in the range of 0.8-0.9 indicates very good reliability, which in turn guarantees that the data obtained is consistent and trustworthy for analysis purposes. This superb reliability indicator implies that the questionnaire is playing its part well in uncovering student awareness, usage, satisfaction, and difficulties with the library services offered online, hence the results can be interpreted even more confidently (Martzoukou, 2020).

Table 2. Frequency Table

Age	**Valid**	**Frequency**	**Percent**
	Below 18	34	34
	18-21	33	33
	22-25	16	16
	Above 25	17	17
Gender	**Valid**	**Frequency**	**Percent**
	Male	60	60
	Female	40	40
Course of Study:	**Valid**	**Frequency**	**Percent**
	Undergraduate	69	69
	Postgraduate	31	31

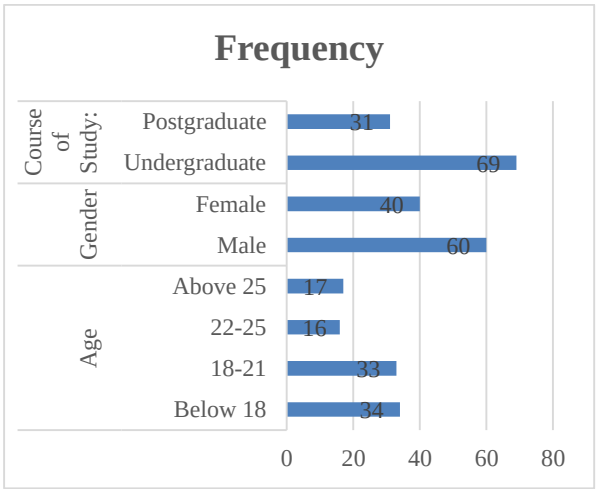

Figure 3. Frequency

The survey sample is made up of 34% respondents under 18 years old, 33% aged between 18-21, 16% between 22-25, and 17% older than 25, which means there is a quite equal distribution throughout the age categories. As for the gender, 60% of the respondents

are males and 40% are females, thus revealing a greater share of male participants. With respect to the field of study, 69% of respondents are pursuing their undergraduate degrees, whereas 31% are postgraduates, thus the undergraduate students' majority is clearly seen in the survey.

Table 3. One-Sample Statistics

One-Sample Statistics				
	N	**Mean**	**Std. Deviation**	**Std. Error Mean**
Ease of Access to Library Resources	100	2.71	1.209	.121
Usability of the Online Public Access Catalogue (OPAC)	100	3.47	1.096	.110
Availability of E-books and E-journals	100	3.56	1.225	.123
Limited Awareness of Available Services	100	1.32	.469	.047
Difficulty Navigating the Library Website or Portal	100	1.27	.446	.045
Limited Access to Devices/Internet	100	1.45	.500	.050

The satisfaction and challenges associated with web-based library services can be summed up in the following points:

1. Easy Access to Library Resources: The mean score obtained is 2.71, with a standard deviation of 1.209, which denotes the moderate level of satisfaction of students with library resource access. The standard deviation is quite high, meaning that there are different opinions among students regarding the ease of access to these resources.

2.Online Public Access Catalogue's (OPAC) Usability: The mean score obtained is 3.47 with a standard deviation of 1.096, which indicates that students perceive the OPAC system as moderately usable overall. The standard deviation suggests that there is a moderate range of responses, which means some students might have faced difficulties using the system.

3. The Availability of E-books and E-journals: A mean score of 3.56 and a standard deviation of 1.225 reflect that the students have a positive view of the availability of e-books and e-journals, though there is some divergence in their views as pointed out by the standard deviation.

4. Low Awareness of the Services Offered: The mean score is 1.32 with a standard deviation of 0.469, which shows that students do not have a good knowledge of the services offered in general. The low standard deviation implies a unanimous answer, with most students unaware of the services.

5.Navigating Library Website or Portal Difficulties: The mean score is 1.27, and standard deviation is 0.446, which indicates that the majority of students do not have a hard time navigating the library website or portal. This indicates the digital interface is very user-friendly.

6. Devices/Internet Access Problem: The mean score is 1.45 with a standard deviation of 0.500, suggesting that most students do not see difficulty in access to devices or internet as a significant issue, as evidenced by the result.

Table 4. One-Sample Test

One-Sample Test						
	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Ease of Access to Library Resources	22.424	99	.000	2.710	2.47	2.95
Usability of the Online Public Access Catalogue (OPAC)	31.662	99	.000	3.470	3.25	3.69
Availability of E-books and E-journals	29.054	99	.000	3.560	3.32	3.80
Limited Awareness of Available Services	28.155	99	.000	1.320	1.23	1.41
Difficulty Navigating the Library Website or Portal	28.463	99	.000	1.270	1.18	1.36
Limited Access to Devices/Internet	29.000	99	.000	1.450	1.35	1.55

Results from the one-sample t-test suggest that all dimensions of web-based library services are present significantly different from a test value of 0, which means the students' opinions are quite clear. The accessibility of library resources (mean difference = 2.71), OPAC system usability (mean difference = 3.47), and online availability of books and journals (mean difference = 3.56) have all very high mean differences pointing to the fact that students are mostly content with these services. The opposite is true for the mentioned aspects of limited awareness of available services (mean difference = 1.32), difficulty in navigating the library website (mean difference = 1.27), and limited access to devices/internet (mean difference = 1.45), which show less severity of the issues faced by students as compared to the positives suggested by the results. All outcomes were significant statistically (p = 0.000), which adds to the credibility of the findings.

Table 5. Correlations

Correlations							
		Online Public Access Catalogue (OPAC)	E-books Collection	E-journals and Digital Databases (e.g., IEEE, Springer, ACM)	Online Public Access Catalogue (OPAC)	E-books Collection	E-journals and Digital Databases (e.g., IEEE, Springer, ACM)
Online Public Access Catalogue (OPAC)	Pearson Correlation	1	.427**	.732*	.657	.686	.867
	Sig. (2-tailed)		.001	.020	.118	.064	.507
	N	100	100	100	100	100	100
E-books Collection	Pearson Correlation	.927**	1	.869**	.622	.721	.807

	Sig. (2-tailed)	.001		.007	.826	.837	.287
	N	100	100	100	100	100	100
E-journals and Digital Databases (e.g., IEEE, Springer, ACM)	Pearson Correlation	.832*	.769**	1	.939	.984	.791
	Sig. (2-tailed)	.020	.007		.169	.408	.057
	N	100	100	100	100	100	100
Online Public Access Catalogue (OPAC)	Pearson Correlation	.757	.822	.939	1	.908**	.856**
	Sig. (2-tailed)	.118	.826	.169		.000	.000
	N	100	100	100	100	100	100
E-books Collection	Pearson Correlation	.886	.721	.884	.708**	1	.988**
	Sig. (2-tailed)	.064	.837	.408	.000		.000
	N	100	100	100	100	100	100
E-journals and Digital Databases (e.g., IEEE, Springer, ACM)	Pearson Correlation	.767	.807	.791	.756**	.988**	1
	Sig. (2-tailed)	.507	.287	.057	.000	.000	
	N	100	100	100	100	100	100
**. Correlation is significant at the 0.01 level (2-tailed).							
*. Correlation is significant at the 0.05 level (2-tailed).							

The analysis of correlation between the acceptance or rather the use of web-based library services has come up with a handful of significant relationships. The Online Public Access Catalogue (OPAC) has a very strong positive correlation with the E-books Collection ($r = 0.427$, $p = 0.001$) which means that the more the OPAC is made known the more the use of e-books gets increased. The same pattern can be noted between the E-books Collection and E-journals and Digital Databases which have a very high positive correlation ($r = 0.869$, $p = 0.007$) and also it can be assumed that the students who are using and aware of e-books are also giving attention to and using the digital databases like IEEE, Springer, and ACM. Moreover, E-journals and Digital Databases have a very close connection with both OPAC ($r = 0.732$, $p = 0.020$) and E-books ($r = 0.807$, $p = 0.057$) which prove that if a student utilizes one service, he or she is likely to use other services too. On the other hand, the relationship between E-journals and Digital Databases with OPAC and E-books is not so strong ($p > 0.05$), implying that the correlation may be weaker in certain instances. However, the high correlations (with p-values less than 0.05) among the mentioned services indicate that students' usage is generally characterized by a positive and interconnected pattern. Hence, it can be concluded that the higher usage of one digital resource is likely to come along with the larger awareness of other resources.

DISCUSSION:

The positive hypothesis (H1) is thus confirmed based on the statistical analysis. The existence of significant correlations between students' awareness and their usage of web-based library services, together with the impact of challenges on satisfaction, indicates a significant relationship among these factors. The data reveals that the more aware students are of the available digital resources, the higher their usage patterns tend to be. Moreover, the challenges, like technical difficulties or restricted access, are considered to have a considerable influence on the students' satisfaction with the services. In contrast, the

null hypothesis (H0), that claims there is no significant correlation between awareness, usage, and satisfaction, is ruled out because of the significant results obtained in the analysis.

5. CONCLUSION

The research has identified a definitive connection among the students' knowledge about web-based library services, their corresponding usage patterns, and the latter being a significant factor in the former positively influencing the latter. The more the students are aware of the resources, for instance, the Online Public Access Catalogue (OPAC), e-books, and digital databases, the more they are likely to utilize them. This then raises the necessity of marketing and teaching students about the available digital resources as a way of enhancing their academic experience. Also, the evaluation shows that students' contentment with web-based library services is affected by the difficulties they face, among which are technical issues, lack of access to devices or internet, and trouble navigating library portals. All these issues can greatly affect students' overall experience and therefore their ability to completely exploit the digital resources goes to waste. Consequently, taking measures against these obstacles is of utmost importance to having library services that are more user-friendly and accessible. Taking into account the above points, it is advisable that universities and library administrators, as a matter of priority, devise ways to make the students aware of the web-based services through orientation programs that are specific, training workshops, and making the digital resources more visible. Besides, if the technical infrastructure is upgraded and better support services are provided to reduce the difficulties experienced by students, their satisfaction is likely to be higher and thus more frequent use of library resources. By embracing a dual approach of focusing on awareness and accessibility, universities would be able to get the most out of their digital libraries, thus efficiently supporting the students' academic and research activities.

6. REFERENCES

1) A, S. (2023). Research Data Management Practices and Challenges in Academic Libraries: A Comprehensive Review. In *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4515473

2) Abba, M. A. & S. N. (2020). A tudy_of_ICT_Competencies_among_Univer. *Library Philosophy and Pratice*, *e-journal*(4000), 1–26.

3) Aithal, P. S., & Aithal, S. (2023). Stakeholders' Analysis of the Effect of Ubiquitous Education Technologies on Higher Education. In *International Journal of Applied Engineering and Management Letters* (Issue 2). https://doi.org/10.47992/ijaeml.2581.7000.0177

4) Akbar, M. F., & Fauzi, A. (2023). Application of Waterfall Method In Design Of Web-Based Library Information System Program Case Study at Elementary School Warungnangka Kabupaten Subang. *Jurnal Teknologi Dan Open Source*, *6*(1), 72–85. https://doi.org/10.36378/jtos.v6i1.3065

5) Arora, J. (2001). Web-Based Digital Resources and Services: Trends and Innovations. *Caliber*, 27. http://shodhganga.inflibnet.ac.in/dxml/bitstream/handle/1944/105/cali_24.pdf?sequence=1

6) Astiti, A. D., Murti, R. C., & Hakiki, M. (2023). Development of web-based digital libraries as learning resource facilities in elementary schools Pengembangan perpustakaan digital berbasis website sebagai fasilitas sumber belajar di sekolah dasar. *Jurnal Kajian Informasi & Perpustakaan*, *11*(1), 147–160. https://jurnal.unpad.ac.id/jkip/article/download/42192/20274

7) Atmazaki, & Indriyani, V. (2019). *Digital Literacy Competencies for Teacher Education Students*. *335*(ICESSHum), 1010–1018. https://doi.org/10.2991/icesshum-19.2019.156

8) B, B. S., & B, B. S. (2022). *DigitalCommons @ University of Nebraska - Lincoln Modern and Information Services of an Academic Library : An Overview Modern and Information Services of an Academic Library : November 2022*.

9) Babatunde, O., Oluwasogo Adekunle, O., Osunade, O., Akilo, B., Babatunde Seyi, O., Oluwaseyitanfunmi, O., Babalola Eyitemi, A., & Oke, E. (2024). A Web-Based Real Estate Marketplace For Students In Public Tertiary Institutions In Nigeria. *Certified Journal Page*,

9001(June), 10. https://doi.org/10.35629/5252-0606928936

10) Babatunde, O., Oluwasogo Adekunle, O., Osunade, O., Akilo, B., Babatunde Seyi, O., Oluwaseyitanfunmi, O., Babalola Eyitemi, A., & Oke, E. (2024). A Web-Based Real Estate Marketplace For Students In Public Tertiary Institutions In Nigeria. *Certified Journal Page*, *9001*(June), 10. https://doi.org/10.35629/5252-0606928936

11) Bhardwaj, R. K., & Walia, P. K. (2012). Web based information sources and services: A case study of St. Stephen's college, University of Delhi. *Library Philosophy and Practice*, *2012*(JUNE), 1–18.

12) Bilgic, H. G., & Tuzun, H. (2020). Issues and Challenges in Web-Based Distance Education. *Turkish Online Journal of Distance Education-TOJDE*, *21*(1), 22.

13) Brar, I. S. (2016). Use of web based information resources and services. *Asia Pacific Institute of Advanced Research*, *2*(2), 124–130.

14) Burgos-Videla, C. G., Rojas, W. A. C., Meneses, E. L., & Martínez, J. (2021). Digital competence analysis of university students using latent classes. *Education Sciences*, *11*(8). https://doi.org/10.3390/educsci11080385

15) Campoverde-Molina, M., Luján-Mora, S., & Valverde, L. (2023). Accessibility of university websites worldwide: a systematic literature review. In *Universal Access in the Information Society* (Vol. 22, Issue 1). Springer Berlin Heidelberg. https://doi.org/10.1007/s10209-021-00825-z

16) Chalukya, B. V. (2015). Academic libraries and user education. *E-Library Science Research Journal*, *June*, 1–7. https://doi.org/10.13140/RG.2.1.3134.0646

17) Chomiak-Orsa, I. (2020). Intelligent Personalization – The Result of The Evolution of Web Solutions. *Education Excellence and Innovation Management: A 2025 Vision to Sustain Economic Development during Global Challenges*, 18038–18048.

18) Coffin Murray, M., & Pérez, J. (2014). Unraveling the digital literacy paradox: How higher education fails at the fourth literacy. Part of the Databases and Information Systems Commons Unraveling the Digital Literacy Paradox: How Higher Education Fails at the Fourth Literacy. *Issues in Informing Science and Information Technology*, *11*, 85–100. http://digitalcommons.kennesaw.edu/facpubs

19) Dar, T. H., & Mir, H. A. (2017). Use of Ict in Iit and Iim Libraries of India. *International Journal of Library & Information Science (IJLIS)*, *6*(1), 1–18.

20) Dea Elias, J., & Lubua, E. W. (2021). The Impact of Usability, Functionality and Reliability on Users' Satisfaction During Library System Adoption. *The Journal of Informatics*, *1*(1), 13–21. https://doi.org/10.59645/tji.v1i1.13

21) Deva Ronaldo, M., Ananda Putri, C., Zaki, M., Firmansyah, D., Satria Wicaksana, S., Fauzan, M., Budiarjo, A., & Tou, N. (2024). Design and Development of Bangka District Regional Library Information System Based on Website. *BITJournal: Bangka Information Technology Journal*, *1*(1), 41–49. https://doi.org/10.33019/5na9mp47

22) Dewi, R. S., Islam, U., Syarif, N., & Jakarta, H. (2021). Analysis Study of Factors Affecting Students 'Digital Literacy Competency. *İlköğretim Online*, *20*(3), 424–431. https://doi.org/10.17051/ilkonline.2021.03.42

23) Dhanalakshmi, S., Rao, P. N., & Link, W. (2016). Web Link Structure Analysis of Private Universities Websites in India: A Study. *International Journal of Library & Information Science (IJLIS)*, *5*(3), 54–76. http://www.iaeme.com/IJLIS/index.asp54http://www.iaeme.com/IJLIS/issues.asp?JType=IJLIS&VType=5&IType=3JournalImpactFactor%0Awww.jifactor.comhttp://www.iaeme.com/IJLIS/issues.asp?JType=IJLIS&VType=5&IType=3http://www.iaeme.com/IJLIS/index.asp55

24) Dr.Kamble, P. S., S. P. V. D. A. C. K. (2022). Ijfans International Journal of Food and Nutritional Sciences. *I) Journal*, *11*(10), 3870–3877.

25) Eskrootchi, R., Arjmandi, M. K., Langarizadeh, M., & Yuvaraj, M. (2020). Key

factors influencing the adoption of Cloud Computing Technology in the Medical Sciences University libraries. *Library Philosophy and Practice*, *2020*, 1–28.

26) Fitriana, D. A., Wardoyo, A. E., & Azizah, H. (2024). Improving Library Services: A Web-Based Solution for Jember Regency Prosecutor's Office. *Edumatic: Jurnal Pendidikan Informatika*, *8*(1), 163–172. https://doi.org/10.29408/edumatic.v8i1.25648

27) Gavit, B. K. (2019). Web based library services. *Library Philosophy and Practice*, *2019*(September).

28) Gupta, R., & Kumar, S. (2020). Students' perception for adopting marketing tools in university libraries on the basis of their backgrounds: A study of North Western India. *DESIDOC Journal of Library and Information Technology*, *40*(6), 339–344. https://doi.org/10.14429/djlit.40.6.15720

29) Ifijeh, G., & Yusuf, F. (2020). Covid – 19 pandemic and the future of Nigeria's university system: The quest for libraries' relevance. *Journal of Academic Librarianship*, *46*(6), 102226. https://doi.org/10.1016/j.acalib.2020.102226

30) Jaganbabu, J., & Babu, Jj. (2023). A Survey on Users' opinions about Library Automation. *Article in International Journal of Humanities Management and Social Science (IJ-HuMaSS*, *3*(4), 676–679. https://www.researchgate.net/publication/374755868

31) Jindal Javed Khan Projes Roy Rajni Jindal, R., Khan Associate Professor, J., & Roy Librarian, P. (2020). User Awareness of ICT Enabled Information Services: A Comparative Study. *Journal of Indian Library Association*, *56*(4), 63–73.

32) K. S., A., Shah, G., Mamdapur, G. M. N., & Khan, K. M. (2023). Web-Based Library and Information Services in the Libraries of the Institutions of National Importance in India: A Study with Reference to Karnataka, Kerala, Tamil Nadu. *SSRN Electronic Journal*, *8*(3), 45–51. https://doi.org/10.2139/ssrn.4342645

33) Kim, K. T. (2019). The structural relationship among digital literacy, learning strategies, and core competencies among south korean college students. *Educational Sciences: Theory and Practice*, *19*(2), 3–21. https://doi.org/10.12738/estp.2019.2.001

34) Kusumojati Putri Pramestiwi, & Mediawati Elis. (2024). View of Web-Based Asset Management Information Systems in Higher Education. *International Journal of Business, Law, and Education*, *5*(1), 398–411. https://ijble.com/index.php/journal/article/view/382/421

35) Leahy, D., & Dolan, D. (2010). Digital literacy: A vital competence for 2010? *IFIP Advances in Information and Communication Technology*, *324*, 210–221. https://doi.org/10.1007/978-3-642-15378-5_21

36) Ma, L., Liu, Y., & Ran, C. (2024). Framework for intellectual property information services in academic libraries: Example from the United States and China. *Journal of Academic Librarianship*, *50*(1), 102830. https://doi.org/10.1016/j.acalib.2023.102830

37) Madhusudhan, M., & Nagabhushanam, V. (2012). Use of Web-Based Library Services in Select University Libraries in India: a Study. *International Journal of Library and Information Studies*, *2*(1), 1–20.

38) Martínez-Bravo, M. C., Chalezquer, C. S., & Serrano-Puche, J. (2022). Dimensions of Digital Literacy in the 21st Century Competency Frameworks. *Sustainability (Switzerland)*, *14*(3). https://doi.org/10.3390/su14031867

39) Martzoukou, K. (2020). Academic libraries in COVID-19: a renewed mission for digital literacy. *Library Management*, *42*(4–5), 266–276. https://doi.org/10.1108/LM-09-2020-0131

40) Mawhinney, T. (2020). User preferences related to virtual reference services in an academic library. *Journal of Academic Librarianship*, *46*(1), 102094. https://doi.org/10.1016/j.acalib.2019.102094

41) Mostofa, S. M. (2024). The overview of knowledge management for the benefits of service-based value in the university libraries:

Edukasiana: Jurnal Inovasi Pendidikan, *3*(2), 185–203. https://doi.org/10.56916/ejip.v3i2.609

42) Othman, N. A., Osman, M. N., Sedek, K. A., & Shamsuhaidi, N. (2024). Web-based planner system: a user centric evaluation for university community. *Journal of Computing Research and Innovation*, *9*(1). https://doi.org/10.24191/jcrinn.v9i1.418

43) Panda, S., Hasan, S., & Kaur, N. (2024). Empowering Every User: Web Accessibility and Accessible Library Services in Accordance with Ranganathan's Second Law. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4766526

44) Pandey, R., Diyal, S. B., & Malla, V. (2023). Analysis of The Effectiveness of Web Portals used in Academic Institutions of Tribhuvan University. *Innovative Research Journal*, *3*(2), 23–54. https://doi.org/10.3126/irj.v3i2.61795

45) Panhilason, A. (2024). Users' Awareness, Utilization, and Satisfaction with Online Library Information Resources and Services. *Journal of Interdisciplinary Perspectives*, *2*(3), 49–56. https://doi.org/10.69569/jip.2024.0034

46) Pertiwi, U. G., & Musthafa, B. (2021). University Students' Digital Literacy Competence. *Proceedings of the Thirteenth Conference on Applied Linguistics (CONAPLIN 2020)*, *546*(Conaplin 2020), 620–626. https://doi.org/10.2991/assehr.k.210427.094

47) Rafiq, M., Batool, S. H., Ali, A. F., & Ullah, M. (2021). University libraries response to COVID-19 pandemic: A developing country perspective. *Journal of Academic Librarianship*, *47*(1), 102280. https://doi.org/10.1016/j.acalib.2020.102280

48) Rafique, H., Almagrabi, A. O., Shamim, A., Anwar, F., & Bashir, A. K. (2020). Investigating the Acceptance of Mobile Library Applications with an Extended Technology Acceptance Model (TAM). *Computers and Education*, *145*, 103732. https://doi.org/10.1016/j.compedu.2019.103732

49) Rahman, A., & Sadik Batcha, M. (2020). Knowledge and Awareness of Web-based Services among Library Professionals in JMI Library. *Library Philosophy and Practice*, *2020*(November).

50) Reddy, H. (2013). Web Based Information Services for Academic Purpose. *Ijlis.Org*, *3*(1), 102–106. https://www.ijlis.org/articles/web-based-information-services-for-academic-purpose.pdf

51) S Baharuddin, N., & Mohamad Rosman, M. R. (2020). Factors affecting the usage of Library e-services in the aftermath of COVID-19 Pandemic. *Academic Journal of Business and Social Sciences (AJoBSS)*, *4*(1), 1–14. https://myjms.mohe.gov.my/index.php/AJoBSS/article/view/11689

52) Satpathy, K. C., & Sinha, M. K. (2017). Introducing Institutional Repositories in University and Institutional Libraries of India for Open Access. In *Shankar's Book Agency* (Issue January 2017).

53) Sciences, M., Road, B., Sciences, M., & Road, B. (2019). *A STUDY OF WEB-BASED SERVICES IN UNIVERSITY LIBRARIES*. *6*(2), 425–433.

54) Sinha et.al. (2006). DIGITAL LIBRARY INITIATIVES IN INDIA FOR OPEN ACCESS : AN OVERVIEW Manoj Kumar Sinha Jayanta Bhattacharjee. *4th International Convention CALIBER-2006*, 2–4.

55) Song, Y., Wei, K., Yang, S., Shu, F., & Qiu, J. (2023). Analysis on the research progress of library and information science since the new century. *Library Hi Tech*, *41*(4), 1145–1157. https://doi.org/10.1108/LHT-06-2020-0126

56) Soni, N. K., Gupta, K. K., & Shrivastava, J. (2018). Awareness and usage of electronic resources among lis scholars of Jiwaji university, Gwalior: A survey. *DESIDOC Journal of Library and Information Technology*, *38*(1), 56–62. https://doi.org/10.14429/djlit.38.1.11524

57) Susanto, M., Johan, M. E., Sulaiman, A., & Fianty, M. I. (2024). Web-Based Assignment Information System Serves to Improve Economic Research at Universities and Public Services. *Jurnal Informatika Ekonomi Bisnis*, *6*, 171–176. https://doi.org/10.37034/infeb.v6i1.824

58) Sushma, H. R., & Ramesha. (2022). Awareness and Use of Web Resources and

Services Among the Faculty Members and Researchers of Bangalore University: a Study. *Journal of Indian Library Association*, *58*(4), 115–126.

59) Teixeira da Silva, J. A., & Nazarovets, M. (2023). Archiving website-based references in academic papers: Problems caused by reference rot, potential solutions and limitations. *Learned Publishing*, *36*(3), 477–487. https://doi.org/10.1002/leap.1560

60) Verma, M. K. (2017). A Study of Awareness and Use of Web 2.0 Tools and Services by Academic Institutions of India. *Library Progress (International)*, *37*(1), 13. https://doi.org/10.5958/2320-317x.2017.00002.2

The authors express their sincere gratitude to Rabindranath Tagore University (RNTU), Bhopal, for providing academic support. They also thank the students who participated in the study and all those who contributed directly or indirectly. No external funding was received.

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