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# Exploring the Usage Pattern of Electronic Resources of Research Scholars of Universities of Lahore

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## ABSTRACT

*The rapid advancement of technology has revolutionized the educational landscape with electronic information resources playing a pivotal role in academic processes. This study investigates the usage patterns of electronic resources among research scholars at universities in Lahore, Pakistan. Employing a quantitative research design, data was collected through a structured questionnaire from a sample of 277 MPhil and PhD researchers. The findings reveal that while awareness levels vary across different types of e-resources, usage frequency is generally high for essential tools such as library catalogues, e-books and dissertations/theses. However, resources like HEC databases and institutional repositories show lower usage despite moderate awareness. The most preferred e-resources include HEC journal databases, institutional websites and university library websites. Scholars primarily use e-resources for coursework, updating subject knowledge, teaching, research and writing assignments. The PDF format is favored for its ease of use and the central library is the most preferred location for accessing e-resources. Scholars face challenges such as inadequate computer facilities, frequent power outages and limited digital literacy skills. Recommendations include increasing user education, expanding subscriptions to international publications and addressing technical and usability issues. By adopting these strategies, university libraries in Pakistan can foster greater engagement with e-resources, support academic excellence and contribute to the development of a robust research culture. This study provides valuable insights into the usage patterns and preferences of research scholars, which can inform the design and delivery of e-resource services in academic libraries.*

***Keywords:*** *Electronic Resources; Information and Communication Technologies (ICT); Online Databases; E-Books; Academic Research; Digital Resources; University Libraries*

## INTRODUCTION

The technological revolution has profoundly transformed the educational landscape, granting electronic information resources a pivotal role in academic processes. These resources encompassing periodicals, databases and e-books provide students and researchers with access to the most current information. Libraries have integrated these resources, evolving their missions to better support academic achievement and scientific research. University students increasingly rely on electronic resources for searching and preparing academic work, benefitting from advanced tools that facilitate efficient information retrieval and presentation on electronic devices (Al Bataineh, Al Dwairi, Humaidat, & Al Fawareh, 2021). The development of electronic systems, particularly databases, has made e-resources indispensable for teaching and learning. For many academic staff and researchers, electronic information resources are now the lifeblood of their activities. As a result, e-resources have become central to teaching and research in academic communities worldwide. For example, higher learning institutions in Tanzania have subscribed to various online databases such as Emerald, Wiley, SAGE, Taylor and Francis and EBSCO, which have contributed positively to academic outcomes despite some challenges in utilisation (Mwantimwa, Mwabungulu, & Kassim, 2021). Due to the cost per user, many organisations restrict access to employees and, in some cases, research students. Online resources are increasingly preferred over other types of electronic resources, as they offer superior accessibility and functionality. Electronic resources refer to sites that store data electronically and are accessible via digital networks (Dhanavandan & Tamizhchelvan, 2012). In the 21st century, information and communication technologies (ICT) permeate all aspects of society. Electronic resources are often superior to their print counterparts, enabling users to acquire knowledge and understanding more efficiently. The expansion of knowledge transfer is closely linked to the use of personal computers and other ICT tools.

Present-day users have numerous options to fulfil their information needs. While libraries continue to offer print editions, users can now access online resources from anywhere, at any time. The ability to use digital resources effectively depends on basic computer skills, an understanding of available resources and the capacity to formulate research questions. Access to electronic resources significantly reduces the time spent searching for information (Vijayalakshmi, Rani & Sornam, 2017). E-resources are defined as electronic information sources or services accessed through computing networks or other ICT infrastructure, either within the library or remotely. However, a study by Piracha and Ameen (2019) found that most libraries in Pakistan were not utilising e-resources, largely due to a lack of awareness, motivation and coordination among library heads. Since the mid-1970s, there has been remarkable growth in the variety and scope of information products, services and systems. This expansion has been driven by rapid advancements in electronic devices for organising, processing and communicating information. With appropriate ICT, researchers can access fully digital information services from central and remote libraries and databases worldwide, enhancing knowledge and skills (Dadzie, 2005). There has also been a significant shift in collection development policies, with online products gradually replacing print media (Sharma, 2009). The importance of print media is diminishing as electronic resources such as CD-ROMs, online newspapers, e-books, OPACs and the Internet become more prevalent. In Nigeria, for example, electronic information resources have substantially changed information processing and management in university libraries (Ani, Okon, & Ahiauzu, 2008; Dadzie, 2005). The use of digital resources is rapidly increasing among students and researchers, particularly in graduate programmes where research is a core academic requirement. Students rely on electronic resources to complete term papers and research reports, applying theoretical knowledge in practice under the guidance of their tutors. These resources provide up-to-date information and facilitate the publication of research papers. Numerous e-resources and databases are available to academics and scholars in libraries to meet their information needs.

**Objectives**

- To find out the awareness level of research scholars regarding library electronic resources
- To find out the frequency of usage of library electronic resources
- To find out the usage pattern of the library electronic resources
- To find out the challenges/issues faced by research scholars in using library electronic resources

## LITERATURE REVIEW

### Global Trends in Electronic Resource Usage

Global trends in electronic resource usage reveal a substantial shift toward increased reliance on digital platforms and online resources across various sectors, particularly in education and commerce. The University of Maryland University College (UMUC) survey demonstrated that student usage patterns have increasingly favored electronic resources such as proprietary databases and the Internet, mirroring nationwide trends where both traditional and nontraditional students are gravitating toward online information access and away from physical libraries (Kelley and Orr, 2003). Academic libraries in the U.S. also illustrate this trend with widespread adoption of Web 2.0 applications—including social media, blogs and RSS feeds—to enhance service delivery and engagement, indicating a broader move toward interactive and digitalized information environment in higher education (Boateng and Liu, 2014). In developing countries, such as Nigeria, electronic information resource development in university libraries heavily depends on Internet connectivity and subscription to online databases and electronic journals, though efforts for digitization and computerization remain relatively lower, highlighting varied stages of digital adoption and resource development globally (Ani and Ahiauzu, 2008). Furthermore, the COVID-19 pandemic accelerated the utilization of digital platforms in e-commerce, causing significant shifts in consumer behavior and an increase in digital shopping activities across multiple categories, particularly during lockdown phases, reflecting a broader trend towards digital transformation in market interactions (Galhotra and Dewan, 2020). Technological advancements such as blockchain and AI are shaping more secure and transparent decentralized digital marketplaces, with European digital ecosystems increasingly adopting these technologies to enhance functionality and integration across sectors (Nikoletos et al., 2024). Moreover, small and medium-sized enterprises (SMEs) benefit from digital platforms, with these tools positively influencing intellectual capital and overall business performance, although environmental dynamism may moderate these effects, signifying that external economic factors interplay with digital adoption outcomes (Le et al., 2024). The adoption of electronic resources (e-resources) has transformed academic libraries worldwide, offering unprecedented access to scholarly content and supporting research and learning. E-resources include e-books, online journals, databases and multimedia content, which have become integral to modern higher education. Their widespread availability has changed how students and faculty access, process and utilise information for academic and research purposes **(**Ruzegea & Msonde, 2021).

### Electronic Resources in Pakistani Universities

Electronic resources in Pakistani universities play a critical role in enabling digital equity and accessibility among higher education students, particularly for marginalized and underserved groups. Studies show that there are significant differences in access to digital resources in Pakistan's universities, especially for students from low-income and remote areas. These disparities contribute to educational inequalities, highlighting the challenges faced in providing equitable digital access (Amjad et al., 2024). Academic libraries in Pakistan, which are key providers of electronic resources, face challenges such as leadership

issues, changing user behaviors, limited human and financial resources and technological constraints. Despite these challenges, there is readiness among academic libraries to adopt smart services and improve digital resource availability, though this requires collaborative efforts involving library professionals, university leadership, policy makers and funding agencies (Ashiq et al., 2020). The adoption of advanced technologies like the Internet of Things (IoT) is emerging within Pakistani higher education to improve learning experiences. IoT applications, when accepted broadly among students and faculty, can enhance access to digital resources, communication and academic collaboration (Shaikh et al., 2019). Information literacy is recognized as crucial in maximizing the utilization of electronic resources. While information resources may be available, lack of awareness, skills to access and evaluate information significantly limits effective use. This indicates a need for ongoing information literacy training to empower students and faculty in Pakistani universities so they can better utilize digital libraries and e-resources (Kinengyere, 2007). The COVID-19 pandemic highlighted the importance of digital learning solutions in higher education. Universities in Pakistan and comparable contexts rapidly shifted to online platforms for teaching and learning, which demonstrated the potential benefits and challenges of digital transformation in education. Leadership styles such as adaptive and academic leadership positively influenced the readiness of universities to change and adopt electronic and digital resources during such crises (Mukaram et al., 2021). Universities globally invest heavily in e-resource subscriptions to enhance academic achievement. However, disparities in usage and effectiveness persist, often influenced by infrastructural limitations and user awareness. Studies highlight that information literacy, digital skills and individual experience are key predictors of effective e-resource utilisation (Mathur, Swarup, Agnihotri, Chaturvedi, & Tripathi, 2025). In Pakistan, electronic resources are increasingly recognised as essential tools for research and academic activities. University libraries in major cities, including Lahore, have integrated e-resources to provide efficient services to information seekers. A survey of users' satisfaction in Pakistani university libraries found that e-resources complement traditional print sources and are considered invaluable research tools (Mirza & Mahmood, 2012). A study focusing on Lahore universities revealed that students from various academic disciplines have easy access to online resources, with e-books and instructional videos being the most popular categories. The frequency of usage and perceived impact of e-resources were positively correlated with academic performance. Factors influencing adoption included usability, relevance to coursework, comfort with the platform and recommendations from teachers and peers (Jabar & Govinder, 2025). Research scholars in Pakistani universities prefer electronic databases, e-books and open-access e-journals over printed collections. However, barriers such as restrictions on e-resources, slow internet connections and lack of awareness and training hinder effective utilisation (Ismail, Khan & Ahmad, 2020).

**Patterns of Usage among Research Scholars**

Studies from other regions, such as India and Nigeria, reinforce the trend of increasing reliance on e-resources among research scholars. The transition from print to electronic media has provided users with new tools for information seeking and retrieval. E-journals and databases are now vital for research work and attitudes towards e-resources are shaped by factors such as age, discipline and information literacy (Ani & Ahiauzu, 2008). In Lahore, research scholars typically access e-resources several times a week, recognising their importance for research activities. The integration of e-resources into academic workflows has improved research productivity and facilitated the publication of scholarly work (Ismail, Khan & Ahmad, 2020). Electronic services now encompass a wide range of formats, including floppy disks, CD-ROMs, DVDs, OPACs, bibliographic and full-text databases, electronic journals, scientific databases, information portals, e-books, the web and email (Okiki & Asiru, 2011). Research scholars have shown a growing reliance on electronic resources for their academic work, reflecting a significant shift from traditional print media to digital formats. Citation analyses of scholarly electronic journals from the late 1990s and early 2000s reveal an increasing use of electronic resources by scholars, with a notable prevalence of nontraditional and interdisciplinary references, indicating that electronic access has diversified the types of materials referenced in research (Herring, 2002). Humanities scholars, traditionally more attached to print sources, are increasingly engaging with electronic information resources. Surveys

among humanities faculty indicate that most have access to computers and the internet at both offices and homes and regularly utilize various electronic technologies. Despite facing some challenges, these scholars perceive modern electronic resources as facilitating their work (Tahir et al., 2010). This trend suggests that universities and libraries should enhance funding and training geared toward electronic resource accessibility, especially in disciplines historically relying on print (Tahir et al., 2010). Faculty members across disciplines prefer electronic journal articles as their primary research and teaching resources. Databases are commonly used as starting points for bibliographic searches, although many scholars also rely on general internet search engines. Academic libraries remain key access points to scholarly content, supplemented increasingly by freely available online materials. The preference for scholarly journals as publishing venues persists, although the open access model is only a marginal consideration for many researchers (Borrego and Anglada, 2016). In interdisciplinary humanities scholarship, information work involves complex strategies of exploration and translation across subject boundaries. These scholars rely heavily on informal collaborations and digital networks to access and manage diverse electronic resources, underscoring the importance of digital research libraries designed to support multifaceted information needs (Palmer and Neumann, 2002). Information literacy is a critical determinant of electronic resource utilization. Studies in Uganda show that availability of electronic resources does not guarantee their use; awareness, access skills and perceived utility significantly affect usage levels. Active information literacy programs are essential to enhance scholars' competencies in navigating, evaluating and applying electronic resources effectively (Kinengyere, 2007). The development of electronic information resources in institutional settings like Nigerian university libraries largely depends on internet connectivity and subscriptions to electronic databases and journals. However, digitization of local content and comprehensive library computerization remains less advanced, suggesting areas for improvement to maximize resource availability and utilization (Ani and Ahiauzu, 2008). The digital environment also enables new modes of scholarly communication and information access. Scholars use online social networks, such as Twitter, for professional purposes including information sharing, seeking assistance, social commentary, networking and managing digital identities. These practices highlight the expanding digital footprint and evolving use patterns of electronic resources among research scholars (Veletsianos, 2011). More recently, advanced AI tools like ChatGPT have begun influencing research practices among scholars, offering capabilities for literature review, data analysis and content generation. Such tools contribute to saving time, increasing productivity and democratizing research access, signaling an ongoing evolution in electronic resource usage (Ullah et al., 2024).

**Challenges in Adoption and Utilization**

Despite the benefits, several challenges persist in the adoption and effective use of e-resources:

**Digital Divid**

Firstly, the digital divide remains a significant obstacle, characterized by disparities in access to technology and the internet across different socioeconomic groups, geographic regions and demographic categories. This divide limits equitable access and often results in marginalized populations being left behind in technology adoption. Socioeconomic factors, such as access to gadgets, internet connectivity and family income, contribute to disparities in e-resource usage, especially between urban and rural students.

**Technical Barriers**

Secondly, technical barriers pose challenges such as inadequate infrastructure, hardware limitations, software compatibility issues and unreliable connectivity. These technical issues can hinder smooth implementation and continuous utilization of digital tools. Slow internet connections, limited access to specialized resources and complicated navigation of digital platforms hinder optimal use (Chouwdhury, 2024).

**Awareness and Training**

Thirdly, awareness and training deficiencies impact adoption. Lack of knowledge about available technologies and insufficient training opportunities can result in underutilization or misuse of digital resources. Users and institutions often require comprehensive training programs to build nece\ssary skills and confidence. Lack of information literacy and insufficient training programmes reduce the ability of scholars to exploit e-resources fully (Ruzegea & Msonde, 2021).

**Institutional Constraints**

Fourthly, institutional constraints including organizational culture, policies, budget limitations and administrative support also affect the adoption and sustained use of technology. Resistance to change within institutions and bureaucratic hurdles may slow down implementation processes. Budget limitations, uneven technological access and lack of institutional cooperation affect resource sharing and access.

**User Satisfaction**

Finally, user satisfaction plays a crucial role. If systems are not user-friendly, intuitive, or aligned with user needs, dissatisfaction may lead to resistance or abandonment of the technology. Continuous feedback and user-centered design approaches are essential to improve satisfaction and utilization. While many users report satisfaction with available e-resources, there is a need for continuous improvement in infrastructure, subscription access and user support.

These challenges are interconnected and addressing them requires a holistic approach involving infrastructural investment, inclusive policies, awareness campaigns, skill development programs and responsive design strategies.

## MATERIAL AND METHODS

The study adopted quantitative research design to measure the usage pattern of electronic resources. This approach is taken under the positivist philosophy to uncover and bring forth the objective. Survey method was adopted to collect data through a structured questionnaire adapted from various studies. Population was comprised of MPhil and PhD researchers from public and private universities in Lahore. Convenient sampling technique was adopted to select sample size. As population was comprised of MPhil and PhD researchers regularly visiting the libraries for using electronic resources. So, convenient sampling technique was adopted to target the usage behavior pattern. In this way it was easy to contact actual users. A total number of 277 responses were collected from the population.

**Demographic Information**

| Category | Group | Frequency (f) | Percentage (%) |
|---|---|---|---|
| University Type | Public | 130 | 46.9 |
| | Private | 147 | 53.1 |
| Current Stage | Course Work | 113 | 40.8 |
| | Research Work | 164 | 59.2 |

| | | | |
|---|---|---|---|
| Program Type | PhD | 108 | 39.0 |
| | MPhil | 169 | 61.0 |

The sample is almost evenly split between public and private university research scholars, with a slight majority from private universities. This balance ensures that findings reflect experiences from both sectors. A larger proportion of respondents are engaged in research work compared to those still in coursework. This suggests the study is well-positioned to capture insights from scholars actively involved in research activities, which is relevant for examining electronic resource usage. Most participants are MPhil scholars, with PhD scholars making up a significant minority. This distribution indicates that the study's findings will be more representative of MPhil students, but still include perspectives from those at the doctoral level. Overall, your sample consists of a diverse group of research scholars, with a slight majority from private universities, most of whom are engaged in research work and are pursuing MPhil degrees. This demographic spread provides a comprehensive view of electronic resource usage patterns across different university types, academic stages and programmer levels.

**Awareness Levels of E-Resources**

| **Statements** | **VLL** | | **L** | | **ML** | | **HL** | | **VHL** | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ***f*** | ***%*** | ***f*** | ***%*** | ***f*** | ***%*** | ***f*** | ***%*** | ***f*** | ***%*** |
| Institutional websites / repositories | 67 | 24.2 | 81 | 29.2 | 41 | 14.8 | 46 | 16.6 | 42 | 15.2 |
| Workshops / Seminars | 67 | 24.2 | 81 | 29.2 | 41 | 14.8 | 46 | 16.6 | 42 | 15.2 |
| Mailing groups | 8 | 2.9 | 51 | 18.4 | 54 | 19.5 | 109 | 39.4 | 55 | 19.9 |
| Journals / Magazines | 43 | 15.5 | 61 | 22.0 | 60 | 21.7 | 104 | 37.5 | 9 | 3.2 |
| Proceedings for Conferences | 9 | 3.2 | 56 | 20.2 | 63 | 22.7 | 108 | 39.0 | 41 | 14.8 |
| Library catalogs (OPACs) | 20 | 8.0 | 43 | 14.7 | 67 | 24.2 | 142 | 51.3 | 5 | 1.8 |
| HEC journal databases | 23 | 8.3 | 40 | 14.4 | 67 | 24.2 | 142 | 51.3 | 5 | 1.8 |
| Social networking sites like blogs, wikis, etc. | 30 | 10.7 | 61 | 22.0 | 75 | 27.1 | 106 | 38.1 | 6 | 2.2 |
| E-Books | 29 | 10.5 | 61 | 22.0 | 75 | 27.1 | 106 | 38.3 | 6 | 2.2 |
| HEC research repository | 31 | 11.2 | 59 | 21.3 | 85 | 30.7 | 92 | 33.2 | 10 | 3.6 |
| Dissertations / Theses | 31 | 11.2 | 59 | 21.3 | 85 | 30.7 | 92 | 33.2 | 10 | 3.6 |
| HEC electronic books (E-Books) | 29 | 10.5 | 54 | 19.5 | 103 | 37.2 | 79 | 28.5 | 12 | 4.3 |

Note: Very High Level =5; High Level = 4; Medium Level = 3; Low level = 4 Very Low, Level=5

About 24% of respondents have very low awareness and 29% have low awareness of various academic resources. Only around 16–17% reported high awareness, while 15% had very high awareness. Awareness of institutional repositories and workshops is generally low, highlighting the need for better promotion and training. However, mailing groups are well-known among scholars, with 39.4% reporting high awareness and 19.9% reporting very high awareness, while only 2.9% have very low awareness. Journals and magazines show 37.5% high awareness, though only 3.2% report very high awareness, with a significant portion (15.5%) having very low awareness, indicating room for improvement. Conference proceedings are fairly well-known, with 39% having high awareness and 14.8% very high awareness. Only 3.2% report very low awareness, showing their importance in research. OPACs and HEC journal databases have widespread recognition, with 51.3% reporting high awareness, though only 1.8% report very high awareness and 8–14% have very low or low awareness. Awareness of social networking sites (SNS), e-books and HEC repositories generally falls in the medium to high awareness categories (27–38%), but very high awareness remains low (2–4%). Lastly, HEC e-books are moderately known, with 37.2% showing medium awareness, 28.5% high and only 4.3% reporting very high awareness, suggesting there is potential for increased awareness.

**Frequency of Usage of E-Resources**

| **Frequency of usage** | **Always** | | **Often** | | **Sometimes** | | **Rarely** | | **Never** | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ***f*** | ***%*** | ***f*** | ***%*** | ***f*** | ***%*** | ***f*** | ***%*** | ***f*** | ***%*** |
| HEC electronic books (e-Books) | 29 | 10.5 | 54 | 19.5 | 103 | 37.2 | 79 | 28.5 | 12 | 4.3 |
| HEC journal databases | 23 | 8.3 | 40 | 14.4 | 67 | 24.2 | 142 | 51.3 | 5 | 1.8 |
| HEC research repository | 31 | 11.2 | 59 | 21.3 | 85 | 30.7 | 92 | 33.2 | 10 | 3.6 |
| Library catalogs (OPACs) | 110 | 39.7 | 105 | 37.9 | 33 | 11.9 | 26 | 9.4 | 3 | 1.1 |
| Institutional websites / repositories | 67 | 24.2 | 81 | 29.2 | 41 | 14.8 | 46 | 16.6 | 42 | 15.2 |
| Mailing groups | 10 | 3.1 | 49 | 19.9 | 53 | 19.3 | 109 | 39.4 | 57 | 20.1 |
| Social networking sites like blogs, wikis, etc. | 89 | 32.1 | 94 | 33.9 | 43 | 15.5 | 45 | 16.2 | 6 | 2.2 |
| E-Books | 103 | 37.2 | 79 | 28.5 | 106 | 38.3 | 12 | 4.3 | 6 | 2.2 |
| Journals / Magazines | 43 | 15.5 | 61 | 22.0 | 60 | 21.7 | 104 | 37.5 | 9 | 3.2 |
| Dissertations / Theses | 103 | 37.2 | 104 | 37.5 | 27 | 9.7 | 32 | 11.6 | 11 | 4.0 |
| Proceedings for Conferences | 9 | 3.2 | 56 | 20.2 | 63 | 22.7 | 108 | 39.0 | 41 | 14.8 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Workshops / Seminars | 84 | 30.3 | 91 | 32.9 | 44 | 15.9 | 50 | 18.1 | 8 | 2.9 |

Note: Always =5; Often = 4; Sometimes = 3; Rarely = 4 Never, =5

The most frequently used resources among respondents include library catalogues (OPACs), with 39.7% reporting "Always" and 37.9% using them "Often," showing a high reliance on them for academic work. E-books and dissertations/theses are also widely utilized, with over 37% using them "Always" and around 28-38% using them "Often," indicating their importance for research and coursework. Moderately used resources include workshops/seminars and social networking sites, which 30-33% of respondents use "Always," with a similar proportion using them "Often." These resources are likely integrated into academic routines for networking and skill development. Resources like HEC electronic books, research repositories and institutional websites are used "Sometimes" or "Rarely" by most respondents, possibly due to limited awareness or perceived relevance. On the other hand, mailing groups, journals/magazines and conference proceedings are less frequently used, with many respondents reporting "Rarely" or "Never" using them. Lastly, HEC journal databases are underutilized, with 51.3% of respondents using them "Rarely," suggesting a need for better promotion or easier access to these resources.

**Comparison of Awareness and Usage of E-Resources**

The comparison between awareness and usage of e-resources reveals varying patterns. For Library Catalogues (OPACs), over half of respondents (51.3%) report high awareness, which aligns with high usage, as 39.7% use them "Always" and 37.9% "Often." This shows that OPACs are both well-known and essential for research. E-books have moderate awareness, with 27–38% in the medium to high categories and frequent usage, with 37.2% using them "Always" and 28.5% "Often." Even with moderate awareness, e-books are widely used. However, HEC Electronic Books and the HEC Research Repository show moderate awareness but lower usage, with most respondents using them "Sometimes" or "Rarely," suggesting a need for more promotion and training. Institutional Websites/Repositories and Workshops/Seminars have low awareness, with over 50% reporting very low or low awareness, which is reflected in their low usage. Mailing Groups have high awareness (39.4% with high awareness), but usage remains low, with only 3.1% using them "Always," likely due to the preference for other communication channels. Similarly, HEC Journal Databases show high awareness (51.3%) but low usage, with most respondents "Rarely" using them, possibly due to access issues or perceived irrelevance.

| E-Resources Preferences | Always | | Often | | Sometimes | | Rarely | | Never | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *f* | % | *f* | % | *f* | % | *f* | % | *f* | % |
| HEC electronic books (e-Books) | 59 | 21.3 | 31 | 11.2 | 85 | 30.7 | 92 | 33.2 | 10 | 3.6 |
| HEC journal databases | 134 | 48.4 | 109 | 39.4 | 22 | 7.9 | 9 | 3.2 | 3 | 1.1 |
| HEC research repository | 31 | 11.2 | 59 | 21.3 | 85 | 30.7 | 92 | 33.2 | 10 | 3.6 |
| Institutional websites / repositories | 110 | 39.7 | 105 | 37.9 | 33 | 11.9 | 26 | 9.4 | 3 | 1.1 |
| Mailing groups | 67 | 24.2 | 81 | 29.2 | 41 | 14.8 | 46 | 16.6 | 42 | 15.2 |
| Social networking sites like blogs, wikis, etc. | 10 | 3.1 | 49 | 19.9 | 53 | 19.3 | 109 | 39.4 | 57 | 20.1 |
| EBooks | 33 | 11.9 | 26 | 9.4 | 3 | 1.1 | 110 | 39.7 | 105 | 37.9 |
| Online Dissertations / Theses | 41 | 14.8 | 46 | 16.6 | 42 | 15.2 | 67 | 24.2 | 81 | 29.2 |
| Patents / Reports | 53 | 19.3 | 109 | 39.4 | 57 | 20.1 | 10 | 3.1 | 49 | 19.9 |
| Proceedings for Conferences / | 103 | 37.2 | 104 | 37.5 | 27 | 9.7 | 32 | 11.6 | 11 | 4.0 |
| General purpose search engines e.g. Yahoo, Google etc | 9 | 3.2 | 56 | 20.2 | 63 | 22.7 | 108 | 39.0 | 41 | 14.8 |
| Specific databases | 84 | 30.3 | 91 | 32.9 | 44 | 15.9 | 50 | 18.1 | 8 | 2.9 |
| Specific institutional websites | 80 | 28.9 | 83 | 30.0 | 93 | 33.6 | 14 | 5.1 | 7 | 2.5 |
| Online citation index e.g. Web of science, MEDLINE etc | 43 | 15.5 | 45 | 16.2 | 6 | 2.2 | 89 | 32.1 | 94 | 33.9 |
| Your university library website | 110 | 39.7 | 119 | 43.0 | 13 | 4.7 | 30 | 10.8 | 5 | 1.8 |
| Other university library websites | 106 | 38.6 | 107 | 38.3 | 31 | 11.2 | 29 | 10.5 | 4 | 1.4 |
| Your library reference services | 107 | 38.6 | 111 | 40.1 | 32 | 11.6 | 19 | 6.9 | 8 | 2.9 |
| Personal contacts e.g. supervisors, teachers, mentors, friends, colleagues etc. | 115 | 41.5 | 118 | 42.6 | 28 | 10.1 | 12 | 4.3 | 4 | 1.4 |

**Most Preferred E-Resources**

HEC Journal Databases are the most preferred resource, with 48.4% of respondents using them "Always." Institutional Websites and University Library Websites are also highly preferred, with 39.7% and 43.0% using them "Always," respectively. Library Reference Services & Personal Contacts are valued by over 38% "Always" and 40% "Often. Moderately preferred resources include Specific Databases & Institutional Websites (30% "Always" or "Often") and Patents/Reports & Conference Proceedings, which are relevant for specialized research. HEC E-books are less preferred, with only 21.3% "Always" using them, while Mailing Groups and Online Dissertations/Theses show moderate preference. The least preferred resources are Social Networking Sites (3.1% "Always") and General Purpose Search Engines (3.2% "Always"), with Online Citation Indexes also being less favored (15.5% "Always").

**Purpose of Using E-Resources**

| Purpose | Always | | Often | | Sometimes | | Rarely | | Never | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *f* | % | *f* | % | *f* | % | *f* | % | *f* | % |
| Studying course work | 111 | 40.1 | 103 | 37.2 | 36 | 13.0 | 21 | 7.6 | 6 | 2.2 |
| Updating subject Knowledge | 103 | 37.2 | 107 | 38.6 | 34 | 12.3 | 24 | 8.7 | 14 | 4.8 |
| For teaching | 115 | 41.5 | 112 | 40.4 | 37 | 13.4 | 11 | 4.0 | 1 | .7 |
| Research | 98 | 35.4 | 113 | 40.8 | 38 | 13.7 | 25 | 9.9 | 3 | 1.1 |
| For writing Assignments | 115 | 56.0 | 74 | 26.7 | 8 | 2.9 | 28 | 10.1 | 12 | 4.3 |

The table highlights the academic purposes for which research scholars use e-resources. For coursework, 40.1% use them "Always" and 37.2% "Often," reflecting their integral role in learning. To update subject knowledge, 37.2% "Always" and 38.6% "Often" use e-resources, emphasizing their importance for continuous learning. For teaching, 41.5% "Always" and 40.4% "Often" use e-resources, showing their value in providing accessible, up-to-date content. For research, 35.4% "Always" and 40.8% "Often" use e-resources, underlining their significance in academic inquiry. The most common use is for writing assignments, with 56.0% "Always" and 26.7% "Often" using e-resources, demonstrating their essential role in academic writing and assessment.

**Preferred Format to Use E-Resources**

| Preferred Format | Always | | Often | | Sometimes | | Rarely | | Never | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *f* | % | *f* | % | *f* | % | *f* | % | *f* | % |
| HTML | 9 | 3.2 | 56 | 20.2 | 63 | 22.7 | 108 | 39.0 | 41 | 14.8 |
| pdf | 59 | 21.3 | 64 | 23.1 | 99 | 35.7 | 45 | 16.2 | 10 | 3.6 |
| No preference | 86 | 31.0 | 106 | 38.3 | 40 | 14.4 | 35 | 12.6 | 10 | 3.6 |

HTML Format is preferred by only 3.2% “Always” prefer HTML, while 20.2% “Often” do. The majority (39.0%) “Rarely” use HTML and 14.8% “Never” use it. HTML is the least preferred format, possibly due to its less user-friendly nature for academic reading or printing. As for as PDF Format is concerned it showed that 21.3% “Always” and 23.1% “Often” prefer PDF format. 35.7% “Sometimes” use PDF, while only 3.6% “Never” use it. PDF is a popular format, likely because it is easy to download, print and annotate, making it suitable for academic work.

**Preferred Location for Accessing E-Resources**

| Preferred Location | SD | | D | | N | | A | | SA | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *f* | % | *f* | % | *f* | % | *f* | % | *f* | % |
| Central Library | 29 | 10.5 | 54 | 19.5 | 12 | 4.3 | 79 | 28.5 | 103 | 37.2 |
| Departmental Library | 142 | 51.3 | 40 | 14.4 | 67 | 24.2 | 23 | 8.3 | 5 | 1.8 |
| Computer Lab | 10 | 3.6 | 106 | 38.3 | 40 | 14.4 | 35 | 12.6 | 86 | 31.0 |
| Other Places | 22 | 7.9 | 48 | 17.3 | 78 | 28.2 | 94 | 33.9 | 35 | 12.6 |

Note: SD=Strongly Disagree; D=Disagree; N= Neutral; A=Agree; SA=Strongly Agree

The central library is the most preferred location for accessing e-resources, with 37.2% "Strongly Agreeing" and 28.5% "Agreeing," likely due to its better facilities, internet connectivity and support services. In contrast, the departmental library is the least preferred, with over half (51.3%) "Strongly Disagreeing" and 14.4% "Disagreeing," possibly due to limited resources or infrastructure. Computer labs are moderately preferred, with 31.0% "Strongly Agreeing" and 12.6% "Agreeing," but a notable portion (38.3%) "Disagree" with using them, indicating some may find them less convenient. Lastly, accessing e-resources from other places shows flexibility, with 33.9% "Agreeing" and 12.6% "Strongly Agreeing," while 28.2% remain "Neutral," highlighting a growing trend for remote access.

**Linking Pattern of E-Resources**

| Linking Pattern | Strongly Disagree | | Disagree | | Neutral | | Agree | | Strongly Agree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *f* | % | *f* | % | *f* | % | *f* | % | *f* | % |
| HEC Online Library | 31 | 11.2 | 59 | 21.3 | 85 | 30.7 | 92 | 33.2 | 10 | 3.6 |
| Institutional websites / repositories | 67 | 24.2 | 67 | 14.4 | 142 | 51.3 | 23 | 8.3 | 5 | 1.8 |
| Mailing groups | 86 | 31.0 | 106 | 38.3 | 35 | 12.6 | 40 | 14.4 | 10 | 3.6 |
| Social networking sites like blogs, wikis, etc. | 22 | 7.9 | 48 | 17.3 | 78 | 28.2 | 94 | 33.9 | 35 | 12.6 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| General purpose search engines e.g. Yahoo, Google etc. | 43 | 15.5 | 61 | 22.0 | 60 | 21.7 | 104 | 37.5 | 9 | 3.2 |
| Specific databases | 106 | 38.3 | 99 | 35.7 | 30 | 10.8 | 34 | 12.3 | 8 | 2.9 |
| Online citation index e.g. Web of science, MEDLINE etc. | 104 | 37.5 | 100 | 36.1 | 24 | 8.7 | 36 | 13.0 | 13 | 4.7 |
| Your university library website | 117 | 42.2 | 101 | 36.5 | 39 | 14.1 | 18 | 6.5 | 2 | 0.7 |
| Other university library websites | 111 | 40.1 | 103 | 37.2 | 30 | 10.8 | 15 | 5.4 | 18 | 6.5 |
| Your library reference services | 117 | 42.2 | 95 | 33.4 | 29 | 10.5 | 33 | 11.9 | 3 | 2.0 |

The HEC Online Library is moderately used for linking to e-resources, with 33.2% "Agreeing" and 3.6% "Strongly Agreeing," though a significant portion (30.7%) remains "Neutral" or disagrees, indicating mixed adoption. Institutional Websites/Repositories show a high level of neutrality, with 51.3% "Neutral" and only 8.3% "Agreeing," suggesting limited use or awareness. Mailing groups are not a preferred method for accessing e-resources, with the majority "Disagreeing" or "Strongly Disagreeing." On the other hand, Social Networking Sites (blogs, wikis) show a growing role in academic networking, with 33.9% "Agreeing" and 12.6% "Strongly Agreeing," reflecting their increasing use for linking to e-resources. General Purpose Search Engines like Google are widely used by 37.5%, though 21.7% remain "Neutral" and a significant portion (38.3%) "Strongly Disagree." Specific Databases are less commonly used for linking, with only 12.3% "Agreeing," possibly due to access or awareness issues. Lastly, Citation Indexes and Library Reference Services are not preferred methods for linking to e-resources, showing that scholars rely more on other tools.

**Challenges in Using E-Resources**

| Problems | Always | | Often | | Sometimes | | Rarely | | Never | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *f* | % | *f* | % | *f* | % | *f* | % | *f* | % |
| Lack of computer facility in institute / university | 110 | 39.9 | 101 | 36.5 | 39 | 14.1 | 18 | 6.5 | 10 | 3.1 |
| Power failure (load shedding etc.) | 148 | 53.4 | 12 | 4.7 | 25 | 9.5 | 13 | 4.7 | 7 | 2.0 |
| Slow internet connectivity | 8 | 2.9 | 51 | 18.4 | 54 | 19.5 | 109 | 39.4 | 55 | 19.9 |
| Non-connectivity | 93 | 33.6 | 86 | 31.0 | 75 | 31.0 | 14 | 5.1 | 9 | 3.2 |
| Inability to use computer | 105 | 37.9 | 129 | 46.6 | 20 | 7.2 | 14 | 5.1 | 9 | 3.2 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Inability to find relevant information | 25 | 9.0 | 48 | 17.3 | 85 | 30.7 | 84 | 30.3 | 35 | 12.6 |
| Lack of information about how to use electronic information resources | 17 | 6.1 | 40 | 14.4 | 57 | 2.6 | 159 | 57.4 | 4 | 1.4 |
| Lack of time to acquire skills needed to use electronic information resources | 25 | 9.0 | 37 | 13.4 | 85 | 30.7 | 120 | 43.3 | 10 | 3.6 |
| Lack of support from the library staff | 17 | 6.1 | 42 | 15.2 | 65 | 23.5 | 115 | 41.5 | 38 | 13.7 |
| Less resources are available relevant to your subject/discipline | 28 | 10.1 | 46 | 16.6 | 79 | 28.5 | 99 | 35.7 | 25 | 9.0 |

A significant majority struggle with inadequate computer facilities in their institutions, which is a major barrier to accessing e-resources. Frequent power outages are a critical and persistent challenge, severely disrupting access to electronic resources. While slow internet is a problem for some, it is not as widespread as other issues, possibly due to improvements in connectivity for many scholars. Lack of internet access remains a substantial barrier for a large portion of scholars. Digital literacy is a significant issue, with many scholars lacking the necessary computer skills to effectively use e-resources. While some scholars struggle to find relevant information, this is less of a barrier compared to technical issues. Most scholars are at least somewhat informed about how to use e-resources, though a minority still lack this knowledge. Time constraints are a moderate barrier, but not as significant as technical or infrastructural issues. Most scholars do not see lack of library staff support as a major issue. While some scholars struggle to find resources relevant to their field, this is not a universal problem.

## RESULTS AND DISCUSSIONS

This study discussed the usage patterns of electronic resources among research scholars at universities in Lahore, Pakistan. The findings indicate a high level of reliance on e-resources, particularly for academic tasks such as coursework, updating subject knowledge, teaching, research and writing assignments. Library catalogues (OPACs) emerged as the most frequently used resource, with 39.7% using them "Always" and 37.9% "Often." E-books and dissertations/theses also saw high usage, with over 37% of respondents using them "Always" and 28–38% using them "Often." These results are consistent with studies by Al Bataineh et al. (2021), which highlighted the integral role of electronic resources in supporting academic work. However, certain resources like HEC journal databases and institutional repositories showed lower usage despite moderate awareness. Only 8.3% of respondents "Always" use HEC journal databases, while 51.3% "Rarely" use them, suggesting a gap between awareness and utilization. This aligns with Piracha and Ameen's (2019) findings, which noted that limited access, technical barriers and a lack of awareness hinder the effective use of e-resources in Pakistani universities.

The study also found that Social Networking Sites (SNS) and General Purpose Search Engines like Google are gaining traction for linking to e-resources, with 33.9% and 37.5% of respondents using them "Agreeably," respectively. This reflects a growing trend observed in other studies, such as those by Veletsianos (2011), which emphasized the increasing role of SNS in academic networking and information

sharing. However, specific databases and citation indexes were less favored, with 38.3% and 37.5% of respondents "Strongly Disagreeing" or "Disagreeing" with their use. This mirrors findings from Ani and Ahiauzu (2008), who noted that databases, despite their academic importance, are often underutilized in developing countries due to access issues and a lack of familiarity with their potential. Location preferences also reveal a strong inclination toward the central library (37.2% "Strongly Agreeing"), likely due to better facilities and support services, whereas departmental libraries were the least preferred, with over 51% "Strongly Disagreeing" with their use for accessing e-resources. This finding aligns with Ashiq et al. (2020), who found that university libraries with more comprehensive resources and infrastructure were preferred over smaller departmental libraries.

The analysis of challenges in e-resource usage highlights inadequate computer facilities and frequent power outages as significant barriers, with 53.4% of respondents citing power failure as a major issue. This is consistent with research by Mukaram et al. (2021), which indicated that technical barriers like power failure and slow internet connectivity remain major obstacles to e-resource adoption in Pakistan. Digital literacy and lack of time to acquire necessary skills were also notable challenges, affecting the ability of scholars to utilize e-resources effectively, which aligns with findings by Kinengyere (2007), who emphasized the need for ongoing information literacy training. Despite these challenges, a majority of scholars reported that library reference services and personal contacts remain valuable resources, with over 38% "Always" using them. This reflects the findings of Jabar and Govinder (2025), who noted that academic support services continue to play a critical role in helping students and researchers navigate and utilize digital resources effectively. Overall, the findings underscore the need for better promotion and training to enhance the adoption and usage of e-resources, especially through overcoming technical and infrastructural barriers. This study provides valuable insights for improving electronic resource services and fostering a more robust research culture in Pakistan's academic institutions.

## CONCLUSION

This study provides valuable insights into the usage patterns and preferences of electronic resources among research scholars at universities in Lahore, Pakistan. The findings indicate that e-resources such as library catalogues, e-books and dissertations are widely used for coursework, research and assignments, highlighting their importance in academic processes. However, a gap exists between awareness and usage for resources like HEC journal databases and institutional repositories, which suggests a need for better promotion and training. Despite moderate awareness, these resources are underutilized, possibly due to access issues or perceived irrelevance. The study also revealed that Social Networking Sites (SNS) and General Purpose Search Engines are becoming increasingly popular for linking to e-resources, reflecting a broader trend in academic networking and information sharing. In contrast, specific databases and citation indexes were less favored, which could be due to technical barriers or limited knowledge of their value. The central library was the most preferred location for accessing e-resources, indicating that better infrastructure and support services contribute to higher usage. However, issues such as inadequate computer facilities, power outages, slow internet connectivity and limited digital literacy remain significant challenges, as highlighted by respondents. To improve the adoption and effective use of e-resources, it is crucial for university libraries to focus on increasing awareness, enhancing digital literacy and addressing infrastructure challenges. By investing in user education, expanding access to international publications and ensuring technical support, universities can foster a more robust research culture. These measures will ultimately contribute to better academic performance, research productivity and the overall advancement of knowledge in academic communities.

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