Print or Digital? Analysing Researchers' Resource Preferences and Accessibility Challenges in Punjab's Higher Education Institutions

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Abstract

Introduction: In today's rapidly evolving academic research landscape, understanding researchers' preferences and challenges in accessing information is essential. With the growth of digital infrastructure and the surge in research output, the choice between print and electronic resources has become a critical concern for both researchers and academic libraries. The study aims to compare the use of print and electronic information resources among researchers in selected universities of Punjab, India. Specific objectives include identifying usage patterns, examining influencing factors, and recommending strategies for academic libraries to better support research needs. **Materials and Methods:** A mixed-methods approach was adopted, combining quantitative surveys (n = 250) with qualitative interviews. Data were collected from faculty members and PhD scholars across three public universities in Punjab. The survey measured usage frequency, preferences, and challenges, while interviews explored in-depth user experiences and contextual influences. **Results:** Findings highlight a growing preference for electronic resources due to their accessibility, searchability, and instant availability. Print resources, however, remain significant for in-depth reading, long-form texts, and archival purposes. Factors influencing resource choice included discipline, access to digital infrastructure, and training in electronic tools. Humanities scholars leaned towards print, while STEM researchers favoured digital formats. Barriers identified included the digital divide, lack of awareness, and limited training. **Conclusion:** The study concludes that academic libraries must maintain a balance between print and electronic resources. Enhancing digital infrastructure, providing targeted user training, and sustaining essential print collections are vital strategies to meet the diverse and evolving expectations of Punjab's research community.

Keywords: Digital Literacy, Academic Libraries, Researcher Preferences, Information Resource Usage, Accessibility Barriers

1. Introduction

The landscape of academic research has undergone a significant transformation with the advent of digital technologies, fundamentally reshaping how information is accessed, disseminated, and utilised[1]. For centuries, print-based resources such as books, journals, and monographs formed the cornerstone of scholarly communication, valued for their permanence, reliability, and established role in the academic tradition[2]. However, the proliferation of electronic information resources, including e-journals, e-books, online databases, and institutional repositories, has redefined information-seeking behaviour among researchers. These digital formats provide advantages such as immediate accessibility, powerful search functions, and continuous availability, features that have made them indispensable in contemporary scholarship[3]. Nevertheless, the continued relevance of print materials cannot be overlooked. Print resources are often preferred for extended reading, critical analysis, and archival use, particularly in disciplines where deep engagement with long-form texts remains central[4]. Scholars in the humanities and social sciences, for example, frequently express a preference for printed texts due to their perceived readability, tangibility, and enduring authenticity. By contrast, researchers in the sciences and technology-oriented fields are more inclined towards electronic resources, which provide rapid access to the most current findings and facilitate integration into global research networks[5]. These disciplinary differences underscore the complexity of resource usage patterns and highlight the need for balanced collections within academic libraries.

In regions such as Punjab, India, the transition from print to electronic resources is marked by uneven progress[6]. While certain universities have made substantial strides in expanding digital collections and subscribing to international databases, others remain constrained by financial limitations, infrastructural challenges, and insufficient expertise in digital resource management[7]. This uneven distribution of resources creates disparities among researchers, with some enjoying seamless access to global scholarship while others continue to rely heavily on traditional print collections[8]. Challenges such as inconsistent internet connectivity, limited awareness of available e-resources, and inadequate training in digital literacy further restrict optimal utilisation. Academic libraries occupy a pivotal position in addressing these challenges. Their role extends beyond the provision of resources to include user education, digital literacy initiatives, and the curation of collections that cater to diverse academic needs[9]. Libraries are also tasked with bridging the digital divide by ensuring equitable access, offering technological infrastructure, and preserving both print and electronic materials for future scholarship. However, libraries often face competing demands in resource allocation, as maintaining robust print collections while simultaneously investing in electronic resources requires significant financial and institutional commitment[10].

Against this backdrop, it becomes imperative to conduct a systematic examination of the comparative use of print and electronic resources among researchers[11]. Such an investigation is particularly relevant in the context of Punjab's universities, where infrastructural constraints

and budgetary limitations coexist with increasing demands for global research visibility. The present study seeks to analyse usage patterns, identify the challenges faced by researchers, and propose strategies that libraries may adopt to enhance access and support. In doing so, the study aims to contribute to the ongoing discourse on how academic libraries can effectively balance traditional and digital resources to meet the evolving needs of the research community.

2. Research Methodology

The Research Methodology chapter outlines the design, data collection, and analysis methods employed in this study. The purpose of this chapter is to explain the systematic process followed to address the research questions, ensuring that the results are reliable, valid, and applicable in the context of print-based and electronic resource usage among researchers in universities in Punjab[11] (Figure 1).
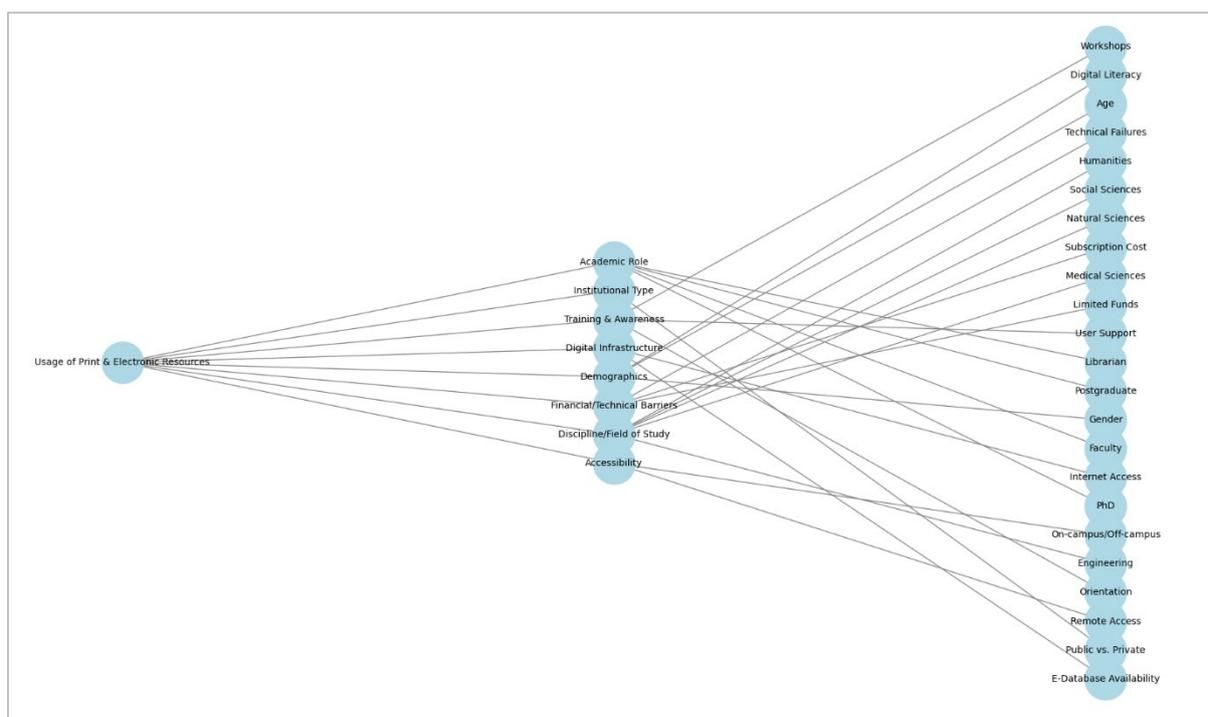
Figure 1: Research methodology framework illustrating the mixed-methods design (survey, interviews, document analysis, and observation) used to assess resource usage among researchers.

2.1 Research Design

This study employs a mixed-methods research design, combining both qualitative and quantitative approaches to gain a comprehensive understanding of the research problem. A mixed-methods design allows for the integration of numerical data (quantitative) and in-depth insights (qualitative), providing a more nuanced understanding of resource use patterns,

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preferences, and challenges[13]. The quantitative component uses structured questionnaires to gather data from a large sample of respondents, while the qualitative component involves semi-structured interviews with key stakeholders, such as researchers, librarians, and faculty members. The use of both methods strengthens the findings through triangulation, ensuring that the results are both broad and deep in their scope[14].

2.2 Sampling Techniques

The study population comprised researchers from universities in Punjab, including postgraduate students, faculty members, and librarians, as these groups represent the primary users and facilitators of print and electronic resources. A stratified random sampling technique was employed to ensure representation across institutional types (public and private) and academic disciplines (humanities, social sciences, natural sciences, engineering, and medical sciences), with the sample size determined using Krejcie and Morgan's formula for finite populations[15]. Universities were selected based on type (public or private), range of disciplines, geographical location, and availability of library and technological infrastructure, resulting in the inclusion of six institutions, three public and three private, across different regions of Punjab. Respondents included master's and PhD scholars, who require extensive literature for their research, faculty members who depend on resources for teaching and scholarly work, and librarians, who manage collections and provide user support, thereby offering a comprehensive perspective on information resource usage and access.

2.3 Data Collection Methods

To obtain comprehensive and reliable data on the comparative use of print and electronic resources in selected universities of Punjab, a mixed-method approach was employed, incorporating surveys, semi-structured interviews, document analysis, and observation. Surveys were distributed to postgraduate students and faculty members through both online and paper-based formats, using a structured questionnaire designed from prior studies[16]. The questionnaire included demographic details, usage patterns of print and electronic resources, preferences, access issues, and satisfaction levels, with a combination of closed-ended, Likert scale, and a few open-ended questions; it was pilot-tested for clarity and reliability. Semi-structured interviews were conducted with librarians, selected faculty, and researchers to capture qualitative insights into acquisition policies, resource accessibility, user support, satisfaction, and perceptions of the transition from print to electronic formats, with data analysed thematically. Document analysis was carried out using library acquisition reports, usage statistics, institutional policies, and annual reports to provide secondary data on budget allocation, usage trends, and institutional strategies, complementing survey and interview findings. Non-participant observation in university libraries further enriched the study by directly recording user interactions with print and electronic resources, resource accessibility, infrastructure, and library environments. To ensure validity and reliability, triangulation was applied by cross-verifying data collected from different methods, thereby reducing bias and

strengthening credibility. Ethical considerations were observed at all stages, with informed consent, participant anonymity, and the right to withdraw maintained throughout[17]. Collectively, these methods enabled a balanced and holistic understanding of how print and electronic resources are accessed, managed, and utilised across Punjab's academic institutions.

2.4 Data Analysis

2.4.1 Quantitative Analysis

Survey responses (n = 250) were prepared through data cleaning, which involved identifying and correcting incomplete or erroneous entries. Descriptive statistics, including frequency distributions, percentages, means, and standard deviations, were applied to summarise demographic information and resource usage patterns. Inferential statistics were conducted to test hypotheses and explore relationships: t-tests compared group means (e.g., faculty vs. researchers), chi-square tests assessed associations between categorical variables (e.g., resource type and satisfaction), and Pearson's correlation examined relationships between resource availability and usage. Statistical analyses were conducted using SPSS, which facilitated both basic summaries and advanced tests.

2.4.2 Qualitative Analysis

Interview transcripts and institutional documents were analysed thematically, following Braun and Clarke's (2006) framework. The process involved familiarisation, coding, theme development, and refinement. Codes such as "accessibility," "user preference," and "technical barriers" were organised into broader themes, including "transition to digital resources" and "barriers to access." NVivo software supported coding and data management. Themes were validated through constant comparison with the original data, while illustrative quotations enriched interpretation. Thematic findings were then integrated with quantitative results to provide contextual depth.

2.4.3 Triangulation

To strengthen credibility, findings from questionnaires, interviews, and document analysis were compared. This triangulation reduced the limitations of any single method and ensured a more robust interpretation of patterns in information resource usage.

2.4.4 Validity and Reliability

Multiple strategies were employed to ensure quality. The questionnaire was pilot-tested for clarity, and internal consistency was assessed using Cronbach's alpha, with values above 0.70 considered acceptable. In the qualitative strand, inter-coder reliability was established through independent coding and assessed using Cohen's kappa. Content and construct validity of instruments were established through literature review, expert consultation, and factor analysis.

Criterion-related validity was confirmed through correlations with established measures of resource usage and satisfaction. Triangulation across methods further enhanced validity

2.5 Ethical Considerations

Ethical principles guided all stages of this study. Informed consent was obtained from participants through clear communication of the study's objectives, procedures, and potential risks. Participation was voluntary, with assurances that respondents could withdraw at any time without penalty. Written consent was secured before data collection. Confidentiality and anonymity were maintained by removing identifying information and storing data securely, with digital files encrypted and physical records kept in locked storage. Results were reported in aggregate form to prevent individual identification. Potential risks were minimised through pre-study risk assessments, provision of support resources, and post-participation debriefing sessions. Ethical approval was secured from the Institutional Review Boards of the participating universities, ensuring compliance with institutional and international standards for research involving human subjects.

3. Results

3.1 Demographic Characteristics of Respondents

The demographic characteristics of the respondents provide important context for interpreting their research resource usage patterns (Figure 2). A total of 200 individuals participated in the study. The gender distribution revealed a higher proportion of male respondents (60%, n=120) compared to female respondents (40%, n=80). This imbalance is consistent with prior studies indicating male predominance in certain academic and research domains, particularly in early career stages. In terms of age distribution, half of the respondents (50%, n=100) were in the younger age group, with the majority falling within 21–30 years (30%, n=60), followed by 31–40 years (15%, n=30). Only 5% (n=10) belonged to the 41–50 years category, while no respondents reported being above 50 years. These findings suggest that the survey sample was skewed toward younger academics, which may reflect the growing involvement of early-career researchers in adopting new technologies and resources. Research experience further confirmed this trend. A substantial proportion of participants (40%, n=80) reported having less than 5 years of research experience, while 30% (n=60) had 5–10 years. Only 15% (n=30) had 11–20 years of experience, and another 15% (n=30) reported more than 20 years. This concentration of relatively less-experienced researchers may explain a higher adaptability to modern research tools and digital platforms, as younger academics often demonstrate greater technological fluency.
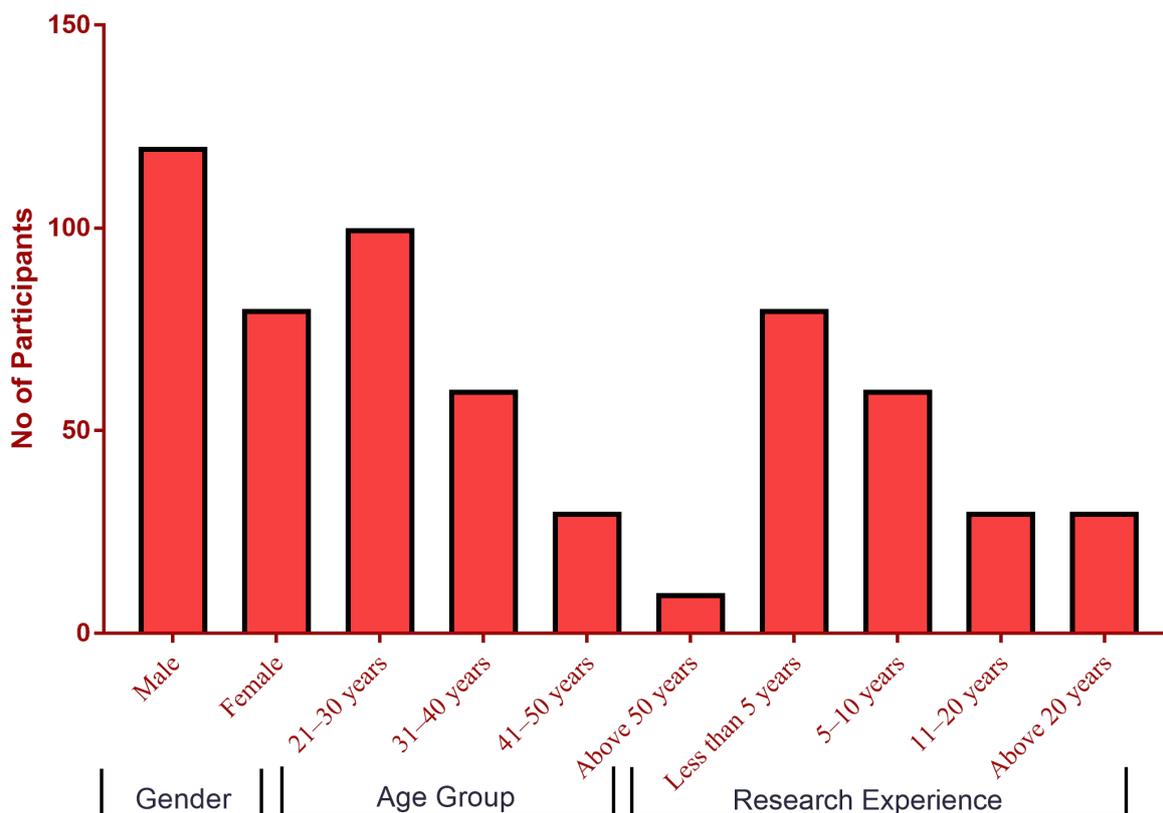
Figure 2: Demographic characteristics of respondents by gender, age group, and research experience.

Researchers' Preferences for Print-Based vs. Electronic Resources

The analysis of researchers' preferences for resource formats indicates a clear shift toward electronic resources. Half of the respondents (50%) reported a preference for electronic resources, while 40% still favoured traditional print-based materials. A smaller proportion (10%) expressed equal reliance on both formats. This finding reflects the global trend in scholarly communication, where the accessibility, searchability, and convenience of electronic platforms increasingly outweigh the limitations of physical collections. The preference for electronic resources can be attributed to factors such as remote accessibility, faster retrieval of information, and the availability of multidisciplinary databases. However, the considerable proportion of respondents who continue to favour print underscores the enduring value of physical materials, particularly for in-depth reading, reduced eye strain, and disciplines where print is still the primary medium. The 10% of respondents who indicated no strict preference highlight the hybrid nature of current academic practices, suggesting that a balanced resource infrastructure remains essential. Overall, while the results confirm the rising dominance of digital platforms, maintaining parallel access to print resources is critical to addressing the diverse needs and work habits of researchers.

Usage Patterns of Print-Based Resources

The analysis of print-based resource usage shows that despite the growing prominence of electronic platforms, traditional resources continue to play an important role in academic research. Among the respondents, books emerged as the most frequently used print resource (50%), followed by print journals (30%). Conference proceedings (10%) and other print materials, such as reports and theses (10%), were consulted less frequently. These findings suggest that books remain central to research, particularly in disciplines where comprehensive coverage, theoretical grounding, and detailed explanations are required. Print journals also maintain relevance, although their usage is comparatively lower, likely due to the wider availability of journal articles in digital formats. The relatively low reliance on conference proceedings and other print resources may be attributed to their limited availability in physical collections and the rapid transition of such materials to online repositories. A key challenge highlighted by respondents is restricted access to updated print collections, which may reduce the effectiveness of print resources in meeting contemporary research needs. This aligns with global trends, where libraries are increasingly prioritising electronic subscriptions over print acquisitions. Nevertheless, the continued reliance on books and journals underscores the importance of maintaining strong print holdings, especially for disciplines and researchers that value tangible formats and extended reading.

Usage Patterns of Electronic Resources

The findings highlight the central role of electronic resources in supporting academic research. As presented in Table X, online databases were the most frequently used electronic resource (60%), followed by e-journals (40%). E-books were used by 25% of respondents, while other resources, such as institutional repositories and digital archives, accounted for 5%. The strong preference for online databases reflects their comprehensive coverage, advanced search functionalities, and multidisciplinary relevance, making them indispensable for contemporary research. E-journals also remain highly valued, offering up-to-date scholarly output and wide accessibility, often replacing traditional print subscriptions. The comparatively lower use of e-books (25%) suggests that while they provide convenience, many researchers still prefer print books for in-depth reading. The minimal reliance on "other" electronic resources indicates limited awareness or discipline-specific applicability of such platforms. These results confirm the growing dominance of electronic resources in research practices, consistent with global trends in scholarly communication. However, the varying levels of usage among resource types suggest that electronic platforms complement rather than completely replace print materials, reinforcing the need for a balanced and diverse resource infrastructure.

Accessibility and Availability of Resources

An analysis of accessibility challenges reveals that researchers encounter barriers in utilising both print and electronic resources, though the nature of these issues differs. As shown in Table

X, 30% of respondents reported difficulties with print resources, primarily due to budget constraints, limited acquisitions, and outdated collections. This reflects a common concern in academic libraries where declining print budgets have reduced the availability of updated books and journals. Electronic resources, while increasingly dominant in research, also pose significant challenges, with 25% of respondents citing accessibility issues. These were largely linked to institutional subscription limitations, paywalls, and high licensing costs, which restrict access to essential databases and journals. Such barriers are particularly problematic in resource-constrained institutions where funding for electronic subscriptions remains limited.
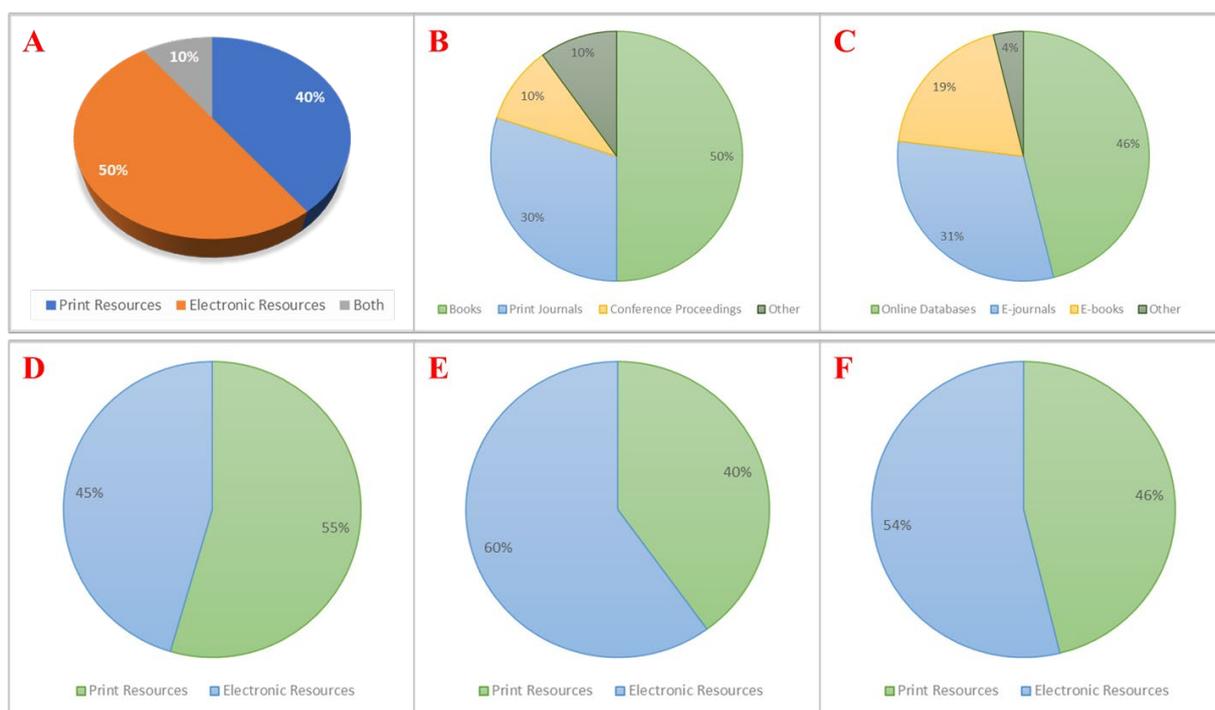

Figure 3: (A) Researchers' preferences for print-based versus electronic resources. (B) Usage patterns of print-based resources. (C) Usage patterns of electronic resources. (D) Accessibility and availability of resources. (E) Comparative analysis of ease of use between print and electronic resources. (F) Satisfaction levels with information resources.

Comparative Analysis of Ease of Use (Print vs. Electronic)

Ease of use emerged as an important factor influencing researchers' resource preferences. As indicated in Table X, 60% of respondents found electronic resources easier to use compared to 40% who favoured print resources. The higher usability of electronic platforms can be attributed to advanced search functionalities, remote accessibility, and the ability to retrieve information quickly across multiple disciplines. In contrast, print resources, though familiar to many researchers, were considered more cumbersome due to physical access requirements, limited availability, and time-consuming retrieval processes. These findings align with global trends in scholarly communication, where convenience and efficiency drive the adoption of

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electronic resources. However, the continued preference for print among a notable proportion of respondents suggests that factors such as reading comfort, reduced eye strain, and familiarity still play a role in shaping usage habits. Overall, while electronic resources dominate in terms of ease of use, maintaining complementary access to print collections remains important to accommodate diverse researcher needs.

Satisfaction Levels with Information Resources

The survey findings on satisfaction levels indicate that researchers generally view both print and electronic resources positively, though electronic resources demonstrate a slight advantage. As shown in Table X, 70% of respondents reported being satisfied with electronic resources compared to 60% for print resources. The higher satisfaction with electronic platforms can be attributed to their broader accessibility, up-to-date content, and convenience of remote use, all of which align with the increasing digitalisation of academic work. Print resources, while still valued, showed comparatively lower satisfaction, likely due to limited availability of updated collections, budget constraints, and the effort required for physical access. Nevertheless, the fact that a significant proportion of respondents remain satisfied with print highlights its continued relevance, particularly for disciplines where physical formats support deeper engagement and comprehension.
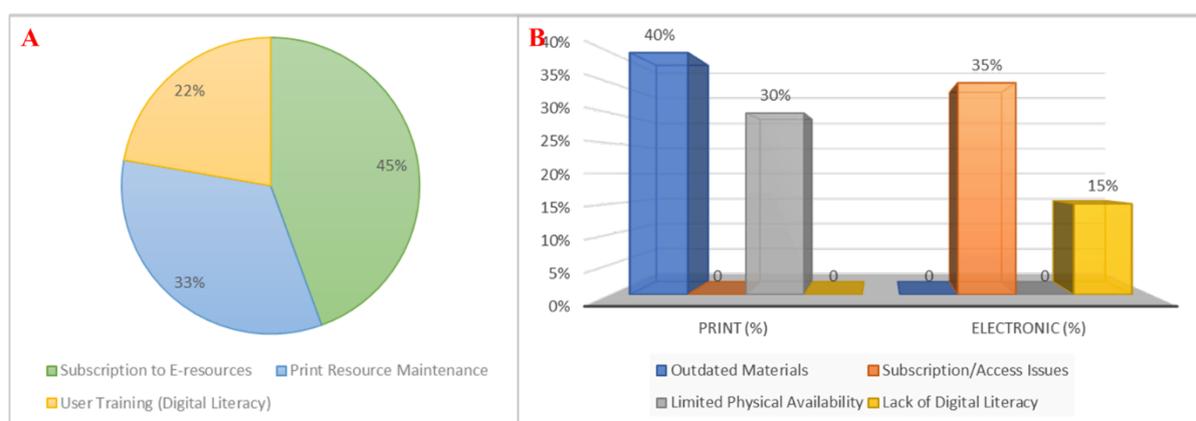
Role of Libraries in Facilitating Access

The findings underscore the pivotal role of libraries in enhancing researchers' access to both print and electronic resources. A majority of respondents (80%) acknowledged the importance of library subscriptions to electronic resources, which provide entry to online databases, e-journals, and other digital content essential for contemporary research. Print resource maintenance was also highlighted by 60% of respondents, reflecting the continued reliance on physical collections, particularly in disciplines where print remains indispensable. Furthermore, 40% of respondents recognised user training initiatives, particularly in digital literacy as a critical library function that enables researchers to maximise the potential of electronic resources. These results demonstrate that libraries not only act as custodians of information but also serve as facilitators of digital adaptation, bridging gaps between traditional and modern resource use. Strengthening library-led initiatives in both subscription management and user education is therefore essential to support the evolving needs of the academic community.

Barriers to Accessing Print and Electronic Resources

The analysis of barriers to accessing information resources highlights distinct challenges associated with both print and electronic formats. For print resources, the most significant issue reported was the prevalence of outdated materials (40%), followed by limited physical availability (30%). These findings reflect ongoing budgetary and infrastructural constraints that

hinder the regular updating and expansion of print collections, thereby reducing their relevance for current research needs. On the other hand, electronic resources presented barriers primarily linked to subscription and access issues (35%), which underscore the high costs of licensing and institutional restrictions that limit seamless usage. Additionally, 15% of respondents identified a lack of digital literacy as a constraint, suggesting that while electronic resources offer convenience and breadth, not all researchers are equally equipped to exploit them effectively. These results reveal a dual challenge: ensuring print collections remain current and accessible while also addressing the financial and skill-related limitations that impede the optimal use of electronic platforms. A balanced strategy that strengthens both print and digital infrastructures, alongside capacity-building in digital literacy, would therefore be crucial to improving overall resource accessibility.

Figure 4: (A) Role of libraries in facilitating access, showing the importance of e-resource subscriptions (80%), print resource maintenance (60%), and user training in digital literacy (40%). (B) Barriers to accessing print and electronic resources, with outdated print materials (40%) and subscription/access issues for electronic platforms (35%), were identified as the most significant challenges.

Conclusion

The study highlights the dynamic balance between print and electronic resources in academic research within the universities of Punjab. While electronic resources are increasingly preferred for their accessibility, speed, and comprehensive coverage, print resources remain vital for in-depth reading, archival use, and disciplines that value tangibility. Demographic findings show younger, early-career researchers dominate the sample, suggesting strong adaptability to digital platforms. However, barriers persist: outdated print collections, limited availability, subscription costs, and digital literacy gaps. Libraries play a crucial role in addressing these issues through e-resource subscriptions, maintaining core print collections, and offering user training. Ultimately, a hybrid model that integrates both formats supported by digital infrastructure, financial investment, and capacity-building will best serve the evolving needs

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of researchers. The findings emphasise that sustained efforts are required to ensure equitable access, user satisfaction, and the long-term relevance of academic libraries in the digital age.

Conflict of Interest: None

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