A Study on Research Infrastructure for Doctoral Scholars in Education Across Karnataka

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Abstract—Education doctoral research is a vital force behind teacher education reform, policy formation, and pedagogical progress. Though, the accessibility and availability of a strong research infrastructure are essential to its success. This study examines the condition of the research *facilities* offered to Ph.D. candidates in the education departments of many Karnataka institutions. Using a mixed-method approach and a descriptive survey methodology, structured questionnaires and qualitative inputs were used to gather data from 38 research supervisors and 94 research scholars. The results show that although basic physical infrastructure, such seminar chairs, seating arrangements, and drinking water, is commonly available, there are still large gaps in the availability of secure storage (64.9%) and personal research rooms (70.2%). Only 62.8% of scholars reported getting authorization to publish or reproduce research materials, despite the fact that access to print media and information resources, such as periodicals and research journals, is very strong. Regarding digital infrastructure, 87.2% of respondents reported having access to a digital library, while only 52.1% reported having 24-hour access, and only 64.9% of scholars reported having dependable internet connectivity. Although staff responsiveness and the guarantee of access to vital sources were judged to be lacking, library services were deemed good in terms of resource availability. According to the study's findings, even while Karnataka's universities often offer the groundwork for research, there is still need for significant advancement in areas like digital accessibility, customized workspaces, and library service responsiveness. In line with the objectives of the National Education Policy (NEP) 2020, which promotes a more robust and inclusive research ecosystem in Indian higher education, the findings highlight the necessity of immediate institutional reforms and focused investments.

Index Terms—Doctoral Research in Education, Ph.D. Research Infrastructure, Higher Education in Karnataka, Teacher Education Reform, National Education Policy 2020 (NEP 2020), Research Scholar Challenges, Digital Infrastructure in Academia, Library Services in Higher Education, Inclusive Research Ecosystem, Institutional Research Reform.

I. INTRODUCTION

The highest level of academic investigation is represented by doctoral research, which necessitates a strong infrastructure to facilitate in-depth studies and knowledge generation. The academic environment, which includes access to labs, libraries, digital databases, guidance facilities, ICT tools, and administrative assistance, has a major impact on the calibre of research that PhD researchers generate (Altbach and Salmi, 2011). The quality and impact of research outcomes are significantly shaped by the accessibility and availability of research infrastructure in the field of education, where research informs teacher preparation, pedagogical innovation, and policy formation (National Institute of Educational Planning and Administration, 2020).

The quality and quantity of research infrastructure offered to PhD researchers varies greatly throughout universities in Karnataka, a state renowned for its intellectual liveliness and diversified higher education institutions (Government of Karnataka, 2021). Lack of access to digital libraries, outdated reference materials, limited funding for research, inadequate academic spaces, and a shortage of qualified supervisors are some of the issues that many academics encounter (University Grants Commission, 2019). The greater objectives of the National Education Policy (NEP) 2020, which prioritizes boosting research and innovation across all levels of higher education, are also hampered by this circumstance, in addition to impeding individual academic progress (Ministry of Education, 2020). In

this study, the availability (both physical and digital) and accessibility (affordability and convenience of use) of research infrastructure for Ph.D. researchers in education departments throughout Karnataka will be critically examined and evaluated.

II. NEED AND IMPORTANCE OF THE STUDY

Doctoral research in education shapes curriculum design, policy recommendations, and professional development for future educators. There is a growing concern about infrastructural gaps in many Indian universities, especially in state-funded institutions. Many doctoral scholars report difficulties in accessing basic research resources, including updated libraries, internet facilities, research software, and mentorship. The NEP 2020 highlights the need to boost research ecosystems in universities, making this study timely and relevant. It will provide empirical data to identify strengths and gaps in the current research infrastructure across education departments in Karnataka. Findings will help policymakers, university administrators, and education departments to allocate resources more effectively. The study can serve as a baseline for developing research-supportive environments and frameworks in teacher education and allied fields.

III. RATIONALE OF THE STUDY

While a number of studies have addressed research productivity and supervision quality, very few have focused specifically on the infrastructural and accessibility dimensions that influence research quality in education departments. This study fills a critical gap by: Providing a state-wide perspective on infrastructural inequities and accessibility barriers. Addressing how availability does not always guarantee accessibility, especially for women, marginalized, and rural scholars. Aligning with national and state-level goals for improving research ecosystems and doctoral output quality.

IV. STATEMENT OF THE PROBLEM

"A Study on the Availability and Accessibility of Research Infrastructure for Doctoral Scholars in Education Departments across various Universities in Karnataka."

V. OBJECTIVES OF THE STUDY

1) To study the different levels of availability and accessibility of research infrastructure available in education departments of selected universities across Karnataka.
2) To analyse the accessibility of available research infrastructure from the perspective of doctoral scholars in terms of usability.

VI. REVIEW OF LITERATURE

Nandini, R., and Bhat, S. (2021) studied on ICT Access and Doctoral Research: A Study from Southern Indian Universities. According to the study ICT infrastructure in southern Indian universities, including Karnataka, and found that while digital libraries were increasingly available, reliable internet connectivity and 24/7 access remained limited. The researchers highlighted that these gaps disproportionately affected education scholars who relied heavily on digital resources for pedagogical research, supporting the current study's focus on addressing digital infrastructure deficiencies.

Rajeshwari, H. (2021) studied on ICT Infrastructure in Higher Education Institutions in Karnataka (Doctoral dissertation). The study analysed ICT infrastructure in Karnataka's higher education institutions and found that only a small proportion of universities provided consistent high-speed internet and comprehensive digital library access. The study emphasized the urgent need for infrastructure upgrades to support doctoral research, particularly in resource-intensive fields like education, directly supporting the current study's objectives to improve research infrastructure.

Jadhav, V. S. (2020) studied on Research Infrastructure in Indian Higher Education Institutions: A Critical Analysis. The research critically analysed research infrastructure in Indian higher education institutions, revealing disparities in access to funding, digital resources, and mentorship. The study noted that education scholars faced specific challenges, such as limited access to specialized journals and research software, emphasizing the need for targeted investments. These findings aligned with the current study's objectives to

assess and improve infrastructure in Karnataka's education departments.

Mohammed, I. (2020) studied on Role of University Libraries in Supporting Doctoral Research in Indian State Universities (PhD Thesis). According to the study the role of university libraries in supporting doctoral research in Indian state universities, including those in Karnataka. The study found that many institutions lacked adequate digital library access and trained library staff, with issues like limited 24/7 access to digital resources and insufficient journal subscriptions. These gaps in library services resonated with the current study's findings on deficiencies in library support for doctoral scholars.

Sharma, R., and Dey, S. (2019) studied on Examining Infrastructural Constraints in Research Output: A Study of State Universities. This study investigated infrastructural constraints in Indian state universities and found that limited access to digital libraries, unreliable internet connectivity, and inadequate workspaces significantly hindered research output. In Karnataka, the researchers identified out-dated ICT infrastructure and uneven resource distribution across institutions as key issues, directly impacting doctoral scholars in education. These findings were relevant to understanding the digital and physical infrastructure challenges faced by scholars in the current study.

Creswell, J. W., and Plano Clark, V. L. (2018). Studied on Designing and Conducting Mixed Methods Research (3rd ed.).This study provided a methodological foundation for the current research by advocating for a mixed-methods approach to investigate complex issues like research infrastructure. The authors emphasized the value of combining quantitative surveys with qualitative interviews to achieve triangulation, enabling a comprehensive analysis of both availability (e.g., percentage-based data) and accessibility (e.g., scholars' perceptions) of resources. This approach directly informed the current study's design for assessing infrastructure in Karnataka's education departments.

VII. RESEARCH DESIGN

The present investigation uses a multidisciplinary, qualitatively-dominant descriptive survey research methodology. The objective of this study is to investigate, characterize, and evaluate the type, accessibility, availability, and perceived influence of research facilities offered to Ph.D. students in the education departments of different Karnataka universities. Quantifiable insights on the level of infrastructure availability and accessibility are provided by percentage-based descriptive analysis, while qualitative data offers depth through the scholars lived experiences and perceptions.

VIII. SAMPLING OF THE STUDY

The present study adopts a purposive-cum-stratified sampling technique to ensure a diverse and representative sample of doctoral scholars enrolled in Education departments across various universities in Karnataka. The study sample was comprised 94 doctoral scholars from selected universities. This sample size was considered adequate for exploring perceptions, experiences, and institutional variations related to the availability and accessibility of research infrastructure.

IX. TOOLS USED FOR THE STUDY

A combination of quantitative and qualitative methods was employed to gather thorough data. A structured questionnaire given to research supervisors served as the main instrument. This survey was broken down into areas that addressed demographic information, the accessibility and usability of these resources, and the availability of both digital and physical research infrastructure (such as workspaces, internet access, library facilities, ICT tools, and research funds).

X. STATISTICAL TECHNIQUES OF THE STUDY

These statistical techniques are aligned with our descriptive survey research design and mixed-method approach, with emphasis on percentage-based analysis and qualitative insights.

XI. FINDINGS OF THE STUDY

Infrastructure and Basic Facilities
The analysis reveals that a majority of the research centres are well-equipped with essential infrastructure. Notably, 97.9% of respondents

confirmed the availability of seminar chairs, and 95.7% reported the presence of a functional electrical system and proper seating arrangements. Access to basic necessities like drinking water (94.7%) and tables (91.5%) was also widely available. However, only 70.2% indicated the availability of separate research rooms, highlighting a gap in dedicated personal workspaces. Similarly, only 64.9% reported having access to secure storage such as almiras or cabinets, suggesting a need for better individual resource management infrastructure.

Print Media and Knowledge Resources

A substantial proportion of the participants acknowledged access to various print-based learning and research materials. Magazines were available in 94.7% of the institutions, and daily newspapers were available in 92.6% of them. Supplemental newspapers were available in 91.5% of cases. Furthermore, the availability of research papers or prior work was affirmed by 92.6% of scholars. Nevertheless, permission for printing research materials was available to only 62.8% of respondents, indicating limitations in access to document reproduction support.

Digital Infrastructure and Internet Facilities

In terms of digital facilities, 87.2% of the scholars had access to the digital library, and 79.8% had free access. However, 24×7 digital library access was reported by only 52.1%, indicating limited flexibility for research beyond standard working hours. Internet access through Wi-Fi was available to 81.9%, and LAN access was reported by 73.4%. Yet, reliable internet connectivity (LAN or Wi-Fi) was present in only 64.9% of the institutions. This emphasizes a need for strengthening digital infrastructure to support uninterrupted research work.

Library Services and Support

When it comes to library support services, most scholars (94.7%) reported that they had printing rights for research materials and 93.6% had permission to digitally reproduce items. Similarly, 92.6% indicated that the library provides materials for reference and subscribes to academic journals. About 90.4% noted that the library preserves research theses. In terms of user facilitation, 85.1% of scholars had library membership or ID cards, while 80.9% had access to photocopying services. However, only 70.2% believed that the library responds promptly to scholar needs, and 68.1% found the staff to be helpful

and supportive. More concerning was that only 61.7% reported that the library ensures access to essential sources, suggesting a considerable area for service improvement.

The results highlight that while there is generally strong availability of physical infrastructure and print/digital resources, there remain notable gaps in areas like personal research space, continuous digital access, internet reliability, and comprehensive library support services. Institutions must prioritize bridging these gaps to foster a more supportive and enabling research environment.

XII. IMPLICATIONS OF THE STUDY

The findings of the present study have several critical implications for institutional policy makers, administrators, and stakeholders in the field of higher education and research development. These implications are outlined below:

1) The study highlights that while basic facilities like seating arrangements, tables, drinking water, and electricity are largely available, more advanced or specific research-supportive infrastructures such as separate research rooms and storage cabinets (almiras) are lacking in a significant number of institutions. This suggests a need for enhanced physical infrastructure to support scholars' productivity, privacy, and material safety.

2) Although a majority of scholars have access to digital libraries and internet services, 24×7 access and high-speed connectivity remain limited. The results imply that uninterrupted digital access is vital for modern research practices and institutions must prioritize upgrading their internet infrastructure and provide flexible, round-the-clock access to digital academic databases.

3) The study found that while library resources such as academic journals and research theses are generally available, staff responsiveness and proactive support are suboptimal in many cases. These points to the need for capacity building and training of library staff to be more research-oriented and user-friendly in their approach.

4) Institutions must adopt policies that facilitate ease of access to essential academic materials, both in physical and digital forms. Granting printing rights, enabling digital reproduction, and offering photocopying services should be standardized

practices across libraries to reduce procedural delays and increase research efficiency.

5) There is a need to establish internal quality assurance and feedback systems to regularly assess the adequacy and satisfaction level of research scholars with the available resources. These mechanisms would help institutions remain responsive and adaptive to the evolving academic and research needs.

6) The findings suggest that not all scholars may have equal access to research facilities. Institutions should ensure equitable distribution of resources and avoid centralization or favouritism in access to digital libraries, LAN facilities, or personal research spaces.

7) The implications resonate with the National Education Policy (NEP) 2020's vision of improving the research ecosystem in Indian higher education. Institutions must take the study's findings as an opportunity to invest in both infrastructure and human support systems to foster a culture of inquiry, innovation, and academic excellence.

XIII. DISCUSSION AND CONCLUSION OF THE STUDY

The purpose of the current study was to investigate the accessibility and availability of facilities and research resources for academics in higher education institutions. The majority of schools offer a rather well-equipped research environment, particularly with regard to physical infrastructure, print materials, and basic internet access, according to the data gathered. Seminar seats, drinking water, electrical systems, periodicals, newspapers, and research paper access all showed high percentages of availability. Services like digital reproduction licenses and printing rights are also readily available.

The study additionally emphasizes some serious shortcomings. Notable shortcomings include the absence of dedicated research spaces, restricted provision of personal storage (almiras), a limited 24-hour digital library, and patchy internet service. The staff's response and the guarantee of access to crucial sources are still issues, even though the library's resources are normally sufficient. The comparatively lower percentages in these areas imply that, even in the midst of material resources, researchers' qualitative experience may be hampered.

Even though there are enough resources available overall, higher education institutions urgently need to fix infrastructure issues, increase digital connectivity, provide flexible access to digital libraries, and make library services more effective and user-friendly. These enhancements are necessary to sustain an academic ecology that is both comprehensive and conducive to research, which is in line with the NEP 2020 goal of high-quality higher education and research excellence.

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