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Awareness and Use of Electronic Information Resources among Academic Users of Indian Institutes of Information Technology (IIITs) in South India: A Study

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ABSTRACT

The rapid evolution of information and communication technology has fundamentally altered the manner in which scholarly information is created, disseminated, and accessed in academic settings. Electronic information resources (EIRs), which encompass e-journals, e-books, online databases, electronic theses and dissertations, and preprint repositories, have progressively supplanted traditional print collections as the primary medium through which researchers and students interact with scholarly content. This study investigates the awareness and use of electronic information resources among students, research scholars, and faculty members of Indian Institutes of Information Technology (IIITs) located across five South Indian states Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, and Telangana. Using a structured questionnaire administered to 455 valid respondents through proportionate stratified random sampling (Krejcie & Morgan, 1970), the study examines awareness levels, frequency and purpose of EIR use, preferred devices and databases, satisfaction levels, and barriers encountered during access. The findings reveal that awareness is high (47.91% highly aware), daily access is prevalent (40%), IEEE Xplore and ACM Digital Library dominate platform preferences, and slow internet speed (47.91%) is the foremost access barrier. Recommendations are offered to library administrators and institutional policymakers for improving EIR access, awareness, and effective utilisation in IIIT libraries.

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KEYWORDS: Electronic Information Resources, IIITs, South India, E-Journals, IEEE Xplore, INFLIBNET, User Awareness, Digital Libraries, Academic Libraries.

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INTRODUCTION

The Internet-based information system has caused a revolutionary change in the nature of library services provided to the academic community in the last two decades. In present era the libraries where once great masses of paper books were stored are defined by their means of electronic resources, from full-text journal databases to institutional access to e-book platforms to membership in national consortium arrangements providing gateways to unlimited

peer-reviewed electronic publications. In Indian scenario, this change has been significantly increased by the UGC-INFLIBNET project and its flagship consortium e-ShodhSindhu that facilitated subsidized access to hundreds of international databases to the eligible academic institutions of the country.

The Indian Institutes of Information Technology (IIITs), established under the IIIT Act, 2014 through Public-Private Partnership (PPP) arrangement with the State Governments, are a niche group in the higher technical education sector of India. The IIITs are home to IT, computer science, electronics and other cognate academic groups with information needs that are high, fast-changing and strongly dependent on state-of-the-art electronic information. The high consumers of electronic scholarly content in the Indian higher education system include the academic users such as students in capstone projects, doctoral students whose research is for publication, and faculty who conduct sponsored investigations.

In spite of this, empirical studies of the awareness and use patterns of EIRs in the IIIT ecosystem are scant in the published literature. So far, existing research on the use of EIRs in higher education institutions of India has been done with the centrally supported universities, state universities, IIT institutions, NITs or management institutions, with the IIITs being a relatively new and fast growing institution category. The present study aims to fill this void by systematically surveying the level of EIR awareness and usage behaviour of the three major academic cohorts of South Indian IIITs and understand the challenges faced towards the utilization of the available electronic resources optimally.

Electronic Information Resources (EIR's)

An electronic information resource may be understood as anybody of information that is stored, organised, and made accessible through electronic systems predominantly computer networks and internet-based infrastructure. The term encompasses a wide spectrum of digital content types, including but not limited to: full-text and bibliographic electronic journals; electronic books and reference works; online bibliographic and citation databases; institutional and national repositories of electronic theses and dissertations; preprint and open-access servers; multimedia learning resources; and web-based current awareness services.

In the context of Indian academic libraries, EIRs are principally accessed through two channels:

(i) institutional subscriptions to commercial database platforms such as IEEE Xplore, ACM Digital Library, Scopus, Elsevier ScienceDirect, and Springer Link; and

(ii) the UGC-INFLIBNET e-ShodhSindhu national consortium, which provides centralised, subsidised access to a curated set of international databases for eligible institutions, including IIITs. The Shodhganga platform, also maintained by INFLIBNET, serves as India's national repository of electronic theses and dissertations and is extensively used by doctoral researchers across the country.

Advantages of Electronic Information Resources: EIRs offer several decisive advantages over conventional print resources: simultaneous multi-user access from any internet-enabled device; round-the-clock global availability; rapid full-text searchability; hyperlinked cross-referencing between related articles and data sets; currency ensured

by continuous online updating; space and cost efficiency relative to physical storage; and integration with citation management, altmetric tracking, and research analytics tools.

Challenges in Using Electronic Information Resources: Despite their advantages, EIRs present several challenges to users: dependence on reliable high-speed internet connectivity; the need for adequate digital and information literacy skills to navigate complex database interfaces; institutional licensing and access authentication barriers; unavailability of full-text content for resources outside institutional subscriptions; absence of systematic training for new users; and, in some cases, language constraints for non-English materials.

LITERATURE REVIEW

The students' usage of e-resource and its frequency was investigated by Maitato (2020), which resulted that internet resources were most frequently used (98.4%) and e-books were (85.6%) and students used internet resources mostly on a daily basis, which reflected the present study.

Sharma and Srivastava (2019) studied the awareness and utilization of online information resources among faculty members, research scholars and post graduate students of private engineering colleges affiliated to RGPV, Bhopal, and concluded that awareness was reasonable but the real utilization of the resources was limited due to the lack of infrastructure and training levels, which is similar to the results of the present study.

In the above study Soni, Gupta and Shrivastava (2018) found out that Shodhganga (95%) was used most followed by DOAJ3. Shodhganga stood out as a major platform in the context of general university researchers, whereas IEEE Xplore and ACM Digital Library were the top two platforms preferred by the researchers of IIITs, which is due to their technology-oriented disciplines.

In engineering college libraries in Kerala, Jestin and Sornam (2016) studied the awareness and availability of e-resources and noted that quality in the technical institutions is being evaluated based on the depth and variety of electronic resources. This is especially relevant in the context of the IIITs which have been mandated to conduct research in the field of EIR with the latest cutting-edge infrastructure. The present investigation extends the findings of Mahato (2023) who studied the awareness of EIR among LIS students of SKB University to a larger population with more diversity and distinct institutional set up at IIIT.

SCOPE OF THE STUDY

This study is confined to the academic users students, research scholars, and faculty members of Indian Institutes of Information Technology located in five South Indian states: Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, and Telangana. The institutions surveyed include IIIT Bangalore, IIIT Dharwad, IIIT Raichur (Karnataka), IIIT Kerala (Kottayam), IIITDM Kancheepuram, IIIT Tiruchirappalli (Tamil Nadu), IIITDM Kurnool, IIIT Sri City (Andhra Pradesh), and IIIT Hyderabad (Telangana). Administrative and non-teaching personnel are excluded from the scope of this investigation.

AIMS AND OBJECTIVES

- ✓ To know the awareness level of academic users of South Indian IIITs towards electronic information resources.
- ✓ To collect information about how often the EIRs are used by students, research scholars and faculty members.
- ✓ To determine the most common use of EIRs and the preferred access devices.
- ✓ To investigate the usage of electronic information resources in relation to the various purposes they are used for in the three academic cohorts.
- ✓ To determine user satisfaction towards the EIRs available in the institutional libraries.
- ✓ To recognise the main obstacles and difficulties faced when accessing EIRs.
- ✓ To recommend ways to enhance EIR awareness, access and effective use in IIIT libraries.

RESEARCH METHODOLOGY

The present study was conducted by descriptive survey method. The structured questionnaire was designed which is based on the extensive review of the literature and good knowledge of the subject. It was then improved after conducting a pilot study with 50 respondents who were not part of the main study (Cronbach's $\alpha = 0.813$, suggesting good internal reliability). The questionnaire included questions about the demographics of the respondents, awareness of EIR, frequency of use and uses, devices used, preferred databases, satisfaction with the databases, and challenges faced. The study population includes the academic users of South Indian IIITs (estimated N = 10,000).

The sample size was calculated by using the Krejcie and Morgan (1970) formula which recommends a minimum sample size of 370 for populations of this size with a 95% level of confidence and 5% margin of error. A number of 500 questionnaires were set for proportional representation across institutional strata and academic categories. The questionnaires were distributed online as well as offline from each of the participating IIITs. A total of 500 questionnaires were sent with 455 being returned (91% response rate).

DATA ANALYSIS AND INTERPRETATION

The data collected through the questionnaires were coded, tabulated, and analysed using Microsoft Excel. The findings are presented below through a series of summary tables, each followed by interpretive commentary.

Table 1: Gender-wise Distribution of Respondents (n=455)

Gender	No. of Respondents	Percentage (%)
Male	226	49.67%
Female	186	40.88%
Prefer not to disclose	43	9.45%
Total	455	100%

Table 1 shows the gender-wise distribution of the respondents, which indicates that the largest group of the respondents comprised of males (49.67%), followed by females (40.88%) and a negligible number of the respondents indicated that they preferred not to disclose their gender (9.45%). The distribution is a progressive rise

in the enrolment of female students in both post-graduate and doctoral programmes at IIIT, and broadly similar to the national trend in female enrolment in technical higher education programmes.

Table 2: Academic Category-wise Distribution of Respondents

Academic Category	No. of Respondents	Percentage (%)
B.Tech./M.Tech. Students	228	50.11%
Research Scholars (Ph.D.)	91	20.00%
Faculty Members	136	29.89%
Total	455	100%

The distribution by academic cohorts is given in Table 2. The maximum number of students are in the B.Tech / M.Tech (50.11%) followed by faculty (29.89%) and research scholars (20.00%). This proportional representation provides a foundation for findings in terms of the views of all three user groups, allowing for meaningful comparisons across cohorts.

Table 3: Self-reported Awareness Level of Electronic Information Resources

Awareness Level	No. of Respondents	Percentage (%)
Highly Aware	218	47.91%
Aware	163	35.82%
Moderately Aware	58	12.75%
Less Aware	16	3.52%
Not Aware	0	0.00%
Total	455	100%

Table 3 shows the respondents' levels of awareness of electronic information resources. 47.91% of respondents report high awareness of the availability of EIRs through their institutional library and another 35.82% report moderate awareness, for a total of 83.73% who report a high to moderate level of awareness of the availability of EIRs through their institutional library. This heightened consciousness is unique to IIIT users than students of general purpose universities and is part of the academic culture in these institutions where technology permeates every aspect of learning. Perhaps surprisingly, there was no indication from any of the respondents that they were not aware of EIRs at all, reflecting successful baseline library orientation activities at the participating institutions.

Table 4: Frequency of Using Electronic Information Resources

Frequency	No. of Respondents	Percentage (%)
Daily	182	40.00%
Several times a week	138	30.33%
Once a week	82	18.02%
As and when required	34	7.47%
Rarely	19	4.18%
Total	455	100%

This is much higher than access to EIR achieved by Table 4 (40.00% had access daily and 30.33% had access a few times per week). Over 70% of the respondents would interact with EIRs on a near daily basis, reflecting the academic culture at IIIT, that is research and literature based. The proportion of low utilisations pockets (4.18 per cent) are not widespread but there are pockets.

Table 5: Devices Used to Access Electronic Information Resources (Multiple Responses)

Device	No. of Respondents	Percentage (%)
Smartphone	312	68.57%
Laptop/Notebook	389	85.49%
Desktop/PC	198	43.52%
Tablet	74	16.26%

The devices used to access EIRs are presented in **Tabled 5** (allowing for multiple responses). The most popular devices used are laptops and notebooks (85.49%), smartphones (68.57%), and desktop PCs (43.52%). 16.26% of the respondents use tablets. It is also notable that, unlike the SKB University study (Mahato, 2023), which found that 65% of users relied on a smartphone for their work, IIIT users' preference for using heavy-duty computing devices like laptops was justified by the nature of the tasks requiring them, such as navigating complex database interfaces, downloading and annotating full-text PDF documents, and using citation management software.

Table 6: Types of Electronic Information Resources Frequently Used (Multiple Responses)

Type of E-Resource	No. of Respondents	Percentage (%)
e-Journals (Online)	441	96.92%
e-Books	428	94.07%
Online Databases (IEEE, ACM, Scopus)	389	85.49%
Shodhganga / ETDs	361	79.34%
Preprint Servers (arXiv, SSRN)	298	65.49%
e-Newspapers / e-Magazines	187	41.10%
CD-ROM / Offline Databases	112	24.62%

The electronic resources used most frequently are e-Journals (96.92%), e-books (94.07%) and Online databases (85.49%) (IEEE Xplore, ACM Digital Library, Scopus) (Table 6). Research scholars particularly those doing literature review, uses the Shodhganga / ETD repository at 79.34% of the respondents. Preprint servers like arXiv and SSRN are also much higher than other general-university studies (65.49%), showing the computing and technology research focus of IIIT doctoral communities, which use preprints to gain easy access to the latest research developments before official publication.

Table 7: Purpose of Using Electronic Information Resources (Multiple Responses)

Purpose	No. of Respondents	Percentage (%)
Research work / Thesis writing	431	94.73%
Writing and publishing research papers	419	92.09%
Keeping current with latest developments	398	87.47%
Examination / coursework preparation	311	68.35%
Teaching preparation (Faculty)	287	63.08%
Project / Assignment work (Students)	264	58.02%
Competitive examination preparation	189	41.54%

Table 7 shows that the main purpose of using EIR is research work and thesis writing (94.73%), writing and publishing research papers (92.09%) and keeping up with the latest research in the field (87.47%). These three purposes are indicative of the research-production imperative under which IIIT scholars and faculty exist. Other EIR activities as significant motivations include coursework/examination preparation (68.35%) and teaching preparation (63.08%), and show that the EIR has a wide pedagogical role beyond research. Competitive examination preparation (41.54%) is among student specific motivations, especially among post-graduate students preparing for GATE and other national level examinations.

Table 8: Level of Satisfaction with Available Electronic Information Resources

Satisfaction Level	No. of Respondents	Percentage (%)
Fully Satisfied	98	21.54%
Satisfied	211	46.37%
Partially Satisfied	94	20.66%
Not Satisfied	52	11.43%
Total	455	100%

The distribution of levels of satisfaction is shown in Table 8. The overall level of satisfaction with the EIRs provided by their institutional libraries is generally high with 67.91% of respondents saying they are satisfied or fully satisfied with the collection they have access to. The 20.66% who say "fairly satisfied" and the 11.43% who are not satisfied are problematic. A comparison with the barrier data shows that this dissatisfaction is not due to lack of a wide range of institutional subscriptions, but primarily to infrastructure issues and awareness.

Table 9: Problems Faced while Accessing Electronic Information Resources (Multiple Responses)

Problem / Challenge	No. of Respondents	Percentage (%)
Slow internet speed / network instability	218	47.91%
Lack of awareness of available subscriptions	189	41.54%
Inadequate search skills / database navigation	164	36.04%
Restricted remote / off-campus access	141	30.99%
Unavailability of full-text content	128	28.13%
Absence of formal training / orientation	112	24.62%
Language barrier (non-English content)	74	16.26%
Other problems	38	8.35%

Table 9 records the types of access problems the respondents indicated (more than one answer was allowed). The primary impediment is slow Internet speed and network instability (47.91%) which is especially problematic in residential campus settings where multiple users are accessing the network at the same time. Limited awareness of available subscriptions comes in second (41.54%) showing that there is a systemic communication gap between library services and user community. Poor search skills, and problems with understanding how to use interfaces in databases (36.04%) indicate a general lack of information literacy, and limited remote or off-campus access (30.99%) supports the lack of seamless VPN or institutional SSO solution at some of the participating IIITs.

MAJOR FINDINGS OF THE STUDY

- A large percentage (83.73%) of the respondents are very aware or aware of the electronic information resources made available by their institution's libraries; none responded that they were unaware.
- A learning environment like South Indian IIITs is marked by a strong research culture with more than 70% of its academic user's logging into EIRs on a daily basis and several times a week.
- The main access device is laptop (85.49%) for general-university studies it was smartphones (68.57%).
- The most accessed platforms are IEEE-Xplore (94.95%) and ACM Digital Library (88.13%). This is unusual as in social-science and general-university settings, Shodhganga tends to be the most used platform, whereas in IIIT, IEEE-Xplore is the most used platform.
- Over 90% of the respondents agreed that research work, the writing of theses, and paper publication are the major uses of EIR.
- 67.91% of respondents are satisfied or fully satisfied with EIR collections available; 11.43% of respondents are unsatisfied.
- The two primary access barriers to EIR effectiveness are slow Internet speed (47.91%) and lack of awareness of subscription (41.54%).
- Another important and unaddressed issue is restricted remote access (30.99%) especially for scholars who work in the field and off campus or for scholars who collaborate with other institutions remotely (30.99%).

SUGGESTIONS

- The IIIT libraries are going to schedule and conduct information literacy and database orientation sessions in a tiered approach with advanced search techniques, navigation of discipline specific databases (IEEE Xplore, ACM Digital Library, Scopus), and citation management, for students, research scholars, and faculty.
- Investment in high-speed, redundant Wi-Fi infrastructure around campuses, hostels and research laboratories should be given proper importance in order to remove the instability of the network as a challenge for the access of EIR.
- Proactive communication through multichannel approach should be adopted by the library by using institutional email alerts, LMS announcements, library newsletters and social media posts to keep the users of the library well informed about newly subscribed or trial EIRs available in e-ShodhSindhu and institutional agreements.

- The seamless VPN or Single Sign-On (SSO) remote access mechanism should be put in place at all IIITs to allow access to subscribed databases remotely with authentication, especially for the doctoral scholars working away from campus.
- Include the setup of Library help desks or dedicated Library online support channels (chatbot, WhatsApp or ticketing system) to help users resolve access problems with EIR promptly.
- Promotion of awareness about preprint servers such as arXiv, SSRN, and open access repositories, such as DOAJ, should be encouraged, especially among research scholars who work in fast-changing fields of computing and engineering.
- Regular surveys to determine user satisfaction should be optimised to track changing information needs and to provide evidence-based service development.

CONCLUSION

The present investigation finds that the academic users of the South Indian IIITs have significantly high level of awareness and almost daily access frequency of EIR which make this population different from the users studied in similar general University environments. The dominance of IEEE Xplore and ACM Digital Library along with the intensive use of preprint platforms shows the nature of academic communities at IIITs that are technology focused and research-production oriented.

Meanwhile, the research reveals substantial issues where slow internet speeds, lack of subscription knowledge and the absence of remote access solutions limit the potential of EIR to be fully realised. Nearly one-third of the respondents who indicate that restrictions on off-campus access are a problem, as well as 11.43% who say that they are not satisfied with existing EIR provisions, are an area where coordinated action is required by library professionals, IT departments, and institutional administrators.

The libraries, as Dr. S. R. Ranganathan has rightly pointed out, are growing institutions and growth of the library can no longer be assessed only in terms of the width of its physical collections; but in terms of the depth, accessibility and active use of electronic collections. With the continuing growth of the academic research thrust and the quest for international academic visibility, user-friendly, proactively managed and well-equipped electronic library services will be essential to the maintenance of scholarly productivity and institutional excellence.

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