Use and Awareness of Electronic Information Sources at IIT Roorkee, India: A Case Study

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Introduction

Desktop access to online catalogues, bibliographic databases, and full-text journals is changing library use patterns. Gate count statistics show fewer patrons entering the library, resulting in lower in-house use. Libraries need documented data to discern use patterns of print and electronic journal collections in this transformed information access environment.

Is journal selection still an important function for libraries? Do traditional collection development principles still apply in the world of the ''big deal?'' Has ease of access through one click from citation to electronic full text or convenient availability of broadened collections changed library users' behaviour? Are the choices users make in an electronic environment different from those they make in the print environment? Is quality being sacrificed for convenience—or is convenience an aspect of quality?

Users often prefer increased access to databases of online-refereed journals and to the Web which provides information that is up to

the minute, international in scope and sometimes not available elsewhere because they see these resources as easier to access and search. Availability of e-resources has changed what users actually read and use. They now tend to use only what is easily accessible. Therefore, they visit the library a lot less, and, as such, discovery through serendipity is reduced. Access to e-resources has decreased the time spent searching for information. Access is only as good as the resources that can be afforded (e.g., the number of computers and existence of network systems), the ability to work with the tools, and the network infrastructure that supports rapid and convenient connections. The ability to use e-resources efficiently depends on basic computer skills, knowledge of what is available and how to use it, and ability to define a research problem. How scientists, researchers attain the above skills and knowledge depends on many factors, such as their disciplines, academic status and ranks, ages, access (hardware and location) to electronic resources, and training. Factors motivating use can be, for example, what level of importance they allocate to e-resources, how useful they have found them, and for which purposes they use e-resources.

As users of digital information, researchers place a very high value on electronic journals, but a much lower value as yet on libraries' provision of other kinds of digital resources. Increases in the scale of research, and the growth of collaborative and interdisciplinary research teams, present challenges to libraries in seeking to provide effective services and equitable access to the researchers. And growth in the volume and scale of research, along with the development of e-research and virtual research communities, is also leading to rapid growth in the volume of digital research outputs in many different forms; these are likely to create new challenges for librarians in data management, storage and preservation. There is an urgent need for librarians and the research community to work

together to clarify the roles and responsibilities of key players – at national as well as institutional level – in managing these outputs.

IIT Roorkee

As in any world class academic institution, library services in IIT Roorkee are the core of academic services, and therefore, Central Library of the Institute finds a unique place in Academic Service centres. The Central Library of the Institute is one of the best academic libraries in the country. With its collection of more than 3, 20,000 documents it provides the world class information support to its users. Besides printed books and journals, its collection contains all forms of documents such as CD-ROMs, online databases, audio-video material, standards, specifications, theses, reports etc.

The main emphasis of the central library is on providing digital information support, which is provided through its five servers and more than 70 user terminals. The library has access to more than 8000 electronic journals which are available through the campus wide fiber-optic network from all computers in the institute. The Library is currently digitizing its archival collection of theses and dissertation, for which an Imaging Centre has been established with latest equipment.

Review of literature

A large number of earlier studies of users of online journals have appeared in the last few years. Kelly and Orr ("Trends in Distant Student Use of Electronic Resources") made an endeavour to identify awareness and use of and perceived needs for physical libraries, delivery materials, instructional and promotional services, resources and technologies. To access the extent of students' use of electronic

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resources, a mailing questionnaire procedure was adopted and a stratified random sample was taken from part-time distant learning graduate and undergraduate students located within continental United States. The findings show that national trends demonstrate that non traditional, predominantly part-time student usage patterns have changed and now they favour the use of electronic resources, particularly internet. Physical library use is significantly higher among those who take the majority of their courses face-to-face. The library efforts are reaching online students: the students are aware of the library resources and use them for their research. Ibrahim ("Use and User Perception of Electronic Resources in the United Arab Emirates University (UAEU)") made an attempt to measure the use and perception of the United Arab Emirates University (UAEU) faculty members of electronic resources. He found out that the frequency of use of electronic resources was low due to lack of time because of the time needed to focus on teaching; lack of awareness to electronic resources provided by library; ineffective communication channels and language barrier. Stratified random sample questionnaires were sent to the faculty. The questionnaires were self-administered. E-mail and phone calls were also made. 25 per cent sample was drawn department-wise. Ali ("The use of electronic resources at IIT Delhi Library") examines the use of Electronic Information Services (EIS) among the users of the Indian Institute of Technology (IIT) Library in Delhi, India. Both questionnaire and observational methods were used for data collection, where 300 samples were collected. The analysis of data collected covers awareness of EIS services, use of e-journals, advanced search facilities, acquaintance with electronic information sources, the purpose of using e-information, problems faced by the users while using EIS, infrastructure facility available and satisfaction level of users. The study found that Boolean logic and truncation are the most often used search facilities by IIT users.

Lack of printing facilities, terminals and trained staff are the major reasons that would discourage users from accessing the electronic information service. The survey also reveals that some 60 per cent of users face difficulties while browsing e-information.

Doraswamy ("Familiarity and Use of the Available Electronic Information Resources by the Students in U.R Siddhartha Engineering College Library, Vijay Wada: A Survey") studied the use and familiarity of electronic information resources The study was conducted by using questionnaire method. The findings show that 61.25 per cent students are familiar with electronic information resources, 27.50 per cent of the students use the computer daily and 5.63 per cent have never used it. A small percentage of students, i.e., 2.5 per cent of students used CD-ROM, 33.13 per cent internet, 38.13 per cent e-mail, 36.87 per cent search engines, and 21.25 per cent use VRSECE website "daily" respectively. Online databases are used by 25 per cent and VRSECE catalogue "once a month". 18.75 per cent of students use online journals rarely. 42.50 per cent of the students use electronic information resources for communication purposes. The main problems faced while using electronic information resources were lack of training and time.

Asefeh and Nosrat ("Awareness and use of digital resources in the libraries of Isfahan University of Medical Sciences, Iran") carried a survey to investigate the relationships between awareness and use of digital resources among students in Isfahan University of Medical Sciences. A questionnaire based on a descriptive method was randomly used for survey. 250 users of the Medical libraries and information centres affiliated to Isfahan university of Medical Sciences were taken for survey. The results were founding the paper titled "Awareness and use of digital resources in the libraries of Isfahan University of Medical Sciences, Iran", showing that 70 percent of students were aware of digital resources, but 69 percent

have used them; 62 percent were aware of offline databases and 19 percent were only using them through Central library LAN network. About 70 percent were aware of online databases, accessible via Central library web site, and 53 percent have used them. In total, 87 percent of students felt that the available data met their information needs. Infrequent periodic orientation and lack of education on use of offline databases and fewer terminals connected to the server in the Central library, due to these factor students had less use offline databases. Users faced problems like low speed connectivity and shortage of hardware facilities.

Needs, Objectives & Scope of the Study

Today libraries are undergoing transformation: on a side they are facing three major challenges – shrinking budgets, shortage of space and increasing cost of publications; on the other there are the challenges posed by advances in the field of information and communication technology. The remarkable growth of electronic information in the last few decades has changed the scenario and has solved the problem of space. In this digital era digitized information is available on CDs, audio cassettes, video cassettes etc., as well as on the internet. This property, which Daniel Atkins calls digital coherence, allows all the objects in a digital library – sounds, images, texts, and everything else – to be treated in essentially the same way. The information technology has changed the complexion of the libraries in a big way. Electronic resources play a vital role in the field of science and engineering studies. Electronic access to technology journals has become important and valuable tool for researchers, students and faculty. The user community is becoming more and more familiar with these tools and now they have started using them very regularly. In India the Ministry of Human Resource

Development (MHRD), has set up the ''Indian National Digital Library in Science and Technology (INDEST) Consortium''. The INDEST Consortium has started its operation from December 2002 through its headquarters at the IIT, Delhi. Access to resources is now considered more important than collection building, especially if the access is perpetual in nature. The INDEST Consortium would, directly or indirectly, benefit most of the engineering and technical institutions in India. The access to e-resources for the beneficiary institutions under the INDEST Consortium has increased from the present level of access to e-journals from 100 to 500 to more than 4000 journals in case of IITs and IISc, which is comparable to world class institutions like MIT. But how much these resources are being used, and what is the impact of this electronic era on the non-electronic era, has to be examined. Technical institutions being the first to initiate the use of latest technologies, study of use and impact of electronic resources at these institutions is the need of the hour, and the results will facilitate and encourage other academic institutions to follow.

In the present study, the main objectives are to:

- examine the use of online journals and the databases by the under graduate, postgraduate students, research scholars and faculty members of IIT Roorkee;

- to identify users' opinion of different features of EIS;

- their awareness of the EIS and of INDEST consortium;

- the purpose of using EIS and their preferred formats.

The present study deals with use, awareness and impact of e-resources in IIT Roorkee in India. This can be extended over to the other IIT libraries. Detailed analysis can be taken to see the impact of technology on libraries and usage. Further studies could identify which

barriers occur at which stages in the information using process and how can these obstacles be overcome. There is a vast scope for further research to study different types of users' behaviour and comparison of users' behaviour and attitudes towards the e-resources. Finally investigator believes that studies are needed on ways to improve and encourage users to use maximum of electronic information resources. The results will help collection developers in designing suitable policy and assess the technical intricacies faced by the library staff in providing effective EIS services. It will also help in designing the efficient infrastructure requirements for managing journals in both the formats.

Methodology

The present study was conducted using questionnaire-based survey method along with observations and informal interviews. The questionnaire was pre-tested on ten users which included the 4 groups; the faculty, research scholars, post graduate students and the undergraduate students and some amendments were made. A total number of 300 questionnaires (randomly) were administered among the users of the IIT Roorkee under study. Out of which 283 question-naires were received back duly filled in. The sample respondents chosen for the study consists of 37 faculties, 63 research scholars, 71 post graduate students and 112 undergraduate students. The data collected were tabulated and analyzed. Statistical techniques of percentage of respondents have been mainly used to analyze the collective data.

Data Collection Sources: To study user awareness and perception of e-resources the following sources were used to collect the data:

1. institute library website/home page;

2. library resources and services given to users;

3. annual reports and brochures of the IIT Roorkee;

4. questionnaire filled in by the librarian and users.

Data Analysis and Interpretation

User profile section of the questionnaire provides information regarding the different academic status (as can be seen from figure 1). The population studied were 13.07% Faculty, 22.26% Research Scholars, 25.09% Post Graduate Students and 39.58% Under Graduate Students.
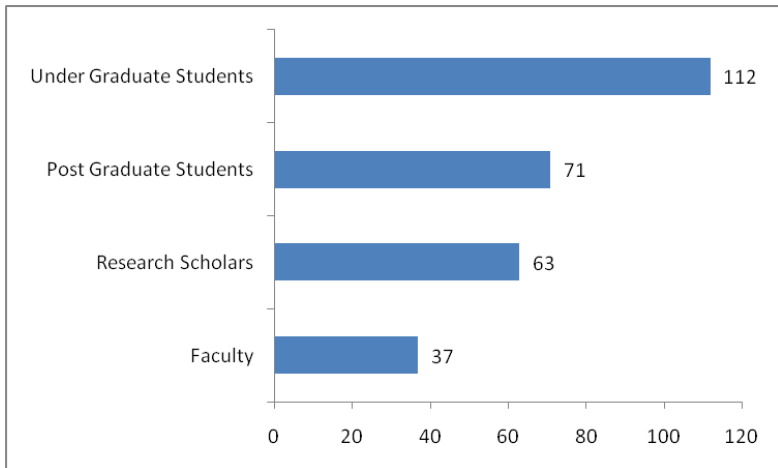

Figure 1: Population taken for Survey

According to their own assessment, a majority (77.03%) of the respondents stated that they are having "average skill" in the use of

computers. Only 22.97% of the respondents opined to have "above average skill" in the use of computers. On the whole, respondents' self-perceived ability to use the computer for electronic information sources is quite high (table 1).

Professional Status	Average	Above Average	Total
Faculty	21 (56.76%)	16 (43.24%)	37 (100%)
Research Scholars	47 (74.60%)	16 (25.40%)	63 (100%)
Post Graduate Students	63 (88.73%)	8 (11.27%)	71 (100%)
Under Graduate Students	87 (77.68%)	25 (22.32%)	112 (100%)
Total	218 (77.03%)	65 (22.97%)	283 (100%)

Table 1: Perceived level of computer literacy

The response from the table 2 shows that 100% of faculty members and research scholars were aware about the library's E-resources/services.In case of post graduates and under graduate students 97.18% and 36.61% were aware. Whereas 63.39% population of undergraduate students were not aware E-resources/services (table 2).

Respondents	Awareness (Response)		Total
	Yes	No	
Faculty	37 (100%)	–	37 (100%)
Research Scholars	63 (100%)	–	63 (100%)
Post Graduate Students	69 (97.18%)	2 (2.82%)	71 (100%)
Under Graduate Students	41 (36.61%)	71 (63.39%)	112 (100%)

Table 2: Awareness about library's E- resources/ services

The IIT, Roorkee library subscribes to many e-journals/portals for their users under INDEST consortium. It is important to know from the users if they are aware of INDEST consortium's name and of these e-resources. 100% of the faculty members and research scholars were aware of INDEST. In case of post graduate students

94.37% were aware. The results show that undergraduates 31.25% were comparatively less aware of INDEST consortium e-journals than other users. Majority of undergraduate students 68.75% were not aware (table 3).

Respondents	Awareness (Response)		Total
	Yes	No	
Faculty	37 (100%)	–	37 (100%)
Research Scholars	63 (100%)	–	63 (100%)
Post Graduate Students	67 (94.37%)	4 (5.63%)	71 (100%)
Under Graduate Students	35 (31.25%)	77 (68.75%)	112 (100%)

Table 3: Awareness about INDEST Consortium

The data shows that faculty and research scholars make more use of e-resources as compared to undergraduates and postgraduates. 100% of faculty and research scholars make use of INDEST consortium. 85.92% of post graduate and 20.54% of undergraduate's students make use of INDEST consortium respectively. The percentage of under graduate students for non use of INDEST consortium was high 79.46% (table 4).

Respondents	Awareness (Response)		Total
	Yes	No	
Faculty	37 (100%)	–	37 (100%)
Research Scholars	63 (100%)	–	63 (100%)
Post Graduate Students	61 (85.92%)	10 (14.08%)	71 (100%)
Under Graduate Students	23 (20.54%)	89 (79.46%)	112 (100%)

Table 4: Use of INDEST Consortium

The table 5 on the next page shows the percentage of users using various e-resources provided by their library. 100% of the faculty and research scholars make use of e-journals, e-articles, databases,

e-books, downloading services and online search respectively. In case of post graduate and under graduate students 91.55%, 91.96% and 94.37%, 81.25% make use of online search and downloading services respectively.

Type of e-information	Faculty	Research Scholars	Post Graduate Students	Under Graduate Students
E-Journals	37 (100%)	63 (100%)	31 (43.66%)	8 (7.14%)
E-Articles	37 (100%)	63 (100%)	35 (49.29%)	12 (10.71%)
E-Thesis	11 (29.73%)	63 (100%)	14 (19.72%)	5 (4.46%)
Databases	37 (100%)	63 (100%)	17 (23.94%)	11 (9.82%)
E-Books	37 (100%)	63 (100%)	47 (66.19%)	37 (33.04%)
E-Archives	19 (51.35%)	17 (26.98%)	7 (9.85%)	—
Downloading Services	37 (100%)	63 (100%)	67 (94.37%)	91 (81.25%)
Online Search	37 (100%)	63 (100%)	65 (91.55%)	103 (91.96%)
Subject Gateways	23 (62.16%)	29 (46.03%)	15 (21.13%)	—
Newsgroups	13 (35.14%)	11 (17.46%)	—	—

Table 5: Use of Electronic Information Resources

The respondents were asked to give reasons as to why they use electronic information sources but based on choices fixed by the faculty and researchers. Various professional purposes for which electronic information sources was used were elicited from the respondents. Table 6 indicates the purpose of using the electronic information sources. Majority of faculty 100% use the EIS for writing a research paper for publication, for research work and for subject specific information. In case of research scholars they marked 100% to ongoing research work, for thesis/projects, writing a research paper for publication, and for subject specific information. The results show that post graduates and undergraduates were comparatively less use online journals and databases marked 57.75% and 38.39% for studying course work respectively (table 6 on the facing page).

Many of the 47.70% respondents search online journals through linking facility available on the library website while 34.28% respondents links through search engines. 100% of faculty and research scholar search through library website (table 7 on the next page).

It was observed from the analysis that majority 54.42% of the

Purpose	Faculty	Research Scholars	Post Graduate Students	Under Graduate Students
For collecting study materials	—	29 (46.03%)	41 (57.75%)	43 (38.39%)
For update subject knowledge	37 (100%)	63 (100%)	35 (49.29%)	27 (24.11%)
Thesis/Projects	14 (37.84%)	63 (100%)	13 (18.31%)	—
For proposed research work	37 (100%)	63 (100%)	6 (8.45%)	—
For writing research/revirew articles	37 (100%)	63 (100%)	—	—

Table 6: Purpose of Using online journals and databases

Linking pattern	Faculty	Research Scholars	Post Graduate Students	Under Graduate Students	Total
Links through IIT library's website	37(100%)	63 (100%)	26 (36.62%)	9 (8.03%)	135 (47.70%)
Links through publishers website	14 (37.84%)	24 (38.09%)	—	—	38 (13.43%)
Links through search engines	19 (51.35%)	63 (100%)	9 (12.68%)	6 (5.36%)	97 (34.28%)
Links through online journals website	37 (100%)	27 (42.86%)	—	—	64 (22.61%)

Table 7: Linking pattern of Online Journals

respondents download the content in removable storage devices mostly in pen drive whereas 17.67% of respondents save on the computer hard disk (table 8).

Using Patterns	Faculty	Research Scholars	Post Graduate Students	Under Graduate Students	Total
Save on computer	18 (48.65%)	16 (25.39%)	13 (18.31%)	3 (2.68%)	50 (17.67%)
Save in removable storage devices	25 (67.57%)	45 (71.43%)	27 (38.03%)	57 (50.89%)	154 (54.42%)
Printout	10 (27.02%)	8 (12.69%)	—	—	18 (6.36%)

Table 8: Using patterns of online journals

On analyzing the data it was observed that, the online journals preferred by faculty members were Science Direct (83.78%), IEEE/IEE IEL online (78.38%), Springer (70.27%), and INSIGHT (62.16%) respectively. Research Scholars used Science Direct (68.25%), IEEE/IEE IEL online (49.21%), Springer (46.03%), and INSIGHT

(36.51%). Post graduate and under graduate students preferred Science Direct (38.03%, 9.82%) and IEEE/IEE IEL online (29.58%, 8.04%) (table 9).

Online Journals/Databases	Faculty	Research Scholars	Post Graduate Students	Under Graduate Students
ABI/INFORM	7 (18.92%)	9 (14.28%)	6 (8.45%)	2 (1.79%)
ASCE Journals	9 (24.32%)	11 (17.46%)	3 (4.22%)	1 (0.89%)
ASME(TAMR) Journals	4 (10.81%)	12 (19.05%)	6 (8.45%)	1 (0.89%)
Science Direct	31 (83.78%)	43 (68.25%)	27 (38.03%)	11 (9.82%)
IEEE/IEE IEL Online	29 (78.38%)	31 (49.21%)	21 (29.58%)	9 (8.04%)
J-Gate	13 (35.13%)	8 (12.69%)	5 (7.04%)	1 (0.89%)
Springer	26 (70.27%)	29 (46.03%)	3 (4.22%)	3 (2.68%)
INSIGHT	23 (62.16%)	23 (36.51%)	2 (2.82%)	1 (0.89%)
EBSCO online	18 (48.64%)	7 (11.11%)	3 (4.22%)	—
ESDU	14 (37.84%)	4 (6.35%)	2 (2.82%)	—
GMID	5 (13.51%)	6 (9.52%)	3 (4.22%)	—

Table 9: Mostly Used and Useful Online Journals and Databases

Online Journals are available in two major formats PDF and HTML. 37.46% of respondents preferred PDF format for using online journals, whereas 6.36% of respondents preferred HTML format (table 10).

Format	Faculty	Research Scholars	Post Graduate Students	Under Graduate Students	Total
PDF	31 (83.78%)	43 (68.25%)	21 (29.58%)	11 (9.82%)	106 (37.46%)
HTML	5 (13.51%)	7 (11.11%)	3 (4.22%)	3 (2.68%)	18 (6.36%)

Table 10: Using patterns of online journals

Another question sought to ascertain the impact of all e-resources on the members in terms of the extent to which they were replacing printed media in satisfying their information needs. 78.38% faculties, 36.51% research scholars, 38.03% post graduate students and 8.04% under graduate students marked to very high extent electronic resources have become a substitute for printed materials (table 11 on the next page).

Electronic Information Resources provide latest, comprehensive and up to date information which are essential for research. The re-

Users perception	Faculty	Research Scholars	Post Graduate Students	Under Graduate Students
To a very high extent: e-resources have become a substitute for printed materials	29 (78.38%)	23 (36.51%)	27 (38.03%)	9 (8.04%)
To a high extent: e-resources have become a substitute for printed materials	2 (5.41%)	3 (4.76%)	3 (4.22%)	—
To a medium extent: e-resources have become a substitute for printed materials	1 (2.70%)	2 (3.17%)	—	—
To a small extent: e-resources have become a substitute for printed materials but although printed materials are still the basic element in satisfying information needs	13 (35.13%)	9 (14.28%)	—	—

Table 11: User's perception of e-resources as a replacement for print in meeting their information needs

spondents were asked to indicate to what extent they feel the impact of E-Resources on quality of research/Learning. 100 of population (Faculties, Research Scholars and Post Graduates Students) stated that by using e-resources the quality of research/Learning improved highly (table 12).

Impact on Research/Learning	Faculty	Research Scholars	Post Graduate Students	Under Graduate Students
Highly Improved	37 (100%)	63 (100%)	71 (100%)	3 (2.68%)
Improved	—	—	—	1 (0.89%)
Moderately Improved	—	—	—	—
Little Improved	—	—	—	—
Not Improved	—	—	—	—

Table 12: Impact of E-Resources on Quality of Research/Learning

Majorities 85.16% of respondents are highly satisfied with the infrastructure provided by the library for accessing online journals and their databases at different levels (table 13 on the next page).

Satisfactory Level	Faculty	Research Scholars	Post Graduate Students	Under Graduate Students	Total
Highly Satisfied	34 (91.89%)	60 (95.24%)	68 (95.77%)	79 (70.54%)	241 (85.16%)
Satisfied	3 (8.11%)	2 (3.17%)	2 (2.82%)	16 (14.29%)	23 (8.13%)
Average	—	1 (1.59%)	1 (1.41%)	5 (4.46%)	7 (2.47%)
Not Satisfied	—	—	—	—	—

Table 13: Satisfactory Level

Conclusion

The results of the study offer significant information on the level of awareness and use of electronic journals, the characteristics of the users and their evaluation of the journal collection. Interestingly, users have knowledge about the availability of electronic journals, but many use them as the supplementary way to use information. Many users need to be aware of the complete potential of the electronic journals. However, the preference for the electronic format is related to the discipline and age of the respondents and is higher among academic status. The present survey reflects a growing interest in online journals among the user at IIT Roorkee. This study reveals that mostly users are aware about the availability of online journals through the library, and they can make maximum use of it for various purposes.

Effective use of electronic information sources for retrieving needed information will have a profound impact on the learning and quality of research output by the students. Convenience and full-text availability appear to play roles in selecting online resources. The findings of this study suggest that databases without links to full text and online journal collections without links from bibliographic databases will have lower use. These findings have implications for collection development, promotion of library resources, and end-user training.

In terms of information seeking, today's user seems to be comfortable with using a wide variety of sources for information. Internet search engines, e-print servers, author Web sites, full-text databases, electronic journals, and print resources are all used to some degree by most users. The relative amounts of use and enthusiasm for use vary as described above, but today's users are mostly flexible and adaptable.

Both browsing and searching remain important information-seeking behaviours, but there is some evidence that the amount of searching is going up when users have access to multi-title, full-text databases. Browsing through journal issues is done in print issues or in electronic journals for core journal titles. Articles from non-core journals are most often located through searching.

Convenience remains the single most important factor for information use–all types of users prefer electronic journals only if they make their work easier and give them the information they need. Desktop access, speed of access, and the ability to download, print, and send articles are top advantages of electronic journals for all groups.

Suggestions/Recommendations for implementation

Based on the findings, the focus of the study has been laid on efficient use of electronic resources among the faculty members and all the students in the IIT Roorkee of India. Following suggestions/recommendation is derived out the study.

- Library should subscribe to e-resources keeping in mind the priorities and preferences of users.

- Announcements should be done by the library about the availability of new e-resources or additions of new databases for user of the library.

- Library should provide the facilities for the user to get familiar with e-resources subscribed by the library; this can be done by the presentations organized by the concerned publishers or vendors.

- Special training programs should be organized for students and faculty member for the maximum use of e-resources so that users can adequately trace relevant information.

- The library should also organize orientation programs for the new students and faculty members every year.

- More computers with the latest specifications and multimedia kit should be installed, so that the users can use internet telephony, video conferencing chatting and other useful services of the internet.

- Problems related to slow connectivity should be over come by upgrading the band width.

- The important roles of academic libraries is to promote and provide instructions in the use of electronic resources, as numerous blogs and RSS feeds are available from a variety of scientific databases, electronic journals and electronic books, which there are still not well exploited by many academic libraries.

Limitations of the Study

- Limitations of the present study mainly originate from the data collected by survey.

- For studying use and impact of e-resources, users and librarians point of view, impact on budget, and resources have been studied.

- In survey method only selected sample can be studied, 100% of users can not be studied.

- Usage among different age groups was not studied; as the more population of users was young students at these institutes similarly gender study was also not taken as proportion was more of males.

Recommendations for Further Research

The present study deals with user awareness and perception of e-resources in IIT Roorkee of India this can be extended over to the other university and organization. Detailed analysis can be taken to see the impact of technology on libraries and usage. Further studies could identify which barriers occur at which stages in the information-using process and how can these obstacles be overcome. There is a vast scope for further research to study different types of users' behaviour and comparison of users' behaviour and attitudes towards the e-resources. Finally, investigator believes that studies are needed on ways to improve and encourage students to use maximum of electronic information resources. Effective use of electronic information sources for retrieving needed information will have a profound impact on the learning and quality of research output by

the students. Convenience and full-text availability appear to play roles in selecting online resources. The findings of this study suggest that databases without links to full text and online journal collections without links from bibliographic databases will have lower use. These findings have implications for collection development, promotion of library resources, and end-user training.

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The paper